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Guide to Producing Statistics on Time Use [1]

Prepared by UNSD

[1] Final draft submitted for formal editing.

Preface

Member States at the 48th session of the United Nations Statistical Commission endorsed the *International Classification of Activities for Time-Use Statistics (ICATUS 2016)* and supported the development of methodological guidelines on how to operationalize the classification to produce internationally comparable time-use data, using the latest technologies, in support of Sustainable Development Goals (SDG) monitoring.[2]

Since 2018, the United Nations Statistics Division and the *Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics* (hereafter, EG-TUS) have been working towards promoting time-use data collection across countries and over time, in particular through the development of light solutions and the use of modern technologies to ensure that national statistical offices have access to a sustainable model to institutionalize the systematic collection of those data.

The present *Guide* is an updated revision of the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*[3] that builds on the work of the EG-TUS and aims to provide national statistical offices and policymakers with recommendations and best practices for collecting, processing, analysing and disseminating time-use statistics to inform research and the development of a broad range of policies, including on unpaid work and non -market production, well-being, and gender equality. The *Guide* introduces key concepts and definitions related to time-use data and provides national statistical offices with advice on the different phases and

[2] See Official Records of the Economic and Social Council, 2017, Supplement No.4 (E/2017/24 E/CN.3/2017/35), decisions 48/109 (b) and (c) and Official Records of the Economic and Social Council, 2020, Supplement No.4 (E/2020/24-E/CN.3/2020/37), decision 51/115 (e).

[3] See United Nations Department of Economic and Social Affairs, Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work, New Yor, 2005 (ST/ESA/STAT/SER.F/93) available online: https://unstats.un.org/unsd/publication/SeriesF/SeriesF_93E.pdf

processes when implementing a time-use survey or appending a module on time-use to a nationally representative household survey.

The United Nations Statistics Division invites comments on the useful ways to improve this *Guide*. Comments and additional material may be sent to the Director, United Nations Statistics Division, Attention: Social and Gender Statistics Section

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Table of Contents

Preface ii

Acknowledgments 4

Acronyms ix

Introduction 1

Part One. Relevance of time-use statistics 5

I. Users' information needs for time-use statistics 5
A. What are time-use statistics? 5
B. Why produce time-use statistics? 6
C. Importance of time-use data in the context of the Sustainable Development Goals framework 10

Part Two. Key design specifications for time-use surveys 13

II. Scope and coverage of time-use data 13
A. Activity and time 15
B. Simultaneous activities 26
C. Contextual information 36
D. Background (covariate) information 50
E. Survey population 55
F. Time-use surveys of children 57
G. Use of harmonized classifications of time-use surveys 69

III. Survey instruments for collecting time-use data 74
A. Harmonization efforts in time-use surveys 74
Box III.1. Time-use surveys in times of crisis 83
B. Instrument alternatives: diary or stylized questions 86
C. Survey instruments based on a 24-hour diary 89
D. Stylized questions 107
E. Choosing between a diary and stylized questions 111
Box III.2. Pre-testing tools and guidelines for national adaptation 113
F. Background questionnaires 116
Box III.3 Supplemental questions to measure volunteering 120
G. Privacy in instrument design 121

IV. Survey frameworks for collecting time-use data 125
A. Type of household survey 125
B. Data collection approaches 135
Box IV.1. Changing modes in Mexico 144
Box IV.2. Providing instructions in Canada's self-administered time-use surveys 148
Box IV.3. Assignment of mode in mixed mode data collection 151
Box IV.4. Changing modes in Finland 155
C. Digitizing data collection 156
Box IV.5. Validation criteria for Mexico's National Survey on Time Use (ENUT) 2019 157
Box IV.6. Privacy and data protection in digital modes 166
D. Survey frames: illustrative examples 168

V. Sample designs for time-use surveys 172

A. Standard considerations in sample design for time-use surveys 172
B. Analytical considerations in sampling for time-use surveys 176
C. Technical and operational considerations specific to sampling for time-use surveys 179
Box V.1. Sampling in Finland, 2020-2021 182
D. Sampling for time-use data collection in multi-purpose surveys 185

Part Three. Collecting and processing time-use data 192

VI. Enumeration procedures for time-use surveys 192
A. Main considerations in planning field procedures 192
B. Field procedures for interviews 195
C. Design and administration of digital and mixed mode data collection 202
D. Coding 204

VII. Processing of time-use survey data 242
A. After-coding 244
B. Editing 244
C. Imputation 250
D. Data preparation and management 252

VIII. Weighting and estimation for time-use surveys 259
A. Issues in weighting and estimating of time-use statistics 259
B. Imputation versus non-response adjustments 261
C. Weighting 262
D. Generating estimates of time use 267

IX. Preparation of survey outputs 272
A. Key survey outputs 272
B. Computation of sampling variances 291
C. Statistical estimation software 292

Part Four. Review and dissemination of time-use data 294

X. Dissemination of time-use data 294
A. Dissemination products 295
Box X.1. Audience analysis and targeted dissemination 295
Box X.2. Example of targeted dissemination products - Morocco 299
B. Data 315

XI. Ensuring quality of time-use data and surveys 329
A. Unique quality considerations for time-use surveys – a checklist 329
B. Assurance of data quality of time-use survey results 341
Box XI.1. Determining and reporting response rates 345

Bibliography 357

Annexes 365

Annex 1: Minimum Harmonized Instrument - Model Diary 365

Annex 2: Minimum Harmonized Stylized Questionnaire Instrument 377

Annex 3: Questions capturing economic and labor characteristics of respondent 406

Annex 4: Correspondence table for activities of Minimum Harmonized Instruments regional Time-use Survey Classification 421
Harmonized European Time-use Survey Classification 421

Table of Tables

Table II.1. Minimum Harmonized Instrument Activity Categories ..... **Error! Bookmark not defined.**
Table II.2. Examples of response categories for “location” .....**Error! Bookmark not defined.**
Table II.4. Examples of response categories for “for whom”.....**Error! Bookmark not defined.**
Table II.5. Interpretation of sample ICT-reported activity .....**Error! Bookmark not defined.**
Table II.6. Priority background characteristics for time-use data collection**Error! Bookmark not defined.**
Table III.1. Minimum Harmonized Instrument Activity Categories, Contextual Dimensions and ICATUS 2016 Definitions 76
Table III.2. Comparison of features of stylized questionnaires and 24-hour diaries 87
Table III.3. Comparison of features of full and light diaries 90
Table III.4. Example of abridged drop-down list for secondary activities 97
Table III.5. Example of probing questions to identify care as a simultaneous activity 98
Table IV.1. Country experiences using modular approaches to collect time-use data 134
Table IV.2. Costs and representativeness of different data collection modes 136
Table IV.3. Comparison of interviewer-administered and self-completed surveys 138
Table IV.4. Illustrations of national time-use survey latest frameworks 168
Table VI.1. Illustration of time terminology and corresponding “clock time” 197
Table IX.1. Six key time-use measures 276
Table X.1. Sample data protection goals and measures 320
Table XI.1. Key quality considerations for time-use surveys, by business process 331
Table XI.2. Threshold for complete diary or stylized questionnaire 349

Table of Figures

Figure III.3. Paper full diary with fixed intervals: HETUS 2018 105
Figure III.4. Digital full diary with open intervals: Belgium (MOTUS) 2020 106
Figure IV.1 Icons from Argentina CAPI forms 142
Figure IV.2. Example of validation checks from Costa Rica: a) Soft check (yellow alert) for activity time out of probable range b) Hard check (red alert) for impossible duration (0 minutes) 143
Figure IV.3. Example of validation checks from Belgium: a) Soft check for deleting activity b) Prompt for missing activity 147
Table V.1. The population of inference for a time-use survey 172
Table VII.1. Extract from list of episode file variables from GSS 2015 on Time Use 254
Table VII.2. Extract from the episode file from the 2015 ESG PUMF on Time Use 255
Table VII.3. Extract from the main file from the 2015 GSS PUMF on Time Use 256
Figure X.1. Bar graphs from American Time Use Survey 303
Figure X.2. Total time spent on unpaid domestic and care work 304
Figure X.10. Tempograms of time shared with respondent's partner, by country 311
Figure X.11. Infographics of time use in Morroco 312

Figure X.12. Benefits of open public data 317
Figure XI.1 Generic Statistical Business Process Model (GSBPM) 329

Acronyms

ATUS	American Time Use Survey
PSU	Primary Sampling Unit
CAPI	Computer Assisted Personal Interview
CATI	Computer Assisted Telephone Interview
CAUTAL	Classification of Time-Use Activities for Latin America and the Caribbean
CAWI	Computer-assisted web interviewing
DPIA	Data Protection Impact Assessment
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
GDPR	General Data Protection Regulation, European Union
GPS	Global positioning system
GSBPM	Generic Statistical Business Process Model
HETUS	Harmonized European Time-use Surveys
ICATUS 2016	International Classification of Activity for Time-use Statistics
ICLS	International Conference of Labour Statisticians
ICTs	Information and communications technologies
ILO	International Labour Organization
IVR	Interactive Voice Response

LFS	Labour Force Survey
MHI	Minimum harmonized instrument
MICS	Multiple Indicator Cluster Surveys
NSO	National statistical office
OMR	Optical Mark Recognition
PAPI	Paper Assisted Personal Interview
PC	Personal Computer
RSE	Relative Standard Error
SDG	Sustainable Development Goals
SMS	Short Message Service
SNA	System of National Accounts
UNICEF	United Nations Children's Fund
UN-Women	United Nations Entity for Gender Equality and the Empowerment of Women
VNR	Voluntary National Review

Introduction

Time-use data play an important role in measuring unpaid household service work, well-being and gender equality. Different international agreements point to the importance of collecting time-use statistics for evidence-informed policies and guiding research. In the Beijing Declaration and Platform for Action adopted at the Fourth World Conference on Women in 1995, Governments requested that regular time-use studies be conducted to measure unpaid work. At the nineteenth International Conference of Labour Statisticians (ICLS) in 2013, a new resolution was adopted concerning statistics of work, employment and labour underutilization, which updated the definition of work in alignment with the general production boundary of the System of National Accounts (SNA). Time-use surveys are the principal source of data on forms of work outside the general production boundary and produce statistics that are critical for more comprehensive measurement of all forms of work.[4] In target 5.4 of the Sustainable Development Goals, States were called upon to "recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate". Time-use data are, therefore, necessary and serve as a direct input for monitoring progress towards the achievement of indicator 5.4.1, "proportion of time spent on unpaid domestic and care work, by sex, age and location". In 2017, at its forty-eighth session, the Statistical Commission endorsed the 2016 International Classification of Activities for Time-Use Statistics (ICATUS 2016), which is aimed for use as an international statistical classification.

[4] See International Labour Organization, document ICLS/21/2023/RES. II. Available at www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_230304.pdf.

Time-use data are also critical to guiding policies and research related to changing work practices, commuting and transportation, as well as education, health, culture, environment and sports. In addition, time-use data can provide insights related to the life conditions of certain population groups, such as older persons, children and persons with disabilities. When carried out regularly, time-use surveys also provide evidence of changing patterns in people's use of time, including as a result of using new technologies. Therefore, time-use data analysis is fundamental for the design, implementation, monitoring and evaluation of a broad range of public policies, including those called for to achieve the Sustainable Development Goals set out in the 2030 Agenda for Sustainable Development. Time-use data are also important components for the measurement of quality of life, an area of high policy attention, particularly in the context of accounting for people's well-being to complement the measurement of economic performance, beyond gross domestic product (E/CN.3/2022/12). In addition, as part of the 2025 revision of the System of National Accounts, additional "extended accounts" will be included for improved monitoring and analysis of well-being, including measures of unpaid household work.

National statistical offices (NSOs) are confronted with great demands to produce high-quality time-use data that are granular enough to inform policy formulation and respond to other users' needs, and that are suitable for trend analysis and cross-country comparisons. However, many countries are facing challenges in conducting time-use surveys as they are complex and costly. Traditional time-use surveys, in particular those requesting respondents to complete leave-behind paper diaries, are facing low response rates. Furthermore, coding and processing time-use data are complex and resource-intensive procedures (E/CN.3/2022/12). As a direct consequence of these challenges, there is a lack of time-use data in many countries.

The primary objective of this document is to ensure the production of high-quality time-use statistics and indicators by providing guidance to statisticians of NSOs on the different phases and processes of a time-use survey (data needs, design, build, collect, process, analyse, disseminate and evaluate). The present *Guide* is also designed to help a broader range of time-use data users to develop an understanding of the opportunities and limitations of the different methodological decisions.

While the Guide is an updated version of the 2005 *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work,* much of the latter is still valid. The revised *Guide* is not intended to replace the previous version but rather to supplement the content by incorporating developments since it was produced, such as the development of innovative technologies and processes, as well as new global and regional initiatives and lower-resource options for collecting quality data.

The present *Guide* synthesizes and extends the work of the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics to develop standards for the production of time-use statistics to support national, regional and global mandates. Given that every country and context is unique and that there is no one single solution that would respond to the data needs of all, the *Guide* is not prescriptive. It, therefore, proposes a "basket of options" covering different instruments and modes for collecting time-use data and highlights the advantages and shortcomings of the options, as well as ways to mitigate any shortcomings. The options presented are based on good practices that have worked in different contexts, using national examples to illustrate how they were successfully applied in practice. The *Guide* also serves to help countries to learn from the difficulties experienced by other countries, by presenting common challenges

faced by NSOs. It is hoped that the lessons learned from other countries can provide insight that countries can adapt to their contexts.

The distinctive features of the *Guide* include:

- A technical document containing 11 stand-alone chapters that serve to describe the steps involved in planning, collecting, processing and using time-use statistics. While each chapter can be read on its own, the material is not repeated across chapters. There are cross-references to relevant content in other chapters where appropriate.
- Each chapter in the *Guide* ends with a quality checklist. Users can refer to the checklist to help to ensure that they are addressing critical issues that affect the quality of time-use statistics. In the final chapter, there is also a comprehensive checklist for the entire process that is in line with the Generic Statistical Business Process Model (GSBPM) and the United Nations National Quality Assurance Frameworks Manual for Official Statistics.
- The Guide is supplemented by a comprehensive online hub that is designed to serve as a one-stop shop for materials that are available on time-use statistics. In the above-mentioned technical document, reference is made to some resources in the hub. Users can search the hub for items that are relevant to specific chapters or to cross-cutting themes. The hub is updated regularly with newly available materials to reflect the latest developments in time-use statistics.

Part One. Relevance of time-use statistics

I. Users' information needs for time-use statistics

A. What are time-use statistics?

Time-use statistics are quantitative summaries of how individuals "spend" or allocate their time over a specified period, typically over the 24 hours of a day or over the seven days of a week. Time-use statistics shed light on the daily life of a population in terms of what people do (activities), how much time they spend doing that (duration) and the context of those activities (who they are with, where they are, who benefits from what they are doing). Some examples of time-use statistics are:

- Proportion of individuals aged 15 years and over who participate in unpaid care work.
- Average number of hours spent commuting on weekdays.
- Total number of hours in a week spent working in a paid job.

Time-use surveys are specialized household surveys that make it possible to measure all the activities that people undertake and the time allocated for each of these activities over a given period. The aim of this type of survey is to shed light on the specific ways that societies organize their time, with a view to ascertaining how social groups determine people's time use (Delfino, 2009). The Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work and the Methodological Guide on Time-Use Measurements in Latin America and the Caribbean (ECLAC, 2022) both provide a brief history of time use.

B. Why produce time-use statistics?

Time-use data can reveal the details of an individual's "daily life with a combination of specificity and comprehensiveness" not achieved in any other type of survey data (Gershuny, 1992). Time-use surveys are the only way to adequately measure unpaid domestic and care work. Information gathered through these surveys also enables the analysis of the time spent on all forms of work, including the various activities related to unpaid domestic and care work, paid work and community and volunteer work, as well as personal activities. When properly collected and analysed, time-use data can allow for relating time-allocation patterns to the demographic and socioeconomic status of the individual.

Time-use data are crucial for measuring gender equality, in particular gender disparities in the distribution of unpaid domestic and care work,[5] which are also at the base of persistent inequalities in the labour market and the overrepresentation of women among people living in poverty.[6] Measuring time spent on unpaid domestic and care work also reveals the "invisible" value of women's contribution to the economy and society and highlights the intergenerational reproduction of gender roles and stereotypes (ECLAC, 2022). In contexts of scarce resources or limited political support for promoting gender equality, emphasizing other policy areas that time-use data can contribute to will be key to improving resource allocation for time-use surveys.

It is increasingly acknowledged that time-use data are key components for assessing quality of life, which is an area of high policy attention, particularly in the context of accounting for people's well-being to complement economic performance measures beyond gross domestic product

[5] The Beijing Declaration and Platform for Action emphasizes the need to improve the collection of time-use data to measure unpaid work in quantitative terms, in order to shed light on women's contribution to the economy and on the sexual division of labour.

[6] See United Nations, Department of Economic and Social Affairs, Statistics, "The World's Women 2020 Trends and Statistics". Available at https://worlds-women-2020-data-undesa.hub.arcgis.com/.

(GDP). In addition, it is expected that, in the 2025 update of the System of National Accounts, additional "extended accounts"[7] will be included for improved monitoring and analysis of well-being, including measures of unpaid household service work.

Time-use data, suitably augmented by sociodemographic characteristics, have innumerable applications for identifying behavioural patterns and informing policies to address social problems. Knowing and understanding how people spend their time is fundamental for comprehending both the personal and the social experience of the organization of life and time. Time-use data are crucial for analysing the inequalities inherent in the use and distribution of time, including time poverty and other measures, and how time use contributes to society and the economy.

Time-use data are also critical to guiding policies and research related to changing work practices, commuting and transportation, as well as education, health, culture, environment and sports. Time-use data can provide insights related to the life conditions of specific population groups, such as older persons, children and people with disabilities, thus helping us to understand the challenges they face in their lives. Over time, time-use surveys also provide valuable insights into the changing patterns of how people use their time and the impact of technologies, such as the Internet, on how people allocate their time.

A more comprehensive discussion of why time-use statistics are important for designing, implementing and monitoring public policies, including country-specific examples, can be found in the regional time-use guides for Europe (UNECE, 2013), Asia (ESCAP, 2021) and Latin America and the Caribbean (ECLAC, 2022). The regional publications demonstrate that time-use

[7] Extended accounts were previously referred to as "satellite accounts". The terms "extended accounts" and "satellite accounts" are used interchangeably in the text.

research is relevant to countries with diverse populations and living conditions, and across the development spectrum.

National users-producers dialogue at the outset of any statistical process may serve as an opportunity to clarify what information is needed to formulate evidence-informed policies. Time-use surveys, in the same way as all surveys, generate financial costs for NSOs and are a burden on respondents, but given the many applications of time-use data, they are a good investment. Time-use surveys should, therefore, be an integral part of the national statistical system, rather than ad hoc or experimental activities, and they should be conducted regularly by means of guaranteed funding. How time-use surveys fit into a national statistical system will depend on the expected uses of time-use statistics, the data that are available from other sources and how time-use data can be integrated with those data to meet user needs (UNECE, 2013).

In partnership with data users, NSOs should prioritize the applications to determine the key objectives of time-use surveys. Users-producers dialogue is an opportunity for NSO to explain what can be done with a time-use survey. For example, time-use statistics can be used to calculate SNA extended accounts, but only if the time sample is representative of the entire year. Time-use statistics can provide information about time poverty, even though there is still no standard definition of what time poverty is. It may be necessary to choose between maintaining the same activity classification to create a time series and updating the classification to reflect societal changes. The objectives of the survey will help to determine which type of survey (stand-alone or modular), instruments, sampling, analysis and dissemination approaches are the most appropriate.

Box I.1

Quality considerations at the outset of a time-use survey

The first task involved in determining the statistical data requirements is to understand the data needs. This understanding will help to determine the best approach to take to achieve the highest quality outcomes and, indeed, whether a time-use survey is the best option for addressing the identified data need.

Defining the data requirements will also help survey managers with the design, enumeration, processing and dissemination components of the survey. There are several options for how time-use data is collected and having a good understanding of the data requirements means that a "fit for purpose" survey can be designed. Some key quality considerations at the outset of a time-use survey include:

- Identifying key data users.
- Consulting extensively with data users and stakeholders to ensure a thorough understanding of the data needs and relative priorities.
- Identifying the data needs to the highest possible level of specificity (e.g. level of disaggregation).
- Documenting the proposed use of the required data.
- Identifying any conflicts between requirements.
- Identifying alternative available data sources.
- Considering whether the data needs can be accurately delivered by means of the proposed survey vehicle.

- Assessing whether NSO has the resources (time, money, expertise) to undertake a time-use survey.
- Determine whether a time-use survey is the best option for addressing the data needs in the light of the existing resources.

C. Importance of time-use data in the context of the Sustainable Development Goals framework

The analysis of time-use data is fundamental for the design, implementation, monitoring and evaluation of public policies that will enable societies to progress towards sustainable development and the achievement of the Sustainable Development Goals set forth in the 2030 Agenda for Sustainable Development.

Gender equality and the rights and empowerment of women and girls play a central role in the 2030 Agenda. They are referred to in the 2030 Agenda, the Sustainable Development Goals and associated targets; in the means of implementation and global partnership for sustainable development and in the follow-up and review; and in the proposed indicators for measuring progress. Time-use data are essential for measuring progress towards Goal 5 on achieving gender equality and empowering all women and girls, including target 5.4, in which States are called upon to "recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate".

At the global level, Sustainable Development Goal indicator 5.4.1 on the proportion of time spent on unpaid domestic and care work, by sex, age and location was proposed to monitor the

achievement of gender equality and the empowerment of women and girls by ensuring a better share of unpaid work. This is a major step towards the inclusion of time-use data for informing public policies relating to unpaid care and domestic work. The initiative by Mexico to create a national care system is a specific example of how time-use statistics feed into policies to advance progress towards Goal 5.[8]

Time-use data are also important for monitoring other Sustainable Development Goals and targets. Time-use information collected and analysed around the world has shown that:

- There is a very close link between economic poverty (Goal 1) and unpaid work.[9]
- The provision of early childhood education services (Goal 4) not only prepares children for primary education, but also frees up time for their caregivers.[10]
- The gender division of labour is a structural challenge of gender inequalities (Goals 5, 8 and 10).[11]
- The lack of services, such as drinkable water, electricity or transport infrastructure, increases unpaid work time and disproportionately affects women (Goals 6, 7, 9 and 11).[12]

Looking towards the future, time-use statistics can provide information on:

[8] In the explanatory statement of the constitutional reform and the consultation called for by the General Congress of Mexico, the legislative and executive powers, as well as different governmental and non-governmental organizations and institutions, used time-use information, including indicators on time dedicated to domestic work and unpaid and paid care, as well as the total workload, and indicators on the use of time that accounts for the multiple and intersecting discrimination experienced by certain groups of women (ECLAC, 2022).

[9] See United Nations, Department of Economic and Social Affairs, Statistics, "The World's Women 2020 Trends and Statistics". Available at https://worlds-women-2020-data-undesa.hub.arcgis.com/.

[10] See *Social Panorama of Latin America, 2016* (United Nations publication, 2017).

[11] See UN-Women and Department of Economic and Social Affairs, Statistics, "Progress on the Sustainable Development Goals: the gender snapshot 2023" and Harnessing Time-Use Data for Evidence-based Policy, the 2030 Agenda for Sustainable Development and the Beijing Platform for Action: A resource for data analysis

[12] See UN-Women and Department of Economic and Social Affairs, Statistics, "Progress on the Sustainable Development Goals: the gender snapshot 2022".

- The changing nature of work (e.g. increase in remote working/working from home and the automation of jobs) that will have an impact on workforce planning, education and the skills needed, among other things (Goals 4, 8 and 9).
- The age-old question concerning work and what human beings will do to fill in their time if automation takes over daily work routines: changes in caring, leisure and activities (Goals 3, 8 and 11).
- The role of climate change and what it means for unpaid production activities, for example gardening, growing produce for own or other household consumption (Goals 12 and 13).

As societies continue to age, it is necessary to promote efforts in many areas, including the employment, social engagement, health and welfare of older persons. In an ageing society with diverse values, older persons need opportunities to enrich their mind and fulfil their purpose in life through learning and social engagement activities. Time-use data can be utilized to understand how older persons spend their time, such as the amount of time they spend alone or with family members, as well as the percentage of older persons who are engaged in sporting activities, learning, hobbies and leisure and volunteer activities, among others. Time-use data may also be used to determine the extent to which they take up opportunities to continuously acquire new knowledge and adapt to technologies, in order to keep up with social changes, through the continuation of employment and daily life.

Part Two. Key design specifications for time-use surveys

II. Scope and coverage of time-use data

The wide range of possible objectives and applications of time-use data affect decisions relating to the scope and coverage of time-use data collection. Specific goals will require particular data items and affect the choice of the population to be covered. The basic content of a time-use survey are the activities of individuals and the amount of time they engage in the various activities. Other dimensions also need to be included in the data to be collected to the extent that they are essential to the survey objectives; context gives meaning to activities and groups of activities. The background characteristics of the population covered serve to provide information about the respondents and their behaviours.

Box II.1
Considerations before developing a time-use survey

Engaging respondents

- It can be difficult to explain to potential respondents how they will benefit from participating.

Sampling

- In many cases, only one member per household is sampled; multiple members of a household need to be sampled for intrahousehold analysis
- An unbalanced representation of certain times of the year or days of the week may result in the overreporting or underreporting of particular activities. In order to develop internationally comparable satellite accounts on the basis of a time-use survey, the sample should be representative.

- The sample distribution should be geographically representative of the population distribution (e.g. people living in urban areas and rural areas, as different areas may be associated with different activity types).
- The sample distribution should be representative of different subpopulations, in particular vulnerable populations.

Mode of data collection

- The mode of data collection (e.g. interview, full-text diary, web diary with a limited list of activities) can affect the information provided.
- If a survey offers respondents a choice of mode and different modes are associated with specific characteristics of the population (e.g. if only younger populations use CAWI and older populations prefer paper diaries), it will be difficult to isolate the effects of the mode from true subgroup differences.

Classifications and coding

- Activity classification systems need to be able to respond to the different uses of time-use data. International harmonized classifications should be used for cross-country comparisons. It is recommended that countries use ICATUS 2016.
- Time-use surveys may require significant coding of activities, for example activity, location, with whom. Thorough training on and procedures are needed to ensure consistent coding and categorization of responses.

Simultaneous activities

- People do more than one thing at once, but a day has only 24 hours. The collection and dissemination of simultaneous activities is encouraged.

Recall and reporting

- Most surveys require respondents to report on a previous day and to accurately estimate the time spent on each activity. How well they do this can vary depending on the respondents and types of activities.
- There is a trade-off between collecting comprehensive data and minimizing the respondent burden. Excess burden reduces quality (people provide responses that are not very precise in order to finish more quickly) and response rate (people consider time-use surveys too time-consuming or intrusive).

A. Activity and time

1. Describing activities

Activity may be defined as human behaviour in terms of what is being done and it may be characterized by the context in which it occurs, as well as its timing, duration, sequence and the frequency with which it takes place.

Activity classifications are used to classify activities into groups to support policymaking and facilitate the collection and organization of statistics. (United Nations, 2020a) A detailed, comprehensive, systematic listing of activities serves as the basis for assessing completeness of coverage of activities. The activity listing is used as a guide in the design of survey instruments and selection of methods. Furthermore, it defines the framework for analysis of the time-use survey data, serving as the basis for defining analytical and tabulation categories of activities. The activity listing specifies the level of detail required from respondents in both diaries and stylized questions and is used for developing coding rules and indexes for full diaries.

With a view to harmonizing the collection and reporting of time-use statistics across countries and over time, the Expert Group developed a light survey instrument. As its fifty-third session in 2022, the Statistical Commission endorsed the minimum harmonized instrument for the production of time-use statistics, which comprises a minimum set of background questions, as well as a minimum list of daily activities for the collection of time-use data, including for the measurement of Sustainable Development Goal indicator 5.4.1, in line with ICATUS 2016 and other international standards.

The minimum list of activities covers all possible activities that could be carried out by a person in a day. It consists of 25 activities (including "other" to account for activities that are not listed). The list of activities was developed for use in light precoded diaries and stylized questions, based on the information available in 15 light diary-based surveys and 15 time-use surveys based on stylized questions around the world. It represents the minimum requirements to enable the production of time-use statistics in line with ICATUS 2016 (second-level activities[13] in most cases). It was acknowledged, however, that the minimum list may need to be adapted to reflect different national contexts.[14] In total, 9 of the 25 activities are related to unpaid domestic work (7 activities) and unpaid care work (2 activities) and are recommended for the collection of data to measure indicator 5.4.1. In tTable II.1, a description is provided of the 25 activities included in the proposed minimum harmonized instrument using common language that is suitable for application in digital diaries.

[13] Second level activities, also called divisions, represent more detailed activities coded at a 2-digit level in ICATUS 2016.
[14] For example, religious activities might be of special interest in some countries; others might be interested in capturing the activities of specific population groups, such as community-based activities that are very prevalent among Indigenous groups.

Table II.1. Minimum harmonized instrument activity categories

No.	*Category*
1.	Working for pay or doing activities to generate an income for yourself or your family
2.	Unpaid activities done to produce goods for use by your household or family
3.	Helping neighbours, friends or others without receiving payment
4.	Cooking, preparing or heating meals, setting up or clearing the table or washing the dishes
5.	Cleaning the inside or outside of the dwelling; disposal of garbage or recycling, watering plants
6.	Making minor repairs to the dwelling, repairing or maintaining furniture, appliances or household vehicles
7.	Washing, ironing, hanging clothes to dry, mending clothes or cleaning footwear
8.	Budgeting, paying bills, organizing or planning household-related activities or completing administrative forms such as passports, contracts, applications or collecting social programme benefits
9.	Taking care of a family pet, feeding, bathing, taking them for walks, cleaning their space or using veterinary or pet services
10.	Buying household supplies, food or clothing for family members, when done in person or online
11.	Taking care of children in your household or family by feeding, dressing, putting to bed, talking, playing, assisting or supervising homework or school activity, accompanying to appointments, providing health care

12.	Taking care of adults in your household or family by feeding, bathing, dressing, putting to bed, talking, listening, providing or planning for health-care services or helping with personal business management
13.	Education, attending classes or courses on-site or online or education-related assignments, homework
14.	Getting together with others for social purposes, talking, chatting, writing or reading personal emails or texts
15.	Joining in community festivities or events, attending civil obligations or participating in religious celebrations or practices
16.	Attending cultural, entertainment or sports events
17.	Participating in hobbies such as painting, music or photography, playing games, or relaxing
18.	Participating in a sport or exercise
19.	Reading for leisure (e.g. newspapers, books, e-books, social media, magazines)
20.	Watching television, listening to the radio or streaming
21.	Sleeping
22.	Eating or drinking
23.	Own personal hygiene, such as showering, getting dressed, getting a haircut or personal health care, including resting, being sick or visiting doctors or specialists
24.	Travelling to and from places
25.	Other (activities not listed or unknown)

The minimum list makes it possible to construct indicators based on comparable activities, regardless of whether a precoded diary of activities or stylized questions are used. It is recommended that all time-use surveys, regardless of the mode of data collection or type of instrument, include the minimum activities as a starting point. If more granularity is desired, countries can expand the list, as long as the categories can be aggregated with the 25 activities and adhere to the ICATUS framework.

The time-use survey launched in India in 2019 survey provides an example of a different category list that can be aggregated with the minimum harmonized list (Government of India, 2020). The survey had separate codes for the following:

1. Childcare and instruction
2. Care for dependent adults
3. Help provided to non-dependent adult household members
4. Other activities related to unpaid caregiving services for household members
5. Travelling and accompanying goods or persons related to unpaid caregiving services for household members

In order to compute unpaid work, to report on indicator 5.4.1, India can include all of these categories. For consistency with the 25 categories of MHI, India can combine code 2 “care for dependent adults” and code 3 “help provided to non-dependent adult household members” into MHI activity 12 “taking care of adults in your household or family”. Code 4 “other activities related to unpaid caregiving services for household members” could be classified under MHI activity 25 “Other” and code 5 “travelling and accompanying goods or persons related to unpaid caregiving services for household members” under MHI activity 24 “travelling to and from places”.

The underlying principles of a classification should be consistent with the objectives of the survey.

Box II.2.
Quality considerations for activity classification

- Consider which activity classification will be used. If ICATUS 2016 is not used, consider using correspondence tables to compare data collected using the classification chosen and this international standard.
- If the MHI activity list is used, ensure that it covers the key activities of interest and understand the limitations.
- Consider activity classification from the perspective of data users to determine whether category groupings make instinctive sense. Activity classifications are a hierarchy.
- If designing your own activity classification, avoid duplication and the overlapping of categories.

2. Reference period

The reference period is the time frame over which survey respondents are asked to report their activities. Time-use surveys benefit from a mixture of work and rest days in their sample to support analysis across the week, in particular the different activities that might be undertaken on workdays compared to rest days. For example, some unpaid care and domestic work occurs throughout the week but may be concentrated at weekends.

When deciding how to attain full week or workday/rest day coverage, survey managers should consider:

- The length of time over which information will be sought from each respondent, for example one day, two days or one week.

- The type of day, for example if a reference day is chosen, they should decide whether to sample all days of the week or only two days, that is one representing a workday and one representing a rest day (weekend).
- The modality of reporting, be it retrospective or prospective.

    a. Length of time (day versus week)

Referencing a single day makes it easier for respondents to recall and estimate the time that they spent on different activities. However, if the survey objective is to measure the difference in time use across different days of a week (or even a longer period of time, for less frequent activities), a longer length of time will capture more activities and data, making it possible to measure differences in time use for each person between the selected days. While a diary of a week is generally considered too burdensome,[15] several countries in Latin America use a week reference period with stylized questions.[16] However, even with stylized questions, a reference period of one week is more challenging for a respondent than one day, as they must recall their activities over a period of seven days.

The decision with respect to the length of time must be balanced with the respondent burden and the risk of recall error. Time-use surveys are relatively burdensome compared with other types of household surveys. In all surveys, increased burden tends to discourage response or encourage the respondent to take "shortcuts" in reporting (Krosnick, 1991; Andreadis and Kartsounidou, 2020). In the case of retrospective diaries, reducing the length of the reference period substantially reduces the respondent burden and the possibility of recall error in a time-use survey.

[15] For a detailed discussion on the advantages and disadvantages of using longer reference periods with diaries, see Ignace Glorieux and Joeri Minnen, "How many days? A comparison of the quality of time-use data from 2-day and 7-day diaries", *International Journal of Time Use Research*, vol. 6, No. 2 (2009). The findings of the study suggest that the first day is the worst in terms of respondent burden and that once the respondents have filled in one day, it becomes easier to continue for seven days without real signs of lower quality over the days.

[16] Costa Rica in 2001 and 2017; Cuba in 2016; Ecuador in 2012; Mexico in 2019, 2014 and 2009; Panama in 2011; Paraguay in 2016; and Peru in 2010.

b. Type of day

If survey managers decide on a single day as the reference period, they must then decide if it is necessary to ensure a balanced distribution of all the days of the week or whether only the workday and rest day cycle should be measured. In the latter case, one workday and one rest day per respondent might be selected or one type of day might be randomly assigned to each respondent. The benefit of this approach is that the respondent burden may be much lower than the "week" approach, since respondents are only asked about two days, but it still allows for comparative analysis of the different activities undertaken on workdays and rest days.

If single days are assigned, it is necessary to ensure a balanced distribution of all the days of the week across the sample. To guarantee the representativeness of the seven days of the week, field operations must be carried out from Monday to Sunday. In some countries, hiring staff on Saturdays and Sundays is complicated or adds to costs. Furthermore, if rest day data are going to be output separately, for example weekend days versus weekdays, the sample design will need to allow for the oversampling of weekend days to ensure that the sample of those days is sufficient to produce accurate data outputs.

c. Modality of reporting

The mode of data collection is a factor that determines whether a retrospective or prospective approach is best.

Retrospective approach. The retrospective approach is best for interviewer-administered diaries because the interviewer can prompt the respondent and methodically work through the reference period from one activity to the next. A well-trained interviewer can also prompt for typical activities that might have been missed, such as travel or eating, and probe for other details, such as whether others were present. In retrospective surveys, the respondent is generally asked about "yesterday" or "last week"; however, to achieve a balanced sample, sometimes it is necessary to ask about a day two or three days

past. Ideally, the reference day should be the day before, since recall diminishes with time, so a gap of much longer is not recommended.

In the retrospective approach, regardless of whether a diary or stylized questions are used, respondents are asked about all the activities that they undertook on the designated day, starting from a particular time (often 4 a.m.) and continuing for 24 hours. This approach places the least burden on selected respondents, because the reference period is only one day and their activities should be relatively fresh in their minds. With the retrospective week methodology, respondent report their activities over the previous week.

Prospective approach. This methodology is used for self-enumerated diaries. In theory, it is possible to give respondents a questionnaire with stylized questions in advance, but since they report the cumulative time spent on each activity category throughout the day, the questions are answered after the day is over.

After the household questionnaire is completed, the interviewer gives respondents a diary and asks them to complete it for tomorrow or a designated date in the near future (usually a few days later). Online diaries can become available "tomorrow" or on the diary date. Diary dates are kept close to the date the household questionnaire is completed to minimize the risk of respondents forgetting to complete it or of household characteristics changing.

If respondents complete a prospective diary throughout the day, they are not required to remember as much information, which should increase the accuracy of reporting. However, evidence shows that respondents tend to record their activities in one or two sessions per day, rather than continuously throughout the day. Organizations conducting the surveys have little control over when the respondents complete the diary, in particular for paper diaries. It is theoretically possible to add a feature in an online diary to prompt respondents regularly to complete it during the day. Reminders should, however, be managed carefully; they can annoy respondents and result in them abandoning the survey.

"Typical" versus specific day or week approach. In the past, respondents have been asked about a typical day or week. However, this approach is not recommended for time-use surveys. If respondents are asked to report on an actual day or week, the information provided will be more accurate. It can be difficult for respondents to conceive of what a "typical" day or week is. The cognitive burden of first determining what "typical" is and then estimating the quantity of time spent on an activity means that some activities are likely to be unintentionally overreported and others underreported. Furthermore, the amount of time spent on socially desirable activities is more likely to be over-estimated and the amount of time spent on socially undesirable activities underestimated to a greater degree when imagining what "typically" happens than when recalling a specific time period.

Box II.3
Quality considerations for the reference period

- Decisions about how many days of the week and which days to cover (workdays or rest days) will depend on the data output requirements. For example, if rest day activities are to be reported separately from workday activities, survey managers must ensure that the sample size corresponding to each type of day supports these data output requirements.
- It is important to maintain a balance between how many survey days the respondent is required to complete and the respondent burden. The longer the reporting period, the more respondent fatigue is likely to affect the data quality.
- Retrospective or prospective assigning of the day will have different quality implications. For retrospective collection, the further the recall day is from the survey day, the less likely respondents are to remember all the activities undertaken and accurately reflect the duration of those activities.

- The timing and duration of the survey can also potentially affect the quality of data. It is, therefore, preferable to collect data over an entire year in order to include all seasons and capture variations in activities across the year. For example, activities carried out in summer may differ from those carried out in winter, as is also the case with activities undertaken during holiday periods and non-holiday periods. Enumerating the survey across the full year may not always be possible due to operational, resourcing or other constraints. Survey managers need to have a good understanding of their environment and plan the survey for the right time to best reflect the activities of their community.

3. Recording time

Time has several dimensions relevant to activity: *timing* or the point in time at which actions occur (for example, weekday or weekend, morning or evening, between 9 a.m. and 10 a.m.); *duration* or the period during which actions occur (for example, 45 minutes, 3 hours); *tempo* or the frequency at which actions occur (for example, twice a day, once a week) and *sequence* (before or after, past, present or future).[17] To capture all of these dimensions, it is necessary to use a time diary, to record the beginning and ending times of activity episodes. Stylized questions are used to ask the respondent to report on the total amount of time they spent doing an activity, by providing the cumulative duration for the day (or week), rather than in distinct episodes; start and end times are not collected. Stylized questions provide information on the duration of the activity, but not on timing, tempo or sequence.

In a time diary, the time interval relates to the units of time in which respondents report their activities. Time diaries may use open intervals or fixed intervals. For a more detailed description of these options, see chapter III.C.

[17] Adapted from (Harvey and Wilson, 1998)

B. Simultaneous activities

1. What are simultaneous activities?

People regularly engage in more than one activity at the same time. People who are multitasking may actually be performing concurrent activities (cooking and taking care of a child, reading while travelling by bus or watching television while eating) or they may be doing activities sequentially and thus frequently switch back and forth between activities (gardening and doing laundry). The terms "simultaneous" and "secondary" are often used interchangeably. A simultaneous activity is one that is carried out at the same time as another. There is no hierarchy or value judgment. The term "secondary" activity generally refers to an activity that is considered to require less attention or be less intense than the simultaneous "primary" activity. In a diary, the primary activity is typically the one that the respondent describes first and any secondary activities are those that they were "also" doing. If they are asked to specify, the primary activity is the one that the respondent considers to be the most intense in terms of focus or energy.

2. Why measuring simultaneity is important?

If respondents experience their activities as simultaneous occurrences, then including the opportunity to report and record secondary activities in collecting time-use data enhances the accuracy of the resulting data. Some activities that are very important for time-use research are frequently reported as secondary activities. However, while collecting data on simultaneous activities in a time-use diary adds to the respondent burden, it enhances the accuracy and completeness of the data. Time-use surveys should, therefore, always explicitly ask about simultaneous activities.

One of the main purposes of time-use surveys is to measure unpaid work. Unpaid work, and unpaid care work in particular, is often done while carrying out other activities. Collecting data on simultaneous activities can help to identify routine unpaid domestic and care work that otherwise may

not be reported or would typically be underestimated if only primary activities were covered. Capturing the extent to which people engage in unpaid domestic and care work is essential for the development of extended accounts to SNA, to monitor well-being, evaluate the economic empowerment of women, develop policies on caregiving and assess work-life balance.

3. Challenges of measuring simultaneous activities

The main challenges of measuring simultaneity relate to collecting and analysing the data. They are discussed in more detail in chapters 0 and 0 of this *Guide*. Survey managers must decide whether and how they will distinguish between primary and secondary activities and how they can convey that to respondents. In principle, the survey instrument may offer the possibility of collecting data on more than one activity. When time-use diaries are used, it is possible to collect data on all simultaneous activities with the same level of granularity. However, it is also possible to provide the respondent or interviewer with fewer options for those activities considered to be secondary, using on a subset of activities that are relevant for analysis, and thus reduce the survey time.

Analysts can sometimes infer a simultaneous activity, such as childcare, based on the "for whom" and "with whom" context data. A protocol for using context information to code activities must, however, be developed.

There are some activities that respondents will not report consistently in the diary (as a primary or secondary activity). To address this problem, survey instruments (diaries or a stylized questionnaire) can include summary or probing questions. Supervisory care is one activity that is underestimated in time-use surveys. Owing to its pervasive nature and the fact that it is generally performed in the background, respondents may omit to report it and more often report personal activities, such as watching television or listening to the radio, even when specifically asked about simultaneous activities ("What else were you doing?"). In box II.4, an explanation of the relevance of measuring supervisory

care is provided, as well as a definition of supervisory care for statistical purposes and some recommendations for improving the reporting thereof in time-use surveys.

Box II.4.
Measuring supervisory care

Defining supervisory care

Caring for dependent household or family members (e.g. a child, an adult with a disability, a family member who is sick) entails an active element whereby the care provider is directly interacting with the dependant to meet their care needs, such as feeding them, bathing them or, administering medical care or helping a child with homework. The responsibility for care also involves a supervisory role, where the care provider is not actively engaged with the dependant, but is "on call", meaning that, for example, they are nearby to provide immediate assistance to the dependant. In practical terms, this implies that supervisory care is undertaken simultaneously alongside other activities and, if measured, the relevant data are collected as a secondary activity. In some contexts, the provision of supervisory care is also a legal obligation as children under a certain age cannot be left alone and unattended.

Care, and all the components thereof, plays a fundamental role in social reproduction and cohesion. Gender gaps in the provision of care are widely documented, with women disproportionally providing the bulk of unpaid domestic and care work. According to data on the minimum set of gender indicators, women are responsible for two thirds of unpaid domestic and care work. These gaps may be further exacerbated during crises and in contexts where public or private caregiving services are not easily accessible or affordable, thus affecting carergivers' opportunities to participate in other important life spheres, including the labour market, politics, learning, leisure and sports.

Measuring both active and supervisory care also inform a wide range of policies and strategic frameworks in the care economy, which are deemed to be increasingly relevant in view of demographic changes and ageing populations.

There are several challenges associated with measuring supervisory care. Respondents may perceive supervisory care as a background responsibility. To improve measurement approaches, the Expert Group formed a subcommittee on supervisory care in 2021. The subcommittee worked on developing a reference concept for measuring supervisory care in official statistics, reviewed country practices and identified main data uses. The following definition acts as a reference concept for measuring supervisory care in official statistics:

> *Unpaid supervisory care refers to the time the caregiver is in hearing or visual proximity to a dependent household or family member to provide unpaid caregiving services, should such need arise. The provision of supervisory care does not require the active involvement implied in the provision of those caregiving services where an interaction between the caregiver and dependent household or family member is needed. Supervisory care may occur at any location where the dependent household or family member is present and in close proximity with the caregiver. There is no requirement for bodily proximity of the caregiver with the dependent household and family member, such being in the same room.*

This definition is in line with relevant international statistical standards, namely the resolutions concerning the measurement of working time (2008) and statistics of work, employment and labour underutilization (2013) adopted by ICLS and ICATUS 2016. More specifically, the definition draws a parallel with the concept of on call time related to employment and extends it to other forms of work.

Supervisory care in ICATUS 2016

Unpaid supervisory care includes time when the caregiver is *on call* to provide unpaid caregiving services. In ICATUS 2016, it is an activity classified under Group 416 (minding children (passive care)) and 425 (passive care of dependent adult).

More specifically, the provision of unpaid supervisory care includes:

- Time when the caregiver engages in other activities in parallel, including the remunerated activities listed in ICATUS 2016 Major Division 1, provided that the caregiver remains accessible and in proximity should the need to provide caregiving services arise.
- Time when the caregiver is not necessarily interacting with the dependent household or family member, but is on call should caregiving services be needed. This includes time when the dependent household or family member is engaged in activities alone, including sleeping or when the caregiver is engaged in personal activites.

Measuring supervisory care

The following recommendations are provided by the Expert Group:

- In diary-based instruments, summary or probing questions should be used after the main time-use information is collected. This is called a "recovery sequence". Some examples of probing questions from the American Time Use Survey are provided below in this box. This recommendation was further supported by the outcome of cognitive testing conducted in Mexico, which highlighted that probing questions after each activity (rather than at the end) can disrupt the flow of the interview and place an unnecessary burden on the respondent.
- In order for retrospective stylized questionnaires to accurately capture the time spent on supervisory care, the reference period should be the previous day. It is more challenging

when the reference period is a week, as respondents' estimation strategies usually fail to accurately account for simultaneity.

- To avoid double counting, reporting should distinguish between active and supervisory care. This distinction is important for calculating SNA extended accounts. When respondents are providing active care, they are not also providing supervisory care.
- Each country should set an upper age limit for children with respect to the adult's obligation to provide supervisory care, based on the laws and norms established therein. To determine the specified age for the identification of children, the upper age limit:
    - May be set by taking into consideration the minimum age for employment and exceptions specified in national laws or regulations or the age of completion of compulsory schooling;
    - May align with country regulatory frameworks on custodianship. Such regulatory frameworks are expected to identify the age limit of a child, for which any legal liability (neglect) arises from when the child is without adult supervision. It is linked to the legal concept of guardianship of children. When necessary, other lower age limits could be introduced for reporting purposes only, taking into consideration national legislation, among other things.
    - May align with the Convention on the Rights of the Child, according to which a child means every human being below the age of 18 years.

Respondent perspective

To support the work of the subcommittee on supervisory care, in 2022 UN-Women, the Global Centre of Excellence on Gender Statistics and El Colegio de Mexico conducted cognitive testing to

assess the understanding of the concept of supervisory care and determine the best phrasing for it (UN Women, 2023). The research confirmed the expected challenges associated with the measurement of supervisory care. For respondents to accurately report supervisory care time, they must have a grasp of the conceptual difference between active and supervisory care, but many carers are not used to thinking in this way. Based on the study, it was recommended that supervisory care questions be preceded by an explanatory task that includes examples, vignettes or visual aids, as appropriate. Furthermore, participants in the study generally recalled having performed supervisory care only when they were asked a probing question.

The research found that respondents used many terms to describe different types of care, with "estar al pendiente" or "estar pendiente", which means "minding" in Spanish, the phrases that were spontaneously mentioned the most often. Based on the study, it was recommended that cognitive testing be carried out to determine the best way to describe supervisory care before designing the questionnaire. Descriptions might include vernacular languages used in rural areas, as the phrasing is likely to vary even within countries.

An essential part of the definition of supervisory care is that the carer is in close proximity to provide immediate assistance if needed, for example if a child calls from another room or the garden. The study found that some respondents considered being reachable by phone to be a form of supervision; if the care recipient needed the carer, they could call the caregiver for assistance. The researchers caution that the explanation should clarify that being "on call" by phone is not included in supervisory care and that the type of proximity has to be spelt out to aid accurate responses.

Country-specific examples of probing questions for supervisory care

The correct wording for probing questions will vary across cultures, in particular as family structures differ. For example, questions in the American Time Use Survey refer to childcare only. Separate

summary questions would be necessary to measure care for adults. In a pilot study conducted by ILO and UN-Women in Indonesia, respondents were asked about the care of adults and children separately.

It is essential to cognitively test survey questions to ensure that they convey the concepts to respondents.

American Time Use Survey

In the American Time Use Survey, when the diary is completed, the interviewer asks follow-up questions about childcare, as well as paid work and volunteer activities. There are childcare-related questions for four groups of children: (1) the respondent's own children who live in the household; (2) the respondent's own children who live in another household; (3) other (non-own) household children, such as siblings or grandchildren; and (4) non-own non-household children, such as neighbour's children.

For each group of children, the interviewer first asks what time the first child woke up in the morning and what time the last child went to bed. The interviewer then asks the following:

> I'd like to ask you about children who live with you. A child was awake between [time first child up] and [time last child to bed]. At which times or during which activities during that time period was/were [name(s)of all the respondent's own children under 13 in the household] in your care?

The interviewer then asks the probing question: "Any other times or activities?"

Pilot study conducted by UN-Women and ILO in Indonesia

This pilot study tested a light diary module attached to a labour-force survey. The questionnaire was administered by means of CAPI, which allowed interviewers to probe and to easily call up previous

episodes to record supervisory care reported during the recovery sequences. The separate roster permits the timing, sequence and duration of supervisory care episodes to be recorded in fixed 15-minute episodes.

It is important to note that the description of supervisory care, namely locally-tested expressions for looking after, minding or keeping an eye on a child, should always be cognitively tested in all local languages that the survey will use, as it will vary, as shown in the case of Mexico described under *Respondent Perspective* above. The questions have been translated into English.

During the diary, after reporting each activity, respondents were asked:

> Were you doing anything else at the same time as [activity 1]?

The first time no simultaneous activity is mentioned, the interviewer asked a probing question:

> For instance, were you talking with a family member, friend or neighbour or [locally-tested expression for looking after, minding or keeping an eye on a child] or listening to the radio or watching television?

The second probe question was not repeated, but respondents were asked about a simultaneous activity for each activity reported.

When the diary was completed, the interviewer asked the recovery sequence questions on supervisory care separately for children and then for adults. An example is provided below:

> Thinking back to yesterday, were there any times when you were responsible for [locally-tested terms for supervising/minding/watching over] a child under the age of 18, staying close by and being ready to respond in case of need?
>
> If yes:
>
> When was this?

What is their relationship to you?

The interviewer recorded each episode of supervisory care separately if there was more than one, for example before school and after school. The respondent was then asked about dependent adult household/family members (aged 18 and over) who require assistance from others to undertake daily activities due to illness, injury, frailty or disability, whether temporarily or long-term. For example:

> Thinking back to yesterday, were there any times when you were responsible for [locally-tested terms for supervising/minding/watching over] an adult aged 18 or over who needs help with daily life, staying close by and being ready to respond in case of need?
>
> If yest:
>
> When was this?
>
> What is their relationship to you?

For more details about the pilot study, see Prospera et al. (2023) and ILO (2023).

When stylized questions are used, it is possible to ask respondents about the time that they spent on different main activities and subsequently ascertain which activities were carried out simultaneously and the frequency of this simultaneity. To reduce the respondent burden, only questions relating to activities that are relevant to the survey objectives may be asked. In order to ensure that data are comparable with data that are obtained from time-use diaries, it should be clear that the questions are relating to activities that are often secondary, that is "while you were doing something else."

When it is reported that time was spent on two activities at the one time, the total time spent on all the activities may extend beyond a 24-hour period. Survey managers must decide how time should be allocated, if estimates need to be limited to the 24 hours of a day. It can be divided equally among simultaneous activities, it can be divided unequally according to a hierarchy or weighting system or

simultaneous activities can be reported separately. For more information, see chapter IXPreparation of survey outputs.

Box II.5.
Quality considerations when collecting data on simultaneous activities

- Collecting data on simultaneous activities (providing that they are collected correctly) provides more accurate time-use data.
- If simultaneous activities are not reported I detail, this can result in the underreporting of activities, in particular the amount of time spent on unpaid care and domestic work.
- When the diary format is used, data on the main activity should be collected, but also on a secondary activity, if possible. It is, therefore, important that respondents are aware that this information is required and that, based on the instructions and examples in the diary, they should report on all activities and not just those demanding their greatest attention.
- In the case of self-completed diaries, as respondents tend to group activities in broader time slots, collecting data on simultaneous activities can provide insight on missing episodes or time.
- Collecting data on simultaneous activities increases the respondent burden and cost, so the trade-offs need to be considered at the survey development stage.
- Cognitive testing is important to ensure that respondents understand the concept of simultaneous activities.

C. Contextual information

1. Importance of studying context

An episode, also called an activity episode, refers to one occurrence of an activity, without a change in any of the contexts. In time-use statistics, contextual information refers to features of the environment in which a specific activity episode takes place (e.g. location, with whom), additional defining

characteristics of the activity (e.g. for whom, paid/unpaid) or subjective aspects (enjoyment, stress and well-being). In diaries, contextual variables are collected at the activity episode level. Stylized questions include contextual information in the wording of the question, for example “Did you work for pay or profit?” or “Did you care for family members without receiving payment?”

To understand the significance of any activity, it is important to understand the context in which the activity took place. Activity-related contextual information can be used to help code activities properly. Contextual information can also help to answer specific research or policy questions, for example relating to remote working, means of transport, the use of information and communication technologies (ICTs), health and quality of life (such as the time that children spend outside, that time that older persons spend alone and the time that parents spend with or without their children).

Context also improves data quality by aiding recall. When respondents considering where they were or who they were with, it helps them to put what they were doing into perspective.

2. Defining context variables

    a. Location

Location is an important objective contextual variable. It facilitates recall and supports important areas of analysis, such as spatial mobility, social integration and isolation, and the accessibility of utilities, services and infrastructure. It can also aid data quality by imposing checks on activities that succeed one another. In the time-use surveys conducted by Belgium in 2013 and Canada in 2022, activity episodes where the location changed without a travel episode were flagged.

The Minimum Harmonized Instrument (MHI) recommends collecting location for all activity episodes (see Annex 1: Minimum Harmonized Instrument - Model Diary). In most surveys, location is given as a generic description from the respondent’s perspective (home, non-home workplace, school, etc.). If the respondent is travelling, location is defined in terms of how they are travelling (car, walking, bus).

In Europe, the Harmonised European Time Use Surveys (HETUS) guidelines provide for 17 types of location and means of transport, but European countries can include more (e.g. in the Italian time-use survey, there are 36 typesof places and means of transport). Typically, the location of each activity is recorded by asking respondents where it took place. Digital tools allows the use of drop-down menus to provide interviewers or respondents with a list of locations to choose from. Where respondents can provide free text answers, the level of detail required is indicated in an example for respondents of self-administered surveys or a list of possible options for location provided to interviewers in the case of interviewer-administered surveys. Table II.2 shows examples of the types of locations and means of transport in MHI, the 2021 Bangladesh time-use survey, the 2022 Canadian time-use survey, the HETUS 2018, the 2010 New Zealand time-use survey and the 2010 South African time-use survey.

Table II.2.
Examples of response categories for "location"

Instrument	*Location*	*Transport*
MHI	1 At home 2 At one's place of work or school 3 At another residence 4 Outdoors (away from home) 5 At store or place of service 6 Other (non-travel)	7 Car, van, truck as a driver 8 Car, van, truck as a passenger 9 Public transportation such as bus, tramway, subway, light train, ferry 10 Bicycle 11 Walking 12 Taxi, limousine service 13 Plane 14 Other transport 99 Refusal, no answer

2021 Bangladesh time-use survey[a]	At home At one's office/workplace At school/college/university At shop/grocery store At marketplace At a restaurant At a mosque/place of worship At a hospital/medical centre In an agricultural field Sports field Neighbour's home Relative's home Household farm Outdoors/Near to one's home On a public road/in a public space	Walk Bicycle Motorcycle Bus Car/truck Van/rickshaw Train Launch Boat Airplane Other (specify)
2022 Canadian time-use survey	At home or on property At place of work or school Away on business At someone else's home or property In the neighbourhood Outdoors Grocery store, other stores or mall	Car, truck or van - as driver Car, truck or van - as passenger Walk Public transit (bus, streetcar, subway, light-rail transit, commuter train) Airplane Bicycle

	Library, museum or theatre Sports centre, field or arena Restaurant, bar or club Place of worship Medical, dental or other health clinic Elsewhere	Motorcycle, scooter or moped Taxi, limousine service Ride-hailing Boat, ferry Other
HETUS 2018	Home Weekend home or holiday apartment Workplace or school Other people's home Restaurant, cafe or pub Shopping centers, malls, markets, other shops Hotel, guest house, camping site Other specified location (not travelling) Unspecified location (not travelling)	On foot Bicycle Moped, motorcycle or motorboat Passenger car Other private transport mode Public transport Unspecified location/transport mode (not known whether respondent is travelling or not) Unspecified transport mode
2010 New Zealand time-use survey	At home At other people's home Workplace or place of study Public or commercial area Bush, beach or wilderness	Travelling by foot or bicycle Travelling by car, motorcycle, truck or van Travelling by bus, train, taxi, ferry, plane

	Marae and other sites of cultural significance to Māori	Other locations or modes of transport
2010 South African time-use survey	Own dwelling Someone else's dwelling Workplace Educational establishment Public space	Walk Bicycle Private transport Public transport Other

[a] In the 2021 Bangladesh time-use survey, respondents were asked where they were when the activity took place and they provided a free text answer. The responses were then categorized as shown in the examples in the table.

With global positioning system (GPS) enabled devices, it is possible to use geolocation to record locations more accurately, rather than relying on respondents to report their location. The absence of travel descriptions in self-completed diaries is one of the most frequent problems that needs to be solved in the data-editing phase. By recording not only locations but also travel times, and even suggesting modes of travel that could be confirmed by respondents, geolocation could help to improve the accuracy of travel information.[18] However, the use of geolocation raises many potential quality, privacy and operational concerns, which must be weighed against the benefits (see 4.2 Contextual information in Quality considerations for Time-use surveys (UN, 2022) for further discussion). While the geographic coordinates of a location are useful in that they provide information on travel episodes, they do not provide any information on the relationship between the place and the respondent, thus limiting its usefulness to providing details of where activities took place.

[18] Geolocation information might be useful for analysing data at different geographic levels or in contexts where the level of regular travel across administrative boundaries (such as cross-border commuting) is high, and for integrating different sources of information as part of more complex analyses of time-use data.

d. With whom

The contextual variable "with whom" records social contact. It can be used to understand the amount of time people spend alone and with others, and as a strategy for improving the recording of supervisory care (UNECE 2013:17). It is therefore recommended for inclusion with all activities, except sleeping.

Respondents might use multiple interpretations of the "with whom" question if no direction or definitions are provided. They might focus on those persons with whom they had an intentional relationship or with whom they were interacting, thus leaving out someone in the same room watching television, for example. They might report those persons who were in the same physical location (for example, in the same area or in the same house). It is, therefore, important to clarify the meaning of the question being asked. Making the question "Who was with you" a two-part question ("Who was present, but not participating?" and "Who was participating?") results in more accurate information being provided, but places an extra burden on the respondent. Most surveys, therefore, define being "with" someone as being physically present, regardless of the level of interaction. This does not necessarily mean that they must be in the same room or within sight.

Responses to "with whom" questions can be recorded verbatim, but it is more common for respondents to choose from a list of types of persons present. Understanding how this information will be used will help to determine the response categories. If the intent is to use the information as a proxy for care work, then it would be best to include a detailed list of household members for respondents to select from. In the case of childcare, the list can be further divided into age groups for children, in recognition that younger children generally require more parental attention than older children. In Italy, where data are also collected in children's diaries, the list of household members that may be chosen consists of "mother, father and siblings", so that the type of activities performed in the presence of the various household members can be studied. If the aim of data collection is to understand how much time people spend alone and with others, less detail is needed.

Table II.3.
Examples of response categories for "with whom"

Instrument	*For whom*
MHI	1 Alone 2 Spouse or partner 3 Household children 4 Other household or family adult 5 Friends 6 Workmates, colleagues, classmates 7 Other
2021 Bangladesh time-use survey	Alone/unknown persons (e.g. in public) Own household: • Husband/wife • Children up to 9 years • Another adult household/family members Other people/members of other households

2022 Canadian time-use survey	On my own Own household: • Spouse, partner • Household children - less than 15 years old • Household children - 15 years or older • Parents or parents-in-law • Other household adults • Other family members from other households Friends Colleagues or classmates Other people
HETUS 2018	Alone (also with unknown persons, alone in crowd) Own household members: • Partner • Parent(s): mother, father • Children up to 17 years • Other household member(s) Other people/members of other households

2023 Italian time-use survey	Alone (also with unknown persons, alone in crowd) Own household members: • Mother • Father • Partner • Children • Siblings • Other household member(s) Other people/members of other households

e. Activity-determined context

Other context variables can be added to study specific aspects related to particular activities.

For whom. context variable for identifying the purpose (motivation) of an activity and classifying activities correctly using ICATUS 2016.[19] A typical difficulty encountered in classifying activities is producing descriptions of activities that correspond to the boundaries that make sense to analysts, for example the "general production boundary", which separates non-market work from other non-market activities. The context variable "for whom" has been found to be useful in providing information for clarifying these situations.

The "for whom" context variable should identify for whom the activity was performed, with four minimum recommended categories to choose from:

- For paid work or own or family business
- For use by own household member(s)

[19] ICATUS 2016 is harmonised with the nineteenth ICLS resolution concerning statistics of work, employment and labour underutilization (2013) and is consistent with th SNA framework.

- For use by family members residing elsewhere
- For use by others

The “for whom” variable can be used to help to code other data items of interest such as volunteering. For example, in the Australian time-use survey, if an activity such as baking a cake was undertaken for a school event (“school fete” was the answer to the question “for whom”), it was coded as voluntary work under the Australian activity classification, whereas baking a cake for the family (“family” was the answer to “for whom”), it was coded to food preparation. In the diary form that is recommended in the HETUS 2018 guidelines, the “for whom” context question has been excluded to avoid burdening the respondent. However, in the explanation of how to describe activities, respondents are asked to specify for whom they are doing the activity when describing helping others, in order to distinguish between unpaid domestic services for household and family members and direct or organized volunteering.

The transition to digital diaries means that it will be possible to link context variable questions, such as “for whom”, to particular types of activities where appropriate rather than to all the activity episodes reported in the diaries.

In aAnnex 1: Minimum Harmonized Instrument - Model Diary, there is provides an example of the category options for different types of activities under the “for whom” context variable. Table II.3.

Examples of response categories for “for whom” context variable in the 2021 Bangladesh time-use survey and 2010 New Zealand time-use survey.

Table II.3.
Examples of response categories for "for whom"

2021 Bangladesh time-use survey	Self Own household/family children up to 9 years Other own household/family members Other households Community/organization Work for pay or profit
2010 New Zealand time-use survey	Own household (including self) Household member aged 0-13 Household member aged 14 or over with an illness or disability Another household or individual Non-household member aged 0-13 Non-household member aged 14 or over an with illness or disability Organization or group Non-profit organization Government organization

Paid and unpaid activity. The definition of work adopted by the nineteenth ICLS in 2013 created the need to measure all forms of work, whether paid or unpaid. The integration of unpaid work into SNA extended accounts has also stimulated interest in the extent to which people allocate time to paid and unpaid work activities. The distinction between paid and unpaid work also informs policy on the advancement of more gender-equitable divisions of labour.

Use of ICTs. The increased use of computers, smartphones and the Internet in almost all activities (shopping, work, entertainment) has prompted countries to increasingly ask about the use of ICTs. The HETUS 2018 guidelines recommend that a variable be included to identify whether the respondent was using ICT when carrying out the activities indicated in the diary. In some countries, specific surveys have been conducted to measure Internet coverage and use and the computer skills of the population, but they fail to assess the pervasiveness of the Internet in terms of daily time use, so the inclusion of this context variable was considered important, at least in the European context.

When a respondent is using ICT, the activity recorded should be classified according to the purpose for which time is spent, with ICT use recorded as a contextual variable. "Using ICT" is not an activity. For example, if a person uses the Internet for shopping, the activity should be classified as shopping and the ICT contextual variable should be marked. Some other examples of the classification of activities when performed using ICTs are shown in Table II.4.

Interpretation of sample ICT-reported activity.

Table II.4.
Interpretation of sample ICT-reported activity

ICT activities reported by respondents	**Classification according the MHI list of activities**
Reading mail for work	Working in paid job or income-generating activities
Reading mail for school	Education
Doing homework on the computer	Education
Browsing pages for a school research project	Education

Browsing pages looking for school uniforms for my kids	Shopping for own household and family
Texting with husband on cellphone	Socializing and communication
Looking for a job online	Seeking employment

f. Subjective context variables

Adding subjective dimensions to the typical objective ones for activity episodes may help to tap into the emotional and psychological side of behaviour. If the survey objectives are extended to measuring quality of life issues, surveys can incorporate subjective context variables, such as how stressed people are when performing an activity and how much people enjoy what they are doing, or their reasons for doing it. For example, the time-use surveys conducted in Italy between 2013 and 2014 and France in 2010 collected a pleasantness variable using a full paper diary. In the time-use survey conducted in Finland between 2020 and 2021, the variable was also collected using both paper and web-based diaries. In the United States of America, ATUS has periodically collected a module on well-being in an electronic diary via CATI. See section 3A.3 of *Harnessing Time-Use Data for Evidence-based Policy, the 2030 Agenda for Sustainable Development and the Beijing Platform for Action* for further discussion.

Subjective context variables can be complex to interpret and difficult for respondents to complete. Is the level of enjoyment a person experiences associated with the activity, the time of day, who they are with, their location or all of these? Data collected in the ATUS well-being module are typically presented as comparisons, for example “people report higher levels of stress when doing activity x compared with activity y”. These data are published as a research data set only. Respondents should be

informed as to whether they are expected to assess the level of enjoyment associated with individual episodes or as an overall daily rating.

Subjective dimensions may not be essential to the survey objectives of a general-purpose national time-use data collection. In countries where the aim is to reduce the respondent burden by having as light an instrument as possible, it may be decided not to include those dimensions. For example, in the HETUS 2018 guidelines, an additional column for self-assessed "well-being/satisfaction" in the model diary for HETUS wave 2020 is not recommended. Instead, there are four questions at the end of the diary, which ask about the diary day in general and the most pleasant, unpleasant and stressful activities (HETUS 2020, p.17).

Box II.6.
Quality considerations when collecting contextual information

- Contextual information included in the diary should be tested to ensure that respondents have a clear understanding of the requested information and answer correctly. The concepts should be well understood and easy to answer.
- Asking too much contextual information adds to the cognitive load and may affect the overall response rate quality of responses. There should be a sound data requirement for adding these items.

D. Background (covariate) information

The collection of time-use data using a diary or stylized questions should always be accompanied by a questionnaire on the selected background characteristics of the respondents and their households. For a theoretical discussion on the need for background information, see the section entitled "Analytical framework for background questions" in the *Guide to Producing Statistics on Time Use* (UN, 2005). The inclusion of priority background variables is discussed therein and suggestions are made as to how

they should be selected and where they can be placed when using a minimum harmonized survey instrument. The timing between the collection of background data and time-use data and guidance on question design are covered in chapter III below.

Background characteristics, such as the sex and age of respondents, and their household composition, are critical to supporting the analysis, interpretation and use of time-use data, including through a gender lens. The background characteristics of household members may be needed to determine which respondents are eligible to complete the time-use data component of the survey. The information can also improve the quality of data by enabling checks and validation or by linking information such as unpaid care time with children or adults with disabilities listed on the household roster.

1. Priority background characteristics

The recommended minimum set of background characteristics for households and individuals are listed in Table III.. The table also provides suggestions for other characteristics that may be critical, depending on the national context. Together, these data are considered high priority for time-use analysis.

Table II.5.
Priority background characteristics for time-use data collection

Household level	**All persons eligible as time-use respondents**
Minimum	

Household size Household composition: classification based on age and sex Place of residence (urban/rural) Household income	Age Sex Marital status* Educational attainment* Current school attendance (and grade)* Current employment status* Labour force status* Labour force status of spouse/partner*
Additional as relevant in national context	
Access and use of care services Presence of persons requiring help with daily living activities Access to utilities Household wealth	Disability status* Race/ethnicity General health status Access to timekeeping devices*

* *Only individuals selected as respondents*

When deciding which background characteristics to capture, it is important to consider:

- Their relevance in supporting the analysis, interpretation and intended policy uses of time-use data;
- The national context;
- The characteristics of the survey, in particular its coverage, sample design and size, and expected duration of the survey interview.

Careful consideration of these aspects will greatly contribute to the overall quality and relevance of time-use data.

2. Selection of priority background characteristics

At a minimum, the background characteristics should include both the personal and household-level information needed for respondent selection and the basic analysis of time-use and activity patterns and data quality considerations.

a. Minimum individual data

For all persons eligible to provide time-use data, data on their sex, age and relationship to each household member must be collected are required to create a respondent selection grid should the need arise. For respondents to the time-use component, the following additional data are required: marital status, level of educational attainment, current school attendance and grade or current labour-force status, current employment status and labour-force status of their spouse or partner.

b. Minimum household data

Individual data on sex and age provides information on household size and composition. In addition, information on place of residence (urban and rural) and household income are required.

c. Additional data depending on the national context

Depending on the national context, additional household information may be required on access to and use of care services, the presence of members requiring help with activities of daily living, access to public services or utilities or measurement of household wealth. Questions relating to public services may focus on access to electricity, indoor plumbing or public transportation. Household wealth questions may be relating to the ownership of labour-saving technologies, such as a laundry machine, dishwasher or other assets. Such information can enhance the analysis of time spent on unpaid domestic and care work, which is a primary objective of time-use surveys. It can also help to inform policies on

care work and time poverty, among other things. However, the relevance of including these topics will depend on their prevalence in the national context. Where there are important gaps in data on public services or household wealth, with respect to the general population or priority groups, for example rural populations, low-income households and single parent households, their inclusion as part of the minimum set of background characteristics is recommended.

Some characteristics that are deemed important may have low prevalence in the population or be concentrated in certain geographic regions or among groups that are difficult to reach. In such cases, it is necessary to assess whether or not the survey can support disaggregation to enable robust subgroup estimation or analysis with a sufficient level of precision. Only those background characteristics identified as relevant to meet user demands that the survey can capture with sufficient precision should be considered for inclusion.

Users' needs and data quality concerns should guide the choice of additional background characteristics to include, if any. For example, to support the analysis of unpaid domestic and care work, information on access to and use of care services should be considered. This includes public, private or community services that may be used to substitute for the unpaid work of household members, such as childcare centers, nursing care, domestic workers and nannies. A general measure of self-perceived health may be included to support the basic analysis of how subjective health status is associated with daily activity participation. This may be important in ageing societies where age-related declines in population health, as well as associated care needs, must be monitored over the medium to long term. As part of quality control mechanisms, capturing basic information on the use of timekeeping devices may be considered, particularly in contexts where the rhythms of daily life are less regulated by "clock-oriented" time for a significant part of the population.

In all cases, to ensure that the quality of the time-use data is not affected by respondent burden, the number of background characteristics to be included should be limited to the extent possible.

To serve in the analysis of time-use and activity patterns, it is important that essential background characteristics be collected at the same time or as close as possible to the time-use component. In cases where the sample for the time-use survey has been selected from another household survey, it may be necessary to re-administer or confirm responses to some of the essential background characteristics to ensure that they are up-to-date. This is particularly the case for characteristics that are likely to change over time, such as household composition, marital status, current school attendance and current labour-force status, and the essential employment characteristics of respondents and their spouses.

Box II.7.
Quality considerations relating to background information

- Background information provides a richer data file, which supports more detailed data analysis. However, the amount of information collected must be balanced with the cognitive load associated with collecting data.
- Users' needs and data quality concerns should guide the choice of background characteristics to be included.
- Background information should be collected as close as possible to the dates of the time-use component. For example, if the background questionnaire is collected well before the diary dates, the individual circumstances may have changed, for example a respondent who reported that they were unemployed in the background questionnaire and then reported employment activities in the diary.
- Any background information that is provided by a proxy or the "any responsible adult" methodology,[a] should be recorded.

[a] Individual time-use information should be collected from direct respondents. Some surveys, such as labour-force surveys, collect some household information using the any responsible adult. The Australian Bureau of Statistics (ABS) describes the approach as follows: "The Any Responsible Adult (ARA), or proxy, method of

interviewing is used in a number of ABS household surveys as an alternative to personal interviewing. This involves obtaining information about all the persons in a selected household who are in scope of the survey, from the first responsible adult with whom the interviewer makes contact (rather than speaking to each individual personally). The method is only used for collecting information on topics where other members of the household are likely to be able to answer the question. If the ARA is unable to supply all of the details for another individual in the household, a personal interview is conducted with that particular individual." (Australian Bureau of Statistics (15/02/2022). Labour Statistics: Concepts, Sources and Methods. https://www.abs.gov.au/statistics/detailed-methodology-information/concepts-sources-methods/labour-statistics-concepts-sources-and-methods/2021/methods-four-pillars-labour-statistics/household-surveys. Accessed 28 February 2023.)

E. Survey population

The survey population of a time-use survey consists of two dimensions, namely the persons or "population of interest" dimension and the time dimension. The unit of analysis is a measure of person-time, which is typically person-days or person-weeks over a year. Representation of the time dimension is a feature that is unique to time-use measurement and is discussed in more detail in chapter V below.

The population of interest for time-use surveys is defined in the same as for other surveys and the inclusion criteria are often set on the basis of geography, sex and the age of respondents, although socioeconomic, racial, ethnic and other characteristics may be considered (see box II.8 for considerations when collecting information on time-use from Indigenous populations.) As with all surveys, it is important to align the survey population with the objectives of the survey. This is of particular concern when adding a time-use module to another survey. For example, if the objective is to measure all forms of work, the working age population must be included. A different survey population would, however, be necessary to measure transportation for school-age children or time spent alone among older persons. In order to produce data to report on indicator 5.4.1 of the Sustainable Development Goals, the lower age limit is 15 years old and no upper age limit is required.

Box II.8.
Indigenous populations

Collecting data from Indigenous populations and some ethnic groups presents certain challenges.

Language. If the group speaks a language other than the primary survey language, it will be necessary to translate the survey instruments and supporting materials or engage interpreters. Interpreters need to receive training in the survey objectives, methods and elements of informed consent in order to be effective. As with all surveys, the relationship between local interpreters and the respondents may affect the information reported.

Concepts. Indigenous concepts and variables are often more fluid and dynamic than mutually exclusive western or Eurocentric ideas. Members of Indigenous communities should be involved in providing and/or adapting questions, collection methods and output requirements. The Indigenous perspectives need to be identified and provided by those communities, as often the underlying concepts used in time-use surveys are not necessarily reflective of Indigenous realties. In other words, it is important not to simply translate an Indigenous concept into, or equate it with, a western concept for example, because of the nuances and contexts that influence them. Instruments and classification systems should reflect relevant activities that may be different from the main population.

Customs and structures. It may be necessary to adapt field procedures or workflows or request permission from traditional authorities, such as tribal elders, who can validate the process and share insights on appropriate approaches for data collection.

The goal of many time-use surveys is to measure disparities among social groups. If that is the case, the subgroups must be sufficiently represented in the target population to enable precise estimates.

Direct (not proxy) respondent. In order to obtain the most detailed, accurate information possible, time-use surveys should be conducted with direct respondents who report on their own time use, without the participation or being heard by other household members. Proxy respondents report on the time use of other individuals and may be required to report on the time use of very young children (see

chapter II.F below on Time-use surveys of children for more information). Some countries also allow proxies in other situations, such as when the respondent's ability to communicate is affected by a disability or language barrier and there is no alternative way to obtain the information directly from the respondent. To the extent possible, NSOs should translate questionnaires into relevant languages and use inclusive data-collection modes and instruments to minimize the use of proxy reporting.

F. Time-use surveys of children

Many countries have successfully collected data from children aged 10 and older. Some countries include children as young as 3 years old, in which case caregivers serve as proxy respondents. There are additional considerations to those taken in account with adult surveys when collecting data on children's time use.

1. Why collect data on children?

For children and adolescents to enjoy a healthy childhood and adolescence, they require opportunities for education and developing life skills, creative outlets, such as sports and hobbies, and supportive social networks, which include both peers and adults. Time-use surveys can provide data on these aspects. (The contextual variable "with whom" provides a proxy for supportive social networks). Time-use statistics shed light on the competing demands on children's time that should be spent on activities necessary for healthy development, thus highlighting the extent to which paid or unpaid work is associated with reduced time spent on education or training activities or leisure.

Many children are engaged in own-account agriculture or informal labour for their family, as well as in collecting firewood or water and doing other domestic chores. Gender differences in time use begin early, with girls spending more time on household chores and care work than boys at the global level (Bruce & Hallman, 2008; Mmari et al., 2017; Charmes, 2015; UNICEF, 2016). The burden of unpaid

work limits girls' opportunities to study and develop marketable skills. While primary school enrolment has reached gender parity in approximately three out of four countries worldwide, girls still leave school earlier than boys in many countries, often as a result of competing demands on their time to carry out household chores (Putnick & Bornstein, 2016; Bruce & Hallman, 2008; Larson & Verma, 1999).

In high-income countries, time-use statistics can inform policy priorities relating to aspects of health and well-being other than work. Activities and variables relating to exercise, screen time, active travel and independent travel, time in school or studying, and time with parents and peers can inform steps to improve outcomes with respect to child and adolescent lifestyles, sleep, learning and psychosocial well-being.

2. Ethical issues

Ethical issues relating to surveying children on time use are the same as those for surveying children on other topics, but they are important to consider at an early stage. NSOs need to develop informed consent and assent tools and procedures that are tailored to children and secure ethical approval. Survey programmes that do not normally collect data directly from children should consult a comprehensive reference on ethical approaches to collecting data from children.[20]

[20] Some resources are: Alderson, P., & Morrow, V. (2020). *The Ethics of Research with Children and Young People: A Practical Handbook*. London: Sage.
Graham, A., Powell, M., Taylor, N., Anderson, D. & Fitzgerald, R. (2013). Ethical Research Involving Children. Florence: UNICEF Office of Research - Innocenti. https://www.unicef-irc.org/publications/706-ethical-research-involving-children.html (in English, French and Spanish)
Schenk, Katie and Jan Williamson. 2005. *Ethical Approaches to Gathering Information from Children and Adolescents in International Settings: Guidelines and Resources.* Washington, DC: Population Council. https://knowledgecommons.popcouncil.org/departments_sbsr-hiv/316/
Thompson, S., Cannon, M., Wickenden, M. (2020). *Exploring Critical Issues in the Ethical Involvement of Children with Disabilities in Evidence Generation and Use*, Innocenti Working Paper 2020-04, UNICEF Office of Research – Innocenti, Florence. https://www.unicef-irc.org/publications/pdf/IWP-Working-Paper-ethical-involvement-of-children-with-disabilities-in-evidence-generation.pdf

Surveys should be conducted in accordance with national laws and conventions, but the usual procedure is to obtain informed consent from the parent or guardian of the child and then verbal assent or agreement from the child. Even if the age at which children are able to grant their consent is under 18 years of age, it may be necessary to obtain permission from the head of household or a parent to ensure that they can take part in the survey.

The informed consent statement for adults must be adapted using language that is appropriate for children. While younger children might not understand all the details about privacy and confidentiality, it is important that they understand what is expected of them and that they can choose whether to participate or not, and that if they participate, they can take breaks or stop whenever they want to. Moreover, while child respondents should have the same degree of confidentiality, anonymity and data protection as adult participants, when it comes to matters of child protection, there is a clear duty to ensure the safety of the child over any responsibility to guarantee confidentiality.

In order to ensure the protection of the child and that of the interviewer, it is important that a parent or an adult known to the child is in the vicinity, but not too close to where the interview is taking place, for example within view or calling distance, but not able to overhear what is being said. However, if a child wants their parent or caregiver to be present, this should be agreed.

3. Population sample

Selecting the sample. Including younger children in the sample does not affect the two-stage sampling approach whereby the household is selected first, followed by the respondents within the household. The inclusion age is lower, but household members are listed in the same way, and either all the household members are selected or the respondent is randomly selected from the household listing, according to the survey protocol (see chapter V).

Minimum age. Different countries have different minimum ages. In the 2020 HETUS guidelines, the minimum age recommended is 10 years of age. Italy and Romania collect data on children from the age of 3 years old. Other countries in Europe start collecting data from 7 years of age (Bulgaria), 8 years of age (United Kingdom of Great Britain and Northern Ireland) and 9 years of age (Norway). In Morocco, data have been collected from children from 7 years of age, in South Africa from 10 years of age and in Mexico from 12 years of age.

Proxy respondents. Proxy respondents are needed for very young children. From the age of between 8 and 10 years old, most children can report on their own time (Eurostat, 2016). A proxy respondent, however, has the potential to improve or reduce the quality of the data. Quality is improved because adults are better at estimating time and may be better at recalling activities carried out. Most children, however, spend significant amounts of time away from their primary caregiver every day, so proxy respondents may not report activities carried out accurately. Individual children vary in their abilities and maturity, which means that some are better at self-reporting than others. In Italy and Romania, the quality of self-report children's diaries were assessed in terms of the number of episodes per day, simultaneous activities and non-response (failing to complete the diary). In Italy, it was found that the quality of data was similar for children and adults. Romania found that the quality of answers provided by children between 8 and 9 years of age was lower, but the quality of data provided by children over 10 years of age was comparable to that of adults. (March 2022 HETUS presentations)

Different countries have different policies on proxy respondents. In Italy and Romania for example, proxy respondents or assistance from a parent is permitted for children under 14 years of age. In Morocco, the ethical review board allowed the parents of children up to 14 years of age to be present if they chose and to provide assistance if the child wanted it. In the United Kingdom, proxy respondents are not used. Surveys should be flexible and allow proxy respondents or at least assistance by parents if the child wants it.

Where proxy respondents are used, this should be flagged in the database and explained in dissemination products. Mixing proxy respondents with self-responses might affect comparability.

4. Time sample

Number of days. One option for reducing the burden on children is to ask for only one reference day, even if the diary calls for two days for adults.

Seasonality. Children's time use is often structured around the school day and term. Survey managers must decide how the school year will be represented if a survey covers only part of the year. Since schools play an important role in for design programs' interventions and stablish policy priorities, it is recommended that time-use surveys of children always include the school term. As with all time-use surveys, comparisons between surveys should consider how days were sampled.

5. Survey instrument

Many smaller studies use a mix of qualitative and quantitative methods, for example the pilot study conducted in Hungary (Viragh, 2018) or research carried out by Young Lives in Ethiopia, India, Peru and Viet Nam (Espinoza Revollo and Porter, 2018). At the national level, however, surveys, whether they based on stylized questions or light or full diaries, tend to use the same instruments for children and adults, with some modifications.

Children will need simplified instructions and tailored examples for self-complete diaries. For a light diary with predefined categories or stylized questions, the examples of what activities fit into each category should be relevant to activities that children do, using language that they understand. In settings where children often provide care for younger siblings, it is necessary to clarify how to distinguish between playing together and providing care.

Depending on the survey objectives, the activity categories may need to be more detailed and perhaps distinguish between physically active and more sedentary recreation or types of study or education. As

an example, Romania has three separate categories for formal school/university, homework and free-time classes. The contextual variable "with whom" may require different options, to distinguish between time with siblings, peers and adult non-relatives.

For free-text diaries that are post-coded, it may be necessary to add categories for when insufficient information is provided, for example if a child reports being with a parent or other person but does not specify an activity or traveling with a parent for an unspecified reason.

Layout and structure. In pilot tests in Italy and Hungary, as well as the Growing Up in Australia study and Millennium Cohort Study, it was found that children were more engaged by visually appealing self-complete diaries and visual aids in interviews. In Hungary, a five-point emoji scale was used for rating subjective well-being, which children preferred more than selecting a text description of how they were feeling. While having them choose from the 15 text descriptions resulted in more accurate information being provided, it was much more time-consuming. To get young children to report on eating and drinking, children were provided with stickers to put on paper diaries as part of the Growing Up in Australia study. They were also given pens with a built-in clock so that they could record exact times.

For light diaries in Hungary, it was found that a list of "favourites" or common activities worked better than hierarchical menus where the child first chose the broad category, then a more specific activity.

6. Mode and enumeration procedures

Children are better at remembering what they did and the order that they did it in than they are at estimating how long it took. Rather than start with waking up and proceeding chronologically through the day with activities and times, it may be better to first record the most memorable activities of the day and then fill in other activities and durations to reconstruct the day around these anchoring points. On a school day, children will have regular times for waking up and going to school at least. On

weekend days, they may have other structured activities or even television programmes that they watch that can be used as a guide. This type of non-linear reconstruction of the day is important to consider when designing a diary. It should be possible to navigate back and forth in a digital diary to fill in less memorable activities around the anchor points, as well as to correct mistakes, adjust times or add forgotten activities.

Mode choice. Children should be able to choose between interview-administered and self-completed diaries and between paper and digital self-completed diaries, if those options are offered to adults. Some children will feel more comfortable using a digital diary, while others will prefer a paper diary. If there is no paper diary option, children may be given instructions suggesting that they jot down the activities for the day on paper first, before starting the CAWI diary, for those who would have preferred to use paper. This can be especially helpful for parents who are helping young children, as young children are more prone to forgetting activities and need more back and forth to recall them all.

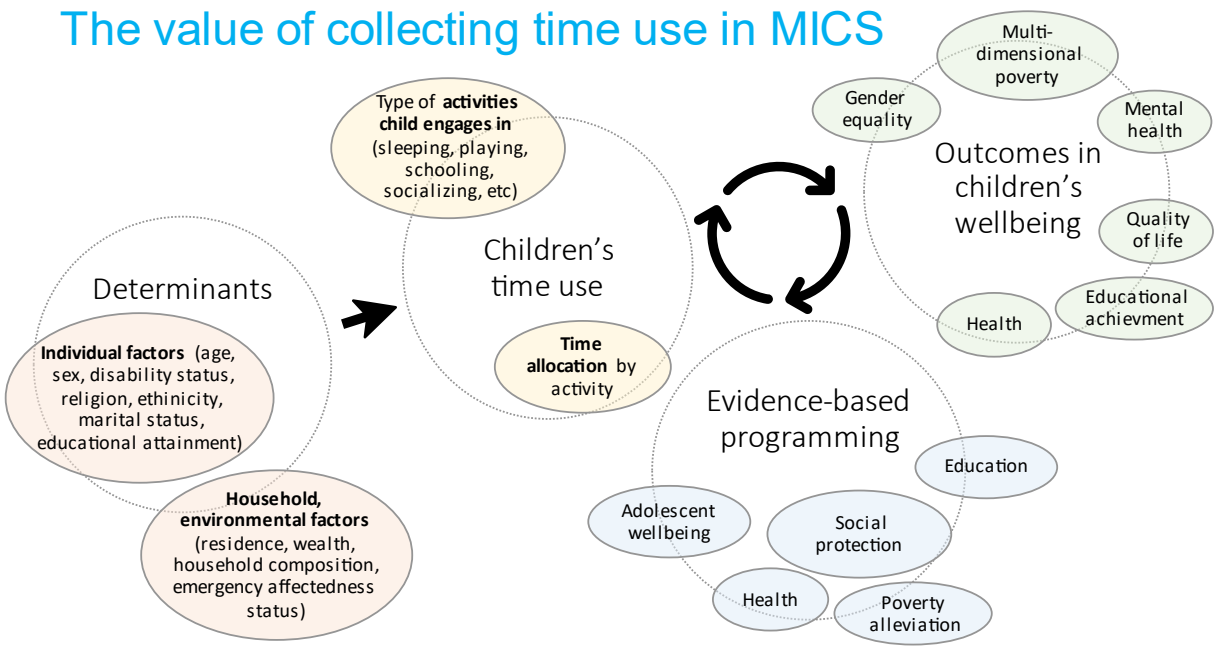
Box II.9.

Measuring how children spend their time in multi-topic household surveys: New United Nations Children's Fund supported Multiple Indicator Cluster Surveys children's time-use module

While a number of dedicated time-use surveys collect information on children's time use, most data-collection efforts focus on the adult population. The lack of standardized data-collection instruments to measure children's time use hinders the ability to understand how it affects their well-being and shapes their opportunities.

The UNICEF-supported Multiple Indicator Cluster Surveys currently collect data on a range of outcomes in children's well-being, such as their educational achievement and health, and their living conditions, including time spent on household chores and economic activities. With the development of a full time-use module to capture the types and durations of all activities children engage in, it will be possible to assess how patterns in children's time use differ by age and sex,

and how these patterns correlate with their well-being. These data will also enable the analysis of the impact that girls' disproportionate burden of unpaid work has on other activities that they may have less time to engage in, such as playing, learning and socializing. Overall, countries will have a better understanding of children's lives and their participation in society, which can inform policy and programming for children more effectively.



Considerations for time-use data collection in MICS

The process of developing and testing the MICS children's time-use module was guided by the following considerations:

- Activities had to be representative of how children spend their day across a range of settings globally and be relevant to UNICEF policy and programming on children.
- A compromise was needed between the desired granularity of the information obtained and the complexity of activity coding and interviewer training.

- Introducing time-use data collection into MICS should not adversely affect the overall quality of the survey.

The following issues were explored by reviewing existing literature and time-use instruments and conducting three rounds of field testing, in Malawi, Belize and Zimbabwe between 2017 and 2022:

- Stylized questions versus time diaries.
- Child reports versus caregiver reports.
- Adaptation of ICATUS 2016 to prioritize children's activities.
- Inclusion of contextual questions.
- Additional respondent burden and implications for interviewer training in the context of a multi-topic survey.
- Feasibility of implementation in more traditional rural societies where tracking time may not be culturally relevant.

	Malawi (2017)	Belize (2019)	Zimbabwe (2022)
Instrument	**Stylized questions with 2 reference periods** (7 days & 24 hrs.)	Survey-based **time diary** (past 24 hrs.) **Adaptation of ICATUS 2016 to prioritize children's activities**	Survey-based **time diary** (past 24 hrs.) **Further adaptation of ICATUS 2016** Introduction of **contextual questions**
Sample design	Split purposive sample of 447 households in 2 rural districts (Nkhata Bay and Balaka)	Probability-based sample of 680 households in 2 districts (mostly rural; urban)	Split purposive sample of 250 households in urban, peri-urban and rural settings in Mutare
Respondent	Proxy reporting by **primary caregiver** of children aged 5-17	Proxy reporting by **primary caregiver** of children aged 5-17	**Self-reporting by adolescents aged 15-17 and proxy reporting by primary caregiver** of adolescents aged 15-17
Implementing partners	UNICEF Malawi & Malawi National Statistical Office	UNICEF Belize & Statistical Institute of Belize	UNICEF Zimbabwe & Zimbabwe National Statistics Agency

Key findings from the field-testing process

- In general, respondents were pleased to speak about their day or their child's day.
- In Malawi, stylized questions required detailed probing for accurate reporting and assistance from the interviewer to aggregate the information over the reference period of one week. Respondent fatigue was observed, potentially owing to the cognitive burden of recalling activities and summing time spent on them. The 24-hour reference period proved easier for respondents. In fact, respondents usually provided answers for the previous 24 hours even when asked about the past week.
- The experience in Malawi confirmed the expected challenges of collecting accurate time-related information in rural, low-literacy settings where respondents provided non-numeric responses (e.g. "not long", "a bit") that required time estimation after extensive probing.
- Some limitations were observed with proxy respondents in all the field tests. In Malawi and Belize, caregivers were not able to report what activities their child had done or for how long on a day that the child was away from home. In Zimbabwe, where the reports of direct and proxy respondents were compared, it was noted that caregivers found it harder to report activities engaged in by adolescents than the adolescents themselves. The preliminary results of this field test show that there are differences between proxy reports and self-reports, but the extent and meaning of these differences need to be further analysed.
- The time diary method was considered a better fit for measuring time use in MICS. Time diaries are a facilitated conversation rather than a scripted set of questions. They require special interviewing techniques that differ from the way that typical survey questions are administered. Chronological reporting in time diaries seems to help respondent's recall and

is not too time-consuming, even though probing is needed to avoid gaps in the accounting of activities. It is also challenging for interviewers to identify the main activity when simultaneous activities are reported (e.g. eating while watching television).

- The use of CAPI can minimize entry and estimation errors through prompts and consistency checks, but it can also interfere with the interview flow and the interviewer's performance.
- Developing a time diary that is meaningful for children involved two steps:
    1. Reclassifying and regrouping the ICATUS 2016 activities and introducing new activity labels to prioritize children's activities and align with UNICEF programming, for example school attendance in person or remotely, gaming as a distinct activity that is different from play, socializing in person or using digital technologies, social media as entertainment.
    2. Introducing contextual questions related to homework support and tutoring as well as digital or online engagement associated with learning, socializing and civic participation.
- Overall, the ICATUS 2016 adapted activities and contextual questions were well understood by interviewers and respondents.
- In general, the quality of time-use data depends on whether there is a good interviewer-respondent rapport and whether the interviewer has strong interviewing skills. With adequate training and practice, interviewers' probing and activity coding skills significantly improved. The customization of training manuals to provide country-relevant

examples can help to make activity coding easier for interviewers. Sufficient time for training is central to obtaining quality time-use statistics.

Roll out of the Children's Time-Use Module in MICS

The seventh round of MICS, which were officially launched in March 2023, offers a complementary module on time use for children aged between 10-17 years in countries wishing to collect these data. The module is included in three individual questionnaires and administered to different respondents as described below.

For children aged between 10 and 14 years, the module is included in the *Questionnaire for Children and Adolescents Age 5-17* and administered to the mother or the primary caregiver of the child randomly selected for interview, if that child is aged between 10 and 14 years.

For adolescents aged between 15 and 17 years, the module is included in the *Questionnaires for Women and Men Age 15-49* and administered directly to the adolescents.

The module and accompanying tools, including administration guidelines, interviewer instructions, protocols and ethical considerations for interviewing children and adolescents, are available at https://mics.unicef.org/tools .

G. Use of harmonized classifications of time-use surveys

ICATUS 2016 is a classification of all the activities on which a person may spend time during the 24 hours of a day. It is intended is to serve as a standard framework for time-use statistics based on activities that are grouped in a meaningful way. It is important that countries that are starting to conduct time-use surveys use an international classification system. Harmonized classification systems make it possible to compare statistics across countries and time.

ICATUS 2016 provides a framework that includes standardized concepts and definitions for the systematic dissemination of internationally comparable time-use statistics, regardless of the type of instruments used for data collection. ICATUS 2016 can also be used to guide the collection of time-use data or adapted by countries to develop classifications that reflect the national context and needs.

ICATUS 2016 was developed on the basis of internationally agreed concepts, definitions and principles in order to improve the consistency and international comparability of time use and other social and economic statistics. These include the production boundaries defined in SNA and the definition and framework for labour statistics adopted by the nineteenth International Conference of Labour Statisticians. In ICATUS 2016, the basic principle applied in classifying activities is that daily activities can be categorized into those that are considered productive and those that are considered personal activities or "non-productive" from an economic point of view. The resulting structure highlights time spent on all forms of work, as well as time spent by people on personal activities, to obtain statistics on time spent studying, socializing, exercising and on many other activities defining the general well-being of the population.

ICATUS 2016 serves as an important input for monitoring progress made towards the achievement of the Sustainable Development Goals and targets, including indicator 5.4.1 on the proportion of time spent on unpaid domestic and care work, by sex, age and location. MHI is based on ICATUS 2016. Annex 4 shows how the MHI activity categories are mapped onto ICATUS 2016, HETUS and CAUTAL.

ICATUS 2016 was developed to achieve:

- Mutually exclusive and exhaustive categories.
- Comparability with other related national and international standard classifications.
- Categories that are well described.

Box II.10.
Quality checklist: scope and coverage

- Consider the extent to which the survey content addresses the identified data needs.
- Ensure that the highest priority needs are addressed.
- Consider the level of detail required in activity classification to meet data needs, but balance this against how easily responses can be coded to that level.
- Where data collection is new or has been substantially redeveloped, consider keeping activity classification flexible enough to be iterated in response to issues encountered when coding diary entries (e.g. removing a category if very few responses are coded to it).
- Undertake cognitive testing to determine whether diaries or stylized questions accurately measure the intended concepts.
- Consider the mode of data collection, for example self-administered or interviewer-administered, retrospective or prospective.
- Consider the length of diary time periods, which are most often 5, 10 or 15 minutes, while balancing the respondent burden against the desired level of precision in measurement.

- Consider the number of diary days collected from each respondent while balancing the respondent burden against any improvements in accuracy.
- Consider providing examples of a completed diary to increase the respondent's understanding of the expected responses and level of detail.
- Consider retaining and using respondents' personal details for the purpose of validating the match between the background questionnaire and time-use records. Determine whether and how this can be done in accordance with applicable legislative and privacy frameworks.
- Consider the data entry and processing requirements for the content included, and the impact on timely data dissemination.
- Consider whether the content is coherent with other data sources available.
- Ensure that data-collection modes are coherent (e.g. paper diary versus electronic diary).
- Design a method for reliably matching questionnaire records with diary records.
- Consider comparability with previous iterations of the survey and with international time-use surveys.
- Consider implementing electronic data-collection methods to improve accessibility and reduce collection costs.
- Consider activity classification from the perspective of data users to determine whether category groupings make instinctive sense.
- Consider which activity classification will be used, for example ICATUS 2016, HETUS or another classification.

- If country comparisons are a data requirement, consider using internationally recognized activity classifications.
- If using MHI activity categories, ensure that it covers the key activities of interest and understand the limitations.
- If designing your own activity classification, it is important to avoid duplication and the overlapping of categories.
- Undertake cognitive testing to identify any aspects of the diary that create a particularly high cognitive load.
- For interviewer-administered dairies, provide survey-specific training for interviewers.
- Consider the usability and respondent experience associated with diary collection instruments. Use visual features and the layout to alleviate the cognitive load and aid respondents' natural ways of thinking about how they spend their time.

III. Survey instruments for collecting time-use data

There are many choices to consider during the stage of instrument design. Decisions are linked to the survey objectives as well as the available resources at the NSO and the characteristics of the target population. Regardless of the choice of instrument, it is recommended that all time-use surveys are made consistent with the Minimum Harmonized Instrument (MHI), further described below. The MHI includes a minimum activity list that can be used in diary or stylized questions format, as well as minimum essential background questions.

This chapter discusses the two most common instruments used to collect time-use data from individuals—24-hour time diaries and stylized questions—as well as household questionnaires to collect background information. Chapter IV Survey frameworks for collecting time-use data discusses the type of survey that these instruments are placed in (stand-alone/dedicated time-use survey or module in multi-purpose survey) and data collection mode (self-report or interview; electronic or paper).

A. Harmonization efforts in time-use surveys

There is no one single solution that would respond to the data needs of all countries. A common conceptual framework, however, can improve international comparability across diverse instruments and modes of data collection.

As previously mentioned, in 2022 the Statistical Commission endorsed the minimum harmonized instrument (MHI) for time-use data collection, to be used by national statistical offices in the proposed format, or to be considered as the basis for the design of a more detailed time-use data collection using either diaries or stylized questions. (see chapter II *Scope and coverage of time-use data.)* The minimum harmonized instrument has been designed for digital data collection but can be used with paper.

If additional questions or activity categories are added, it is important to maintain the structure of categories used in the International Classification of Activities for Time-Use Statistics (ICATUS). The minimum list proposes categories to gather information on time spent on activities corresponding to ICATUS 2016 major divisions but it is possible to further disaggregate information at the two-digit level (for example, for care activities) while ensuring that the activities being asked about are mutually exclusive and exhaustive. For example, the ECLAC Minimum Set of Time-Use Activities for Latin America and the Caribbean maintains the activity list for most items and further disaggregates unpaid care. Developing care policies is a regional priority, requiring more detailed knowledge of specific activities. However, results from the 31 categories in the Latin American and Caribbean minimum list can be aggregated back into to the 25 of the MHI minimum list for international comparisons.

The scope and coverage of time-use surveys described in this section will focus on the minimum essential information countries should collect, but the selected instrument (comprised of background questionnaires, either stylized questions or diary and linked contextual questions) can be expanded as needed to meet a country's survey objectives. NSOs have a range of options to choose from: instruments based on diaries or stylized questions, but also stand-alone surveys or modules in multi-purpose surveys, interviewer-administered or self-complete paper or electronic modes discussed in more detail in Chapter IV. They may sample one or more household members, covering one or more days. These options are outlined in Part Two, Key design specifications for time-use surveys. All time-use surveys, however, must use an activity classification system to measure main and simultaneous activities and, where possible, their context. They must collect background information to correctly categorize activities, guide follow-up questions, and allow for sub-population analysis.

The exact wording of activity descriptions will need to be determined at the country level, so that the understanding of activities is relevant in the country context.

Table III.1. Minimum Harmonized Instrument Activity Categories, Contextual Dimensions and ICATUS 2016 Definitions

	Activity	Description	Contextual information	ICATUS 2016
1	Working in paid job or income generating activities	**Includes:** • Paid work as employee including overtime • Helping in family business or farm to produce goods mainly for sale • Growing produce for sale, raising animals or fishing mainly for sale, making goods for sale, buying and reselling goods, providing services for pay • Reading work related documents and mail • Working as a driver, e.g. taxi driver • Training and studies in relation to working in paid job or income generating activities recognized by the employer or directly linked to one's job **Excludes:** • Lunch should be coded under "Eating and drinking" • Gaining skills or workplace experience by unpaid trainees, apprentices, interns and related activity to be added as "Other" • Seeking job or setting up a business to be added as "Other" • Commuting from home to workplace should be coded as "Travel"	Location Use of ICT For whom With whom Is the activity paid or unpaid	Major division 1

1	Probing questions: For interviewer assisted collection tool, where the proposed background questionnaire is used, the following probing question is suggested for countries wishing to make direct link between labour force and paid work activity from the diary. In a self-completion collection tool, the contextual information "for whom" should be used as it may be too complex to correctly program the probing question. Was this activity done for one of your jobs? If so, which one? • Yes, main job • Yes, secondary job • No **Ask additional questions below** **Additional questions** D1. I need to verify some information with you. I recorded earlier that you do not own either a business or a farm, that you did not do any work for pay in the last week, and that you did not have a job, including a job from which you were absent. Is this correct? 1. YES → Continue with diary 2. NO → Correct responses to relevant labour force questions			
2	Making goods for own household or family use	**Includes:** • Growing produce (including kitchen gardening), raising animals or fishing for own household or family use • Preserving food, making flour, making clothes, textiles, mats, other goods for own household or family use • Working on own or family home construction/renovation **Excludes:** • Small repairs should be under... ("Maintaining and making small repairs in own or family dwelling") • When done as help to friends or other persons, for example, helping a friend with a home renovation.	Location For whom With whom	Major division 2
3	Volunteer work	**Includes:** • Helping without pay neighbors, friends and other non-related people • Working willingly without pay for the community or organizations	Location For whom With whom Is this activity paid or unpaid	Divisions 51, 52

4	Preparing and serving food and meals for own household or family members	**Includes:** • Cooking, serving foods, cleaning after cooking • Setting up the table • Putting away clean dishes **Excludes:** • Preserving food, grinding flour should be classified under "Making goods for own household or family use"	With whom Location For whom	Division 31
5	Cleaning own or family dwelling	**Includes:** • Cleaning inside and outside • Recycling and disposing trash • Upkeep of plants (landscaping, lawn and plant care)	With whom Location For whom	Division 32
6	Maintaining and making small repairs in own or family dwelling	**Includes:** • Small repairs of dwelling • Vehicle maintenance and repairs • Repairing small appliances **Excludes:** • Construction and major renovations should be coded under "Making goods for own household or family use"	With whom Location For whom	Division 33
7	Cleaning and care of clothing and footwear of own household or family members	**Includes:** • Hand/machine-washing, hanging clothes • Ironing • Mending clothes • Cleaning and repairing shoes **Excludes:** • Making clothes should be coded under "Making goods for own household or family use"	With whom Location For whom	Division 34
8	Managing own household or family	**Includes:** • Paying bills • Budgeting • Planning, organizing duties and activities in the household	With whom Location Use of ICT For whom	Division 35

9	Taking care of pet of own household or family	**Includes:** • Walking the dog • Feeding dog, cat, fish • Visiting the veterinary or other pet services (grooming, stabling, holiday or day care) **Excludes:** • Activities related to animal husbandry (tending animals) should be coded under "Working in paid job or income generating activities" or "Making goods for own household or family use"	With whom Location For whom	Division 36
10	Shopping for own household or family	**Includes:** • Grocery shopping • Ordering home supplies online • Browsing clothes for kids online **Excludes:** • Acquiring supplies for income generating activities should be coded under "Working in paid job or income generating activities"	With whom Location Use of ICT For whom	Division 37
11	Taking care of own (household or family) child (use country definition of child)	**Includes:** • Talking, playing with children • Feeding children • Bathing, dressing, changing child • Putting child to bed • Helping with homework • Passive care/minding/supervising	With whom Location For whom	Division 41
12	Taking care of or helping adults (own household or family) (use country definition of adult)	**Includes:** • Washing, dressing, changing dependent adult • Preparing medicines for elderly household or family members • Completing bank forms, insurance claims for dependent household or family member • Collecting pension for dependent household or family member • Paying taxes for dependent household or family member • Taking care of temporary sick adult • Passive care/supervising • Cutting hair of my partner or adult in the family (not for pay) **Excludes:** • Taking care of children • Helping not related people from other households, such as neighbors, friends	With whom Location For whom	Divisions 42, 43

12	Probing questions: Depending on the survey instrument setting, a country has the option to use a probing question or to use the contextual information "For whom" for coding purposes. To probe for dependent adults: Was this activity done for one of the household members: Yes, who from the roster? No.			
13	Education	**Includes:** • Attending classes • Attending club at school • Doing homework • Watching lecture online • Taking cooking course	Location Use of ICT	Major Division 6
14	Socializing and communication	**Includes:** • Talking to neighbor • Phone calls and texting • Going to birthday parties • Visiting relatives, friends • Writing letters and preparing seasonal postcards **Excludes:** • Work-related email should be coded under "Working in paid job or income generating activities"	With whom Location Use of ICT	Division 71
15	Community participation, civic and related responsibilities, and religious practices	**Includes:** • Participating in local parades, festivals • Attending a civil ceremony (marriage) or funerals • Going to vote or attending trial as witness • Meditating, praying • Participating in religious celebrations and ceremonies	With whom Location	Divisions 72, 73, 74
16	Cultural, entertainment and sports events	**Includes:** • Going to the movies, theater, music festival • Visiting historical place, monument • Going to the zoo • Going to amusement park, theme park • Going to the baseball, basketball game, watching sport event at site	With whom Location	Division 81

17	Hobbies, games and other pastime activities	**Includes:** • Hobbies (painting as hobby, taking pictures, etc.) • Playing video games • Playing on mobile phone • Gambling • Resting, reflecting and relaxing	With whom Location Use of ICT	Division 82
18	Sport participation and exercising	**Includes:** • Playing soccer, basketball, etc. • Running or walking for exercising • Going to the gym • Practicing Zumba **Excludes:** • Walking or running with specific purpose (different than exercising) should be coded accordingly, for example under "Travel", "walking the dog" under 9 Taking care of pet of own household or family	With whom Location	Division 83
19	Reading for leisure	**Includes:** • Reading for leisure a newspaper, a book, novel/poems/literature, graphic novel • Going through social media • Reading an article on Facebook, website/blog • Scanning a magazine **Excludes:** • Reading to child should be coded under childcare • Reading for work or learning should be coded under "Working in paid job or income activities" or "Education".	Location Use of ICT With whom	Group 841
20	Watching TV/Listening to radio or streaming	**Includes:** • Watching video on YouTube • Watching TV • Watching/streaming movie • Listening to radio, music, audiobooks **Excludes:** Watching videos related to work or learning should be coded under "Working in paid job or income generating activities" or "Education"	With whom Location Use of ICT	Groups 842, 843

21	Sleep	Includes: • Night sleeping • Napping • Staying in bed without sleep (Sleeplessness) **Excludes:** Resting should be coded under "Hobbies, games and other pastime activities"	Location	Division 91
22	Eating and drinking		With whom Location	Division 92
23	Personal hygiene and care	**Includes:** • Having a bath or shower • Taking bath at a common place/bath/sauna • Applying sunscreen • Getting dressed • Applying contact lenses, using asthma aerosol • Sick in bed • Preparing and taking medicines • Having hair cut or getting nails done • Receiving assistance with personal hygiene, dressing, showering, etc. • Visiting the doctor	Location With whom	Divisions 93, 94
24	Travel	**Includes:** • Traveling, commuting • Moving from point A to point B • Walking and running if the purpose is to reach a different location/place **Excludes:** • Walking and running for exercising • Driving for job, for example taxi drivers.	Purpose Mode of transportation With whom	
24	Probing questions: What was the purpose of the travel: • Going to work • Going back home* • Going to school • Going shopping • Accompanying own household or family members • Accompanying others • Other • Location: Location is given as a generic description of where respondents are (home, work, school, etc.). If they are travelling, location is defined in terms of how they are travelling (car, walking, bus). *This activity should be coded according to the previous activity			

25	Other (specify)	**Includes activities not listed or mentioned before, such as:** • Gaining skills or workplace experience by unpaid trainees, apprentices, interns and related activity • Seeking job or setting up a business	Is this activity paid or unpaid? For whom With whom Location Use of ICT	

Box III.1. Time-use surveys in times of crisis

During a crisis, people's behaviors change. During the COVID-19 pandemic, many people began working from home. With schools and childcare services closed for extended periods, parents had to balance caregiving with their other responsibilities. Many older people were isolated from their usual activities and social contacts. In such changing circumstances, governments need updated information to create policies to respond to new needs. This short video summarizes the importance of time-use statistics in the COVID pandemic.

Rapid surveys

In 2021, the EG-TUS developed a short instrument and guidance for time-use studies during crises. Such a study is not designed to be comparable to previous time-use surveys or to replace a time-use survey, but rather to quickly provide a snapshot of current time use. The minimum required data collection period is 7 days—far less than a normal time-use survey. The instrument uses stylized questions, not a diary, and includes questions asking respondents to compare their current time use to before the crisis. It is designed for phone interviews but can be adapted for face-to-face or online interviews as appropriate for the local context and contact information available for sampling. There is also an abbreviated crisis background questionnaire.

Crises may be protracted (as with ongoing conflict or complex humanitarian emergencies) or may have an acute phase followed by a recovery period. This latter is more common with natural disasters

and was the case with the COVID-19 pandemic. In the acute or emergency phase, the main priority is saving lives and meeting basic needs, and conducting even a rapid phone survey on time-use may be difficult or inappropriate. Conducting a crisis time-use survey is more appropriate in the recovery phase or in a more stable protracted crisis. The Methodological guide on time-use measurements in Latin America and the Caribbean describes rapid gender assessments as well as time-use surveys carried out during the second year of the COVID-19 pandemic (ECLAC, 2022, Boxes IV.8 and IV.9).

Full time-use surveys

The COVID-19 pandemic caused many countries to cancel or postpone planned surveys, but several countries were able to carry out full time-use surveys after the initial stage of the pandemic.

Bangladesh Bureau of Statistics (BBS) conducted their first standalone national survey during COIVD-19 in 2021. Conducting time-use survey in such a difficult situation was challenging. BBS had to take extra measures to keep field enumerators, supervisors and data provider safe from coronavirus infection. BBS adopted appropriate health measures for enumerators and interviewees and ensured proper physical distance; all interviews were conducted in a suitable accommodation as per strict instruction given by the time-use survey core team.

Keeping the pandemic situation in mind, each enumerator was given adequate health and safety information to keep them safe as well as their interviewees. Strict health measures were maintained during training sessions organized by BBS and UN Women. BBS trained reserve enumerators in case they had to withdraw enumerators from the field due to sickness.

As face-to-face interaction was an inevitable part of the survey, BBS took several steps to reduce virus transmission. Each team was provided with adequate masks and sanitizers to keep them safe during data collection. They also provided masks to respondents for the interview. Interviews were

conducted in open places, with only the interviewer and respondent present. Reasonable physical distance was maintained for each interview as instructed by BBS and field supervisors. Enumerators were assigned for 3 households per day in each Primary Selected Unit (PSU).

A team of senior BBS officials were deployed in different districts to check health status of each team for regular monitoring as well as to provide positive encouragement to the data collection teams. Regular follow up with data collection teams helped to understand the field scenario. Only in one case, one enumerator was taken back as the person was not feeling well. BBS immediately replaced with another data enumerator to continue field operation as we had reserved data collectors.

BBS Field Offices were mobilized to follow up with the data collectors and support (along with transport and accommodation) was provided by the field offices as required. The Director General, BBS sent letters to each District Commissioner requesting them to provide support in COVID–19 situation when necessary. They received support from the local government representatives in many locations.

Access to some households in the city corporation areas were challenging. However, BBS took appropriate measures to create enabling environment for the enumerators to collect data within a set timeline.

In each 15 days BBS collected filled-in questionnaires from the field for completing editing and coding activities. It reduces time as well as helped to assess teams performance and to guide them accordingly.

Colombia's National Division of Administrative Statistics (DANE) also conducted a time-use survey in 2021. At the time, schools and childcare services were closed and people who could were working remotely. Like Bangladesh, Colombia implemented infection prevention policies.

Interviewers also gave respondents the option of doing the survey by phone. Only 2% of respondents chose phone interviews over face-to-face.

To create awareness of the survey, they distributed flyers and a video with sign-language interpretation. The field schedule sometimes had to be adjusted, which led to unbalanced days of the week. DANE addressed this with weights during analysis.

B. Instrument alternatives: diary or stylized questions

The typical instruments used to collect time-use data are diaries and stylized questions, which are used in combination with questionnaires recording background information. The definitions in this section are consistent with the EG-TUS Concepts and Definitions, as presented at the 51st Statistical Commission (UN, 2020).

Time-use diaries capture the full sequence of activity episodes performed during a specific reference period (e.g. a full 24-hour period, a weekday and a weekend day, etc.), together with the starting and ending time of each activity. As such, time-use diaries provide information on the duration, timing, sequence, and number of episodes of specific activities during the reference period.

In a diary, the respondent reports each activity episode, in order, throughout the reference day. In addition to the activity, respondents are often asked about additional information for the episode, such as whether they were doing any other simultaneous activity, where they were or who they were with. [See Section IIC, Contextual Variables, for more detail.] Respondents usually reconstruct their day chronologically independently. However, there are occasions in which respondents could be prompted—for example, if the respondent leaves out any common activities such as eating or sleeping, or activities such as childcare if they have a young child in the house, or travel between activities in different locations.

Stylized questions ask respondents the total amount of time they spent on selected activities during a specific reference period. Stylized questions may use categories covering all possible activities or may be limited to a specific subset or subsets of activities (such as only unpaid domestic and care work). A limited set of questions can be exhaustive if the categories are broad enough; more precise activity categories require more questions to be exhaustive. The respondent totals the amount of time they spent on the activity category during the reference period, over all episodes. This gives a total amount of time. It does not capture the timing of the activities, nor the sequence of activities, nor the number of activity episodes during a given reference period.

Both instruments produce information on which activities a respondent engages in and for how long. Diaries further provide information on specific episodes, for activities done more than once in a day. Rushing through breakfast is distinguished from a more leisurely dinner with others. Diaries also permit more complex analysis of the sequence and timing of activities.

Table III.2 summarizes some of the key features of each type of instrument. The subsequent sections describe each in more detail.

Table III.2. Comparison of features of stylized questionnaires and 24-hour diaries

Considerations or Objectives	Stylized	Diary
Timing/sequence	It does not collect the timing in which the activity occurs.	Can collect, thus improving accuracy, aided recall, and enhance data uses/type of outputs
Simultaneous activities	Can collect in a limited way (e.g. questions can ask about activity	Can collect even at episode level

	pairs, or time spent doing X while doing something else)	
Activity context	Can collect if included in the question	Can collect even at episode level
Completeness	Questions about specific activities prompt memory, improving recall and reporting; these activities unlikely to be accidentally excluded. Could be over or under the number of hours of the reference period (a day could have data for more or less than 24 hours)	Some activities may be forgotten and under-reported. Activity information (main activity) should add up to the exact number of hours of the reference period (though can have missing time slots)
Simplicity	Simple to collect and process. Produces same type of output (number of minutes or hours) for all respondents.	Processing and analyzing data are more complicated in particular for full diaries. Respondents provide varying levels of detail.
Literacy and comprehension	Respondents with low literacy can have difficulties with activity categories (e.g. categories encompassing many activities)	Respondents with low literacy can have difficulties with self-complete forms

Cost	Data processing and analysis are simpler, reducing costs. Lists with fewer activities reduce data collection time, reducing field costs.	Data processing and analysis are more complex, increasing cost. The lighter the diary, the simpler the analysis and lower the cost.

C. Survey instruments based on a 24-hour diary

The diary instrument requiring the least effort during data collection, processing and analysis is the light diary with fixed time intervals. This type of diary simplifies data collection, processing and analysing for the NSO. It is recommended that countries looking for the lightest diary solution begin with the MHI. The MHI was developed by merging the key features of all light instruments used so far, reflecting best practices. This section describes the MHI diary and some of the choices countries can make in adapting the format, in accordance with the detail desired and the resources available.

1. Describing activities: full vs. light diary

In a full diary, the respondent either reports the activity they are undertaking in their own words or is provided with a very detailed predefined activity list (with an extensive number of categories) to choose from. Allowing the respondent to use their preferred terminology (after instructing them to provide as many details as possible) provides the opportunity to collect a broader range of activities and to identify new and emerging activities. Interpreting, coding and analyzing full diaries can greatly increase the cost of processing and analyzing the data.

In a light diary, activities are coded directly into a limited list of activities, either by the interviewer in an interviewer-administered setting or by the respondent in self-administered instruments. The Statistics Bureau of Japan uses both light and full diaries for different purposes. For large-scale surveys

to obtain detailed results by region and individual/household attribute, light diaries are used because they can be processed and analyzed in a relatively short period of time. Full diaries are used to collect a broader range of activities and compare with time-use data in other countries. Table III. 3 compares the features of full and light diaries.

Table III.3. Comparison of features of full and light diaries

	Advantages	Limitations
Full diary with free text	• When using free text full diaries, respondents have flexibility to provide granular information on their time allocation rather than comply with a rigid pre-coded list of activities. • Full text offers freedom for respondents • Limitless variety of activities – able to capture activities that may be more relevant for some population groups. • Provides a good indication of how respondents think about how they spend their days and what they define as an activity • Can generally accommodate a high number of contextual	• Requires staff to enter data and code activities (or for modernised tools, to invest in automatic natural language processing categorisation methods), thus increasing overall costs. • Respondents may not describe the activity in sufficient detail or may describe it with too much detail, that needs to be removed • Longer interview time •

	variables and account for simultaneity. • Appropriate for wide range of analytic objectives • Coding of activities into detailed categories enables comparison with time-use data in other countries	
Light diary with pre-defined categories	• Respondents do not have to look through or remember long list of activities • Does not require staff to later code activities—coding is done as diary is completed, thus decreases overall costs. • List can remind respondents to record activities easily missed such as traveling. • Shorter interview, reducing respondent burden • Suitable for responding to specific objectives or public policy interests	• Space on the page or screen can limit the variety of activities that can be collected • Can result in not accurately capturing the nature of an activity as respondents may just select a category that is "close enough" • Does not allow for social, cultural, or geographical linguistic differences between respondents • May need to limit number of contextual variables (depending on mode and layout) • Appropriate for narrower range of analytic objectives

a. Full diary[21]

Self-complete full diaries with free text fields for activities are possible using either paper or digital tools. Free text allows respondents to use their preferred terminology (i.e. verbatim) and provide the opportunity to collect a broader range of activities and to identify new and emerging activities. In addition to instructions, an example page can help the respondent understand the terms and level of detail expected.

Some full diaries use extensive pre-defined lists saving the separate coding step. This is most feasible with hierarchical dropdown menus in digital tools. If the diary is expected to be self-completed, long lists of predefined activities could result in fatigue and coding errors (Andreadis & Kartsounidou, 2020; Krosnick, 1991). If the diary is administered by an interviewer, the interviewer can be trained to accurately code the activity directly into the diary tool.

On the other hand, countries might choose a central team of coders in an office coding all diaries. While "after coding" may improve consistency, it cannot ensure that the coding is more accurate if descriptions are not sufficiently detailed, as the coder cannot ask the respondent to clarify; such queries must be made while the team is still in the field.

Free text (whether handwritten or typed) adds greatly to the time and resources needed for data processing and analysis and is often a greater burden to respondents. For NSOs looking to collect quality data with limited resources, free text should be limited to the field "Other" for when an activity does not fit into any predefined category. It is important for categories to be sufficiently well-described

[21] For more detailed information on full diaries see the *Guide to Producing Statistics on Time Use* (UN, 2005) chapter IV or the Harmonised European Time Use Surveys (HETUS) 2018 Guidelines (2019 Edition), Annex 3 . Additional full diary instruments can be found on the hub.

and easy to find. If large numbers of activities are reported in the "Other—specify" field, additional analysis of the coding process will be needed, adding to processing time and costs.

g. Light diary

In a light diary, respondents (or interviewers) select the best-matching activity from a pre-defined list with a limited number of categories. If using the MHI to conduct interviews, interviewers would code verbatim answers directly into corresponding activities, based on ICATUS 2016 one- or two- digit level codes. Drop-down menus containing appropriate wording to describe the minimum list of activities would be used in a digital self-administered instrument. Annex 1 contains a set of model diary questions for recording the primary activity, activity contexts, and secondary activities. Additional light diary instruments can be found on the hub.

If more detail than the minimum list is desired, digital tools can use hierarchical drop-down menus, with broader categories followed by more detailed activities, to help respondents more easily find the correct activity.

2. Recording time

a. Fixed vs. open interval

The time interval relates to the units of time in which respondents report their activities. Time information can be collected in an open-interval diary or a fixed-interval diary. In open-interval diaries, respondents record the start and finish time of the activity. Respondents report the activity they were doing from when the diary time starts, and progress from one activity to the next through the entire diary period. Fixed-interval diaries specify intervals of time on the diary for recording activities. These are usually 5, 10, 15 or 30-minute intervals.

As with free text for activities, the precision of open-interval diaries can vary greatly, and the open intervals make data processing and analysis more complex and labor-intensive.

Open-interval diaries

Open-interval diaries require recording the start and finish time of the activity. Respondents report the activity they were doing from when the diary time starts (usually 4am), and progress from one activity to the next through the entire diary period.

While this approach appears to be theoretically most accurate, as the respondent can report the exact time an activity commenced and ended, it can add extra burden for respondents to report the exact timing. The level of precision required from respondents is also not clear with this method and it may result in greater variability in how respondents report their activities. Some may choose to report to the minute, others may round to 5, 10 15 or 30 minutes.

For interviewer-administered diaries, the interviewer can instruct respondents on the level of precision required. Self-complete diaries with open intervals should provide instructions or examples to help clarify the level of precision required.

Data entry and processing can be more complex for entering and managing open-interval diaries than for fixed-interval diaries.

Fixed-interval diaries

Fixed-interval diaries are designed to be less burdensome to complete, since they do not require the recording of the actual time. The time interval also gives an indication of the level of detail expected, with a shorter interval suggesting that more detailed activities should be reported. In the paper diary version, the time interval is generally printed in the margin. Activities are entered next to the time the activity commenced and arrows are used to indicate the duration of that activity. In electronic versions of the diary, the application is usually programmed to automatically add the start time for the activity (the first interval for the day, or the end time of the previous activity). The interviewer or respondent

selects the end time from a dropdown list of fixed episodes. The dropdown list of episodes updates to automatically exclude past episodes, reducing scroll time.

h. Length of fixed time interval

The challenge of the fixed-interval diary is choosing an interval that is neither too short nor too long. The 5-minute interval may be considered most accurate because of the finer level of granularity, but very short intervals add extra burden on the respondent given the amount of detail requested.

On the other hand, long intervals may add to the cognitive burden since respondents must decide which activities to report if more than one activity is undertaken in that time slot. This could result in under- or over-reporting of time spent on some activities. Short breaks for snacks or personal care may be missed, or respondents may report multiple activities for a time interval because the period is longer. Data analysts will have to decide how to allocate time across multiple activities, but it may not be possible to tell if multiple activities are sequential or simultaneous. These decisions could potentially introduce error and importantly undermine comparability. For interviewer-completed diaries, the interviewer can prompt for further information about the sequence of activities and/or if they occurred simultaneously. Some countries, especially LMICs, have used intervals as long as 60 minutes. Their field experience showed that respondents that not usually use a time-measurement device or those who do not keep track of non-routinely activities have more difficulties trying to answer for activities for short time periods adding to the response burden. In this cases, longer intervals were used. For example, in South Africa (2010) and Bangladesh (2022), the time-use surveys used a 30-minute slot with up to three activities and respondents are asked if they were continuous or simultaneous. In 2000, South Africa used 60-minute intervals with up to five activities. Generally, interviews using longer intervals ask about each time interval separately, unlike questionnaires that ask for a start time and either end time or duration, as described above.

Clear instructions are required at the data collection and data entry stages to ensure interviewers, respondents and data entry staff understand the requirements when longer intervals are used. For self-administered diaries (where instructions must be limited), it may simpler and more consistent to use a shorter interval, such as 15 minutes.

Quality checks for travel and for basic physical needs should also be added and follow up questions asked if, for instance, no eating or sleeping time is reported. Without such checks, results based on the diary format may diverge from the stylized question format, which systematically asks about all activities.

3. Collection of simultaneous activities

In addition to the main activity, a secondary activity should be collected, if possible, when the diary format is adopted. Although it adds to the respondent's burden, the collection of simultaneous activities enhances the accuracy and completeness of the data. The relevance of collecting simultaneous activities is detailed in chapter II.B

In principle, the instrument may offer the same list of activities for both primary as well as for secondary activities. An alternative is to use a shorter list limited to activities that are most often done simultaneously with other activities, or that are considered most relevant for the objectives of the survey, such as unpaid domestic and care work activities. (See Table III.4. Example of abridged drop-down list for secondary activities.)

Table III.4. Example of abridged drop-down list for secondary activities

Q_Secondary_act1. Please indicate if you were doing any of these activities at the same time.

Secondary_act1. *answer is selected from abridged list or complete MHI list of 25 activities*

Drop-down list for secondary activities (abridged)
Unpaid domestic and care work activity • Housework (such as dishwashing, table cleaning, taking away garbage, laundry, etc.) • Childcare (such as supervising homework, watching child swimming, minding) • Adult care (such as supervising someone else's medication consumption/ or treatment) • Organizing, planning or paying bills • Pet care Additional activities: • Eating or drinking • Socializing or communicating - in person > Talking, conversing • Socializing or communicating - using any type of technology > Phone, email, social media, video call, text messaging • Reading • Watching TV or videos • Listening to music or radio • General computer use • Hobbies

Collection of simultaneous activities will improve reporting of particular activities, but it may still not guarantee comprehensive measurement. For this reason, the inclusion of probing questions should also be considered. These additional questions ask respondents to identify episodes during which specific types of activities, such as childcare, were also being done. (See Table III.5)

Table III.5. Example of probing questions to identify care as a simultaneous activity

Intro	Many of our daily activities help persons living inside or outside our household. The following question is asked to determine how much informal support people provide to one another.
##Q1	**Among the activities you reported in the diary, which one(s) did you do to help another person?** (please select all that apply) programmer: bring full list of activities from the diary with check boxes. For each identified activity have a loop of Q2 to Q6
##Q2	**Did (this activity) help a person inside your household, outside of your household or an organization?** <1> Person from household..... Go to ##Q3 <2> person outside from household..... Go to ##Q3 <2> Organization Go to ##Q6 <3> No (Go to next episode) <x> Don't know (Go to next episode) <r> Refused (Go to next episode)
##Q3	**Was the person helped 65 years or older?** (If more than one, principal person helped.)

<1> Yes

<3> No

<x> Don't know

<r> Refused

##Q4 Does the person you helped have a long-term health or physical limitation?

(Any conditions lasting or expected to last more than 6 months and which can be either chronic or permanent)

<1> Yes

<3> No

<r> Refused

##Q5 What is this person's relationship to you?

<1> husband/wife/partner

<2> child less than 5 years

<3> child 5 to 13 years

<4> Child over 13 years

<5> Parent(s) or parent (s) in-law

<6> Children of respondent living outside the household

<7> Other member(s) of the family outside the household.

<8> Friend(s)

<9> Neighbour(s)

<10> Co-worker(s)

<11> Others

<x> Don't know

<r> Refused

[Go to next episode]

##Q6 Was this organization mostly concerned with seniors, children, persons with disabilities or other?

<1> Seniors

<2> Children

<3> Persons with disabilities

<4> Other

<x> Don't know

<r> Refused

[Go to next selected activity]

End of diary instrument

From all the activities you did on (Diary Day), were any performed to help the following persons?

Children 14 and under leaving in your household	Yes	No
Adult 65+ leaving in your household	Yes	No
Children 14 and under not leaving in your household	Yes	No
Adult 65+ not leaving in your household	Yes	No
Friends, acquaintances	Yes	No

It is also possible to infer a simultaneous activity based on “with whom” context data, but it is preferable to explicitly ask to avoid assumptions that might bias the data. It is recommended that the simultaneous activity be assigned the same episode duration as the main activity. If a simultaneous activity occurs throughout the day, such as passive care or listening to the radio while doing other activities, it should be recorded separately with each new main activity.

4. Reporting activity context

Contextual information refers to information collected in the instrument that captures the context or the physical, psychological, social and temporal features of the environment in which a specific activity takes place (location, for whom, with whom), additional defining characteristics of the activity (for whom, paid/unpaid), or subjective aspects such as enjoyment, stress and wellbeing. Certain contextual information associated with each activity episode is considered the minimal requirement to properly code an activity or fulfill analytical needs using pre-defined categories. These requirements are highlighted in section H paragraph 58 of ICATUS 2016.

The Minimum Harmonized Instrument recommends that diaries include the following contextual variables for each activity.

- location
- with whom
- for whom
- ICT use (if relevant in the national context)

These are discussed in detail above in chapter I.C Contextual information.

5. Diary layout and organization

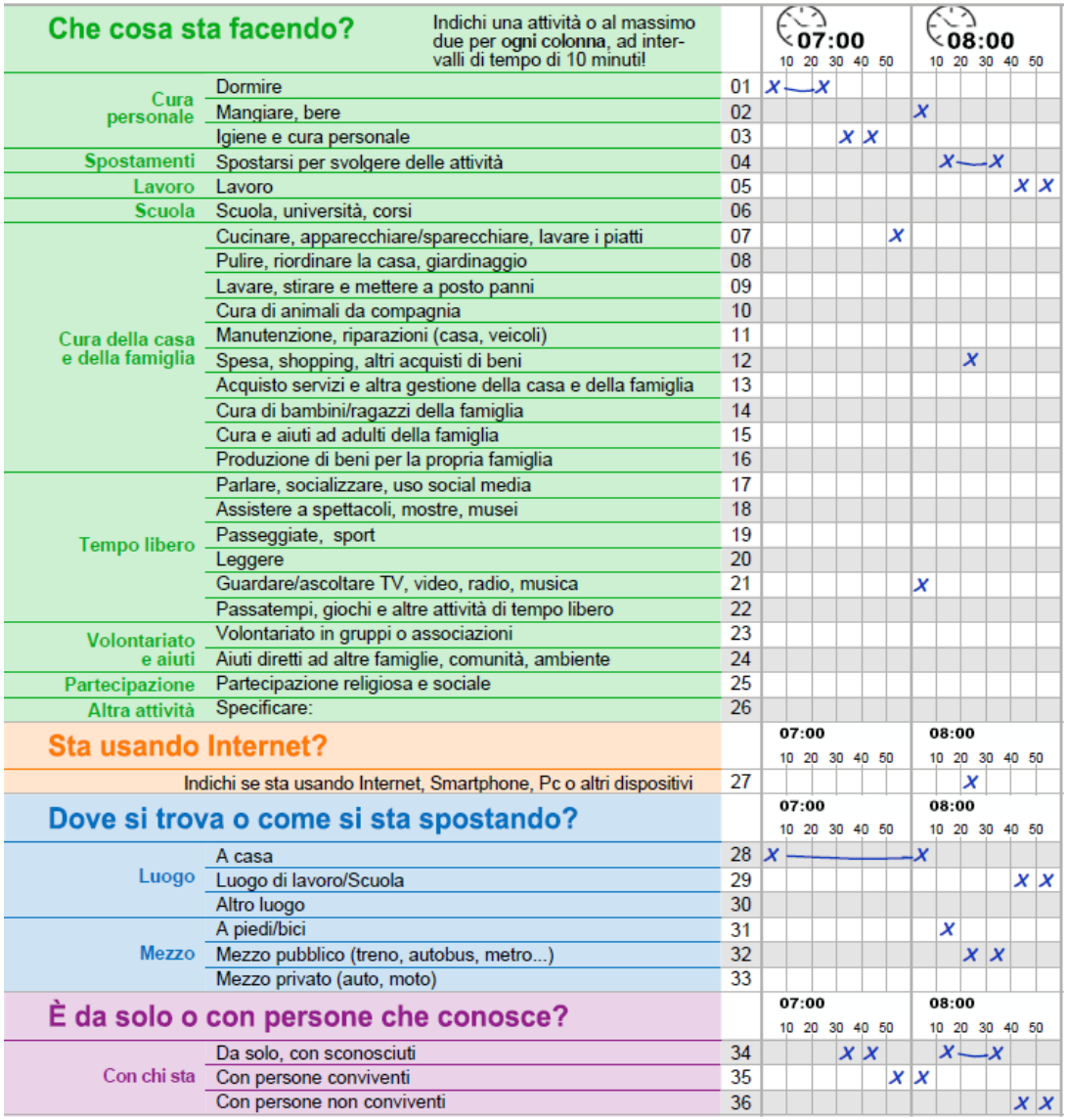
    a. Light diary

A time diary can start and end at any hour, but 4am is a typical time because most people are at home and asleep at that hour.

On paper, the lightest diary can be presented on a single page as a grid, without space for context variables. The X axis would contain time intervals and the Y axis a list of activity categories. Respondents or interviewers can mark the activity using a line across the relevant time intervals (adding a second line for simultaneous activities). With the recommended context variables and simultaneous activities, one alternative layout for a paper diary is to have a row for each time slot, with at least two columns for activities (to allow for simultaneous activities) and additional columns for context variables. Here too, interviewers or respondents can use arrows to mark where activities continue across intervals. It is easy to scan a fixed-interval paper diary to see if rows or columns were missed.

Another alternative is that used by Italy in their pilot survey in 2023, shown in *Figure III.1. Paper light diary with fixed intervals: Italy* 2023. In their paper light diary, rows contain the activities proposed by the Minimum Harmonized Instrument, with the addition of the distinction between direct and organized volunteering (26 options in total). The diary contains a very simplified version of the context variables present in the full diary: location (6 options), with whom (3 options), and ICT use. It is possible to include simultaneous activities, by marking all the activities happening in the same time interval, as with activities 2 (eat or drink) and 21 (watch TV or video, listen to radio or music) from 8:00 to 8:10 in the example below.

Figure III.1. Paper light diary with fixed intervals: Italy 2023



Che cosa sta facendo?	Indichi una attività o al massimo due per ogni colonna, ad intervalli di tempo di 10 minuti!		07:00 (10 20 30 40 50)	08:00 (10 20 30 40 50)
Cura personale	Dormire	01	X — X	
	Mangiare, bere	02		X
	Igiene e cura personale	03	X X	
Spostamenti	Spostarsi per svolgere delle attività	04		X — X
Lavoro	Lavoro	05		X X
Scuola	Scuola, università, corsi	06		
Cura della casa e della famiglia	Cucinare, apparecchiare/sparecchiare, lavare i piatti	07	X	
	Pulire, riordinare la casa, giardinaggio	08		
	Lavare, stirare e mettere a posto panni	09		
	Cura di animali da compagnia	10		
	Manutenzione, riparazioni (casa, veicoli)	11		
	Spesa, shopping, altri acquisti di beni	12		X
	Acquisto servizi e altra gestione della casa e della famiglia	13		
	Cura di bambini/ragazzi della famiglia	14		
	Cura e aiuti ad adulti della famiglia	15		
	Produzione di beni per la propria famiglia	16		
Tempo libero	Parlare, socializzare, uso social media	17		
	Assistere a spettacoli, mostre, musei	18		
	Passeggiate, sport	19		
	Leggere	20		
	Guardare/ascoltare TV, video, radio, musica	21		X
	Passatempi, giochi e altre attività di tempo libero	22		
Volontariato e aiuti	Volontariato in gruppi o associazioni	23		
	Aiuti diretti ad altre famiglie, comunità, ambiente	24		
Partecipazione	Partecipazione religiosa e sociale	25		
Altra attività	Specificare:	26		
Sta usando Internet?			07:00 (10 20 30 40 50)	08:00 (10 20 30 40 50)
	Indichi se sta usando Internet, Smartphone, Pc o altri dispositivi	27		X
Dove si trova o come si sta spostando?			07:00 (10 20 30 40 50)	08:00 (10 20 30 40 50)
Luogo	A casa	28	X —	X
	Luogo di lavoro/Scuola	29		X X
	Altro luogo	30		
Mezzo	A piedi/bici	31		X
	Mezzo pubblico (treno, autobus, metro...)	32		X X
	Mezzo privato (auto, moto)	33		
È da solo o con persone che conosce?			07:00 (10 20 30 40 50)	08:00 (10 20 30 40 50)
Con chi sta	Da solo, con sconosciuti	34	X X	X — X
	Con persone conviventi	35	X	X
	Con persone non conviventi	36		X X

Self-administered digital instruments should be optimized for large and small screens, because many people will fill them out on a mobile phone. Therefore, each activity episode should have a separate screen, although simultaneous activities and contextual variables may be included on the same screen. (See

Figure III.2. Digital full diary with open intervals: Belgium (MOTUS) 2020 below for an example.) Because it will often be necessary to go back to add or correct things a respondent remembers later, it should be possible to navigate backwards and forwards through episodes.

With interviewer-administered digital instruments, it is possible to plan what type of device will be used and optimize the instrument for that size. Interviewers in Argentina's 2021 survey used tablets, which allowed more space on the screen. Figure III.2. Tablet-based light diary from Argentina (2021) shows how 90 minutes worth of activities can be displayed at once. When the interviewer selected an activity group (in this case, paid work), they are shown a pop-up window of activity options within that group.

Figure III.2. Tablet-based light diary from Argentina (2021)

For self-complete diaries, it is important to provide instructions that are sufficiently detailed to explain how to fill out the form yet short and simple enough that the respondent will read and comprehend them. Examples should be provided.

i. Full diary

The HETUS sample paper diary comes with a cover page, two pages of instructions, three pages of examples, the diary including a few summary questions about the day, and a checklist. The checklist helps the respondent check for common errors and ensure that they completed all parts of the diary. Figure III.1. Paper full diary with fixed intervals, below, shows an extract of the example diary.

Figure III.1. Paper full diary with fixed intervals: HETUS 2018

Elderly example page 1/2

Time	*What were you doing?* *Record your main activity for each 10-minute period from 07.00 to 10.00!* Only one main activity on each line! Distinguish between travel and the activity that is the reason for travelling.	*What else were you doing?* *Record the most important parallel activity.*	*Did you use a computer, smart device, internet, online tool, or similar technology or device for doing this?* Yes	*Where were you?* *Record the location or the mode of transport.* e.g. at home, at friends' home, at school, at workplace, in restaurant, in shop, on foot, on bicycle, in car, on motorbike, on bus, …	*Were you alone or together with somebody you know?* *Mark "yes" by crossing* Alone (or with unknown persons)	With other household members: Partner	With other household members: Parent	With other household members: Children (up to 17 years)	With other household members: Other household member	Other persons that you know
07:00-07:10	*Got out of bed*			*At home*		X				
07:10-07:20	*Took a shower*				X					
07:20-07:30	″				X					
07:30-07:40	*Made breakfast*	*Talked to my wife*				X				
07:40-07:50	″	″				X				
07:50-08:00	*Had breakfast*	*Read online newspaper*	X			X				
08:00-08:10	″	″	X			X				
08:10-08:20	″	″	X			X				
08:20-08:30	*Cleared the table*	*Listened to the radio*				X				
08:30-08:40	*Dressed*	″			X					
08:40-08:50	″	″			X					
08:50-09:00	*Waited for a taxi to go to doc*	*Talked to my wife*				X				
09:00-09:10	*Went to the doctor*			*Taxi*	X					
09:10-09:20	*Waitin in doctor's wating roor*	*Listened to the music*	X	*Doctor's waiting room*	X					
09:20-09:30	*Had a medical examination*			*Doctor's room*						X
09:30-09:40	↓			↓						X
09:40-09:50										X
09:50-10:00	↓			↓						X

Use an arrow, citation marks or the like to mark an activity that takes longer than 10 minutes.

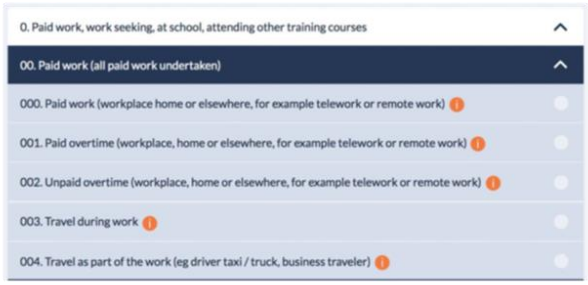
Source: Harmonized European Time Use Surveys – 2018 guidelines

Figure III.2. Digital full diary with open intervals: Belgium (MOTUS) 2020

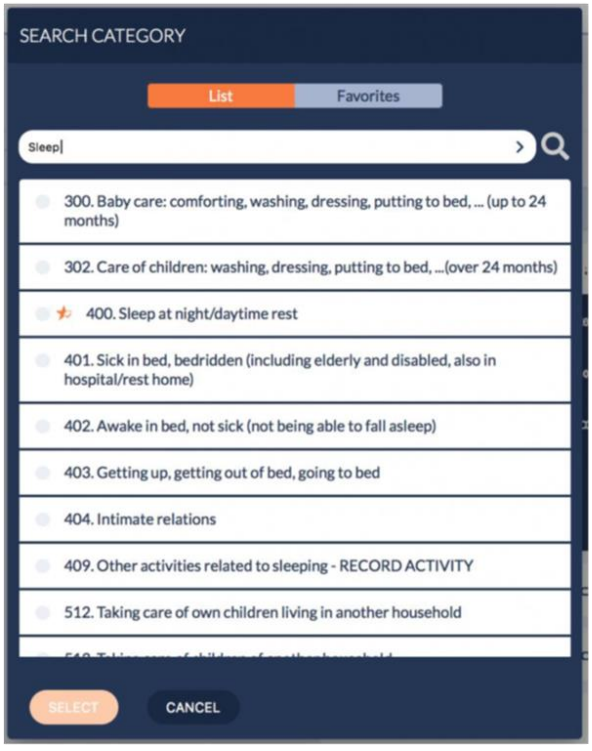
1) Select starting and ending time of the activity

2) Select a primary activity

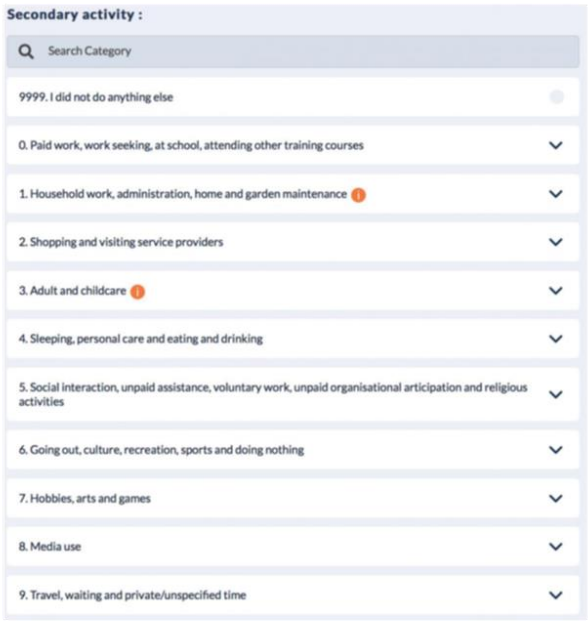
a) Tree structure



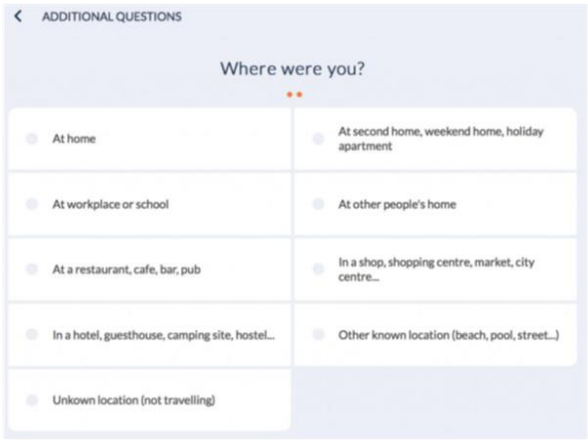
b) Search category

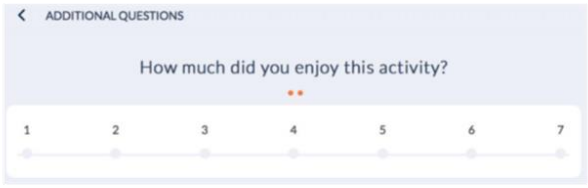


3) Select secondary activity



4) Select context





Source: Minnen et al. 2022

D. Stylized questions

1. Questionnaires based on stylized questions

Instruments based on stylized questions ask respondents to indicate whether they participate in each activity during the reference period, and if so, how much total time they spent on the activity. The reference period is usually a day or a week. Stylized questions do not support gathering contextual data by activity episode, but can include specific questions about activities carried out at the same time as others, such as supervisory care.

Respondents do not need to report on the chronology of events, but they do need to be familiar with clock time as they need to estimate the duration of activities (Seymour, Malapit and Quisumbing, 2020). They also need to be able to sum up the time from separate episodes, which an interviewer can help with. Interviewers should be trained to be careful to correctly convert summed minutes into hours (for example, 150 minutes into 2.5 hours and not 1.5 hours). Automated time calculators in digital tools can help with this.

The MHI stylized instrument uses the exhaustive and mutually-exclusive categories of the minimum activity list (25 activities, presented in Section IIA), with some operational amendments. The stylized instrument, presented in Annex 2, could be included as part of a specialized time-use survey or as a module in a household survey. If incorporated into another survey, the stylized questions can be an independent module or they can be integrated into the thematic structure of the survey. For example, the stylized questions on time spent in paid work activities could e asked immediately after the questions on the economic characteristics of respondents. Questions on care for children can be asked with other questions about children.

As with a time diary, background information needs to be collected to be able to compute appropriate indicators, as discussed in section E, below. The questionnaire proposes one question for each of the

25 recommended activities, except for several activities that were further disaggregated to ensure these are adequately captured through stylized questions. (These are discussed in section 3, Minimum list of activities for stylized instruments, below.) A more detailed disaggregation will ensure good data quality as well as support more detailed analysis to inform relevant policies. When using a stylized questionnaire, explicit probing for certain activities is necessary to ensure respondents take such activities into consideration in their answers. Probing questions minimize potential calculation errors in the time reported for activities that are done multiple times throughout a day.

Countries in Latin American and the Caribbean have used stylized questions extensively. Based on their lessons learned, the MHI stylized questionnaire includes suggested wording to capture the activities in the minimum list and a question order proven appropriate to facilitate recall. Countries should adapt the questionnaire to their cultural and linguistic context. Adaptations should always be pretested.

Each proposed question includes notes indicating the corresponding ICATUS activities and relevant remarks where necessary. The reference period is either a day or a week; both options are provided but only one should be selected. Coloured text in the Annex contains additional guidance for the interviewer.

The set of questions asks the respondent to include travel and waiting time in the total amount of time for each activity. The exceptions are for employment and education-related travel where 2 questions were added in modules A and B (see Annex 2). This is in line with ICATUS 2016.

Stylized questions are valuable for situations when the survey has limited objectives—for example, to measure only a few activities, or when a time-use module in a larger survey must be reduced to a very few questions. In these cases, an abbreviated activity list can be used. It is recommended that the full minimum activity list is used for periodic surveys, such as every five to ten years, but shorter lists may be appropriate for interim monitoring.

2. Operational considerations for the stylized questionnaire approach

The proposed questionnaire provides the option to measure unpaid work for family members living in other households separately from the domestic and care work done for household members. NSOs should follow the option that ensures consistency with other surveys and/or to respond to national policy requirements.

Whereas diaries longer than one day are considered overly burdensome, instruments with stylized questions sometimes use a week as a reference period. Options for both a day and a week are provided in Annex 2, but the NSO should choose the appropriate period and only include that period in the actual questionnaire. If using a week as reference period, splitting the week into weekdays and weekends is suggested, as shown in TTable III.6. Sample layout for reference period of day or week.

Both hours and minutes should be included in each of the time allocation questions. It is important that interviewers are trained to gather the total time spent in **all** the episodes of the activity during the reference period.

Table III.6. Sample layout for reference period of day or week: Minimum Harmonized Instrument

Reference period a day	Reference period a week
How much time did you spend on it? [ ] hours and [ ] minutes	How much time did you spend on it? Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

3. Minimum list of activities for stylized instruments

To ensure the stylized questionnaire provides estimates comparable with those obtained from diary-based measures while guaranteeing high quality of statistics, two groups of activities related to care

work and production of goods for own final use require additional explanation. Stylized questions may contain more detail than the diary format as a way to capture contextual information.

a. Care work activities

The unpaid care work activities in the minimum list are organized according to two care- receiving population groups: children and adults.

Taking care of own (household or family) child (activity 11 in the minimum list)

Although the minimum list of activities has only one category to include all activities related to unpaid care of children under ICATUS Division 41, these activities are further disaggregated in the stylized questionnaire, based on the type of care.

Activities regarding provision of care to own (household or family) children are divided into separate questions to capture:

- basic care and support (activities under ICATUS 411,414,415, and 416)
- health-related care (activities under ICATUS 412)
- school-related and education support (activities under ICATUS 413 and 417)

Taking care of or helping adults (own household or family) (activity 12 in the minimum list)

The minimum list of activities combines all activities falling under ICATUS Division 42 and 43 in activity 12. The proposed set of stylized questions further disaggregate these activities into:

- basic care and support (activities under ICATUS 421, 424 ,425 ,431, 432)
- health-related care (activities under ICATUS 422 and 426)
- support with administrative errands (activities under ICATUS 423)

b. Production of goods for own final use

Time spent in activities related to the production of goods for own final use is collected through one question. In countries where all or some of these activities are prevalent or are particularly important for selected groups of the population (rural population, women, etc.), NSOs should consider including an optional module on own-use production. An example is presented in Annex 2 but should be adapted to fit the national context.

E. Choosing between a diary and stylized questions

Both diaries and stylized questions have advantages and limitations. When deciding which format is most appropriate for a particular survey, it is important to consider the objectives of the survey, and the NSO's resources and constraints at that time. It is possible for countries to do both—for example, a stand-alone survey with a diary every five to ten years for comprehensive data, and a short list of stylized questions in quarterly labor force surveys or continuous household income and expenditure surveys to monitor time spend on unpaid care work or other specific topics.

Table III.7. Advantages and Limitations of Diaries and Stylized Questions

Diary		**Stylized questions**	
Advantages	**Limitations**	**Advantages**	**Limitations**
Content			
Provides information at the episode level (frequency of activity, time of day) as well as sequence. Allows for a broader range of activities than if you had to ask a separate question for each activity. Allows collecting simultaneous activities and	Because respondents are not prompted to think of specific activities, diary is more likely to miss activities that require less attention, such as supervisory care.	Better at measuring infrequent activities, such as volunteering, sports or cultural activities. Because respondents are asked about it explicitly, it records activities that usually respondents forget to report.	Does not provide information on daily rhythm (frequency of activity, time of day or sequence of episodes) Episode-specific contextual variables cannot be collected. It is possible to ask about activities done while doing something else (e.g.

episode-level contextual information.			supervisory care) but detail about the simultaneous activities is limited unless more questions added
Data collection			
The diary follows a narrative order. Reconstructing the day in chronological order follows a logical progression. May reduce respondent cognitive burden compared to trying to think of similar activities and total the time in the abstract. The chronological order and contextual variables make it easier to detect errors like skipped activities (for example, travel) or incompatible activities. It is designed to capture exactly 24 hours per day.	Some respondents find it harder to complete. Interviewer skills and self-administered diary layout affect difficulty. Need to provide special training for interviewers unfamiliar with format Even the lightest diary requires reconstructing a day, which may demand more time from respondents; important if diary is added as module in a long survey. Respondents may become suspicious and hesitant to provide information at level of detail required.	It is possible to target only the most relevant activities for the objectives of the survey. If an NSO is only interested in particular activities this can be measured by adding questions regarding those activities to a labour-force survey or other specialized household surveys (e.g. HIES) without being too burdensome, for frequent surveys.	Cognitive burden of recalling all episodes of sporadic or irregular activities and summing their duration can be high. Time required to complete the survey can be as long or longer than a 24-hour diary (Seymour, Malapit and Quisumbing, 2020), especially if the activity list is long or a reference period of a week is used. Activities might account for more or less than 24 hours.
Analysis			
It can be used for a broad range of research questions (such as transportation, health, social isolation or new uses). Timing and sequence information makes more types of	Fully exploiting the data requires more data management and analysis skills. Free-text or open-interval diaries can be much more complicated to process and analyze.	Processing and analysis are simple, since total time per respondent is already provided and the only indicators produced are average time and participation rate for each activity.	Appropriate for narrower range of analytic objectives

visualizations possible.			

Box III.2. Pre-testing tools and guidelines for national adaptation

Testing is a key statistical procedure to ensure the accuracy of survey results. An essential component of building the statistical solution, it is usually performed prior to collecting data. According to the Generic Statistical Business Process Model (GSBPM), for statistical outputs produced on a regular basis, this phase usually occurs for the first iteration or following a review or a change in methodology or technology, rather than for every iteration.

Testing can be divided into two distinct sub-processes:

- pre-testing of survey tools
- small-scale piloting of field procedures and data collection

These are sequential sub-processes; the pre-test of survey tools may result in revised instruments that are then piloted on a small-scale sample along with field procedures.

Pre-testing of survey tools

The main objective of pre-testing instruments is to minimize potential sources of measurement error occurring due to a lack of comprehension or poor performance of the instrument. An important aim of pre-testing newly-designed instruments is to ensure a uniform understanding of the wording of survey questions among population groups, and thus among potential survey respondents who may differ in key characteristics, such as education. This is particularly important in contexts where vernacular languages are predominant, or when the survey tool is to be administered in multiple languages. When pre-testing comprehension of time-use instruments, testing items should include not only wording associated with activity titles (e.g.,

gardening) as well as their activity scopes, but also language associated with reference periods, such as “yesterday”. In Indonesia, a UN Women and ILO supported pilot showed that the wording associated with “yesterday” changed meaning across geographical areas. For time use measurement, pre-testing of the survey instrument should also verify that activity categories are truly exhaustive, possibly by adding activity titles particularly relevant to national contexts and needs.

Pre-testing can play a crucial role in identifying omitted activities and assessing the overall performance of the flow and administration of the instrument. For instance, pre-testing could focus on format and functionality (layout, logic, technology), helping gauge if the instructions are adequate, whether additional support is needed, and what automated checks can be added to digital tools. This is especially important for self-administered tools. The example below describes some of the modifications Canada made to their self-administered instrument after pre-testing.

Qualitative research methods, such as cognitive testing, focus groups and in-depth semi-structured interviews, are increasingly employed in pre-testing survey instruments. These are not specific to time-use surveys so are not discussed here.

The preparatory phase of the Time-Use Survey conducted by Statistics Canada provides an illustration of how the qualitative testing can positively impact the design of the survey instrument. In the fall of 2021, the Questionnaire Design Resource Centre at Statistics Canada (QDRC) conducted 30 qualitative interviews (ten French interviews and twenty English interviews), with participants joining virtually from across the country. Both the interviewer and the participant typically had their cameras on, except in the case of technical difficulties,

whereas two observants from Statistics Canada attended the interview with microphones and cameras turned off.

The qualitative testing aimed at understanding how participants responded to the electronic diary and at collecting feedback on new content, skipping portions of the questionnaire that had undergone qualitative testing for previous Statistics Canada surveys. This aim was achieved through observing how participants reacted to the questionnaire, such as where they perhaps had difficulty navigating the diary or understanding a question, and by asking specific probing questions about the experience. Testing also included collecting inputs on the relevance of the information included in the invitation letter and whether anything was missing that would help encourage people to complete the survey.

Qualitative pre-testing was key to address potential sources of measurement error. For instance, during interviews, it emerged that travel activities were frequently omitted and at times confused by the error message popping up when location changed without a travel activity. Following the pre-testing, Statistics Canada made changes to the questionnaire ranging from things as small as rewording help text that was not as clear as it could be, all the way to restructuring the layout of the time use diary. The content of the diary stayed the same but the team changed some questions from drop-down selection to radio buttons. They added help text to remind respondents of their reference day and the activity of each instance. They also compressed the diary from three pages down to two by using hidden related questions.

Since participants typically found most of their challenges with the diary, Statistics Canada created a series of three short videos to answer some frequent questions about it. The videos explain what the 24-hour diary is, how to report simultaneous activities (and a reminder to avoid grouping multiple activities together) and how to report travel activities – this type of activity

was something that participants in QDRC testing frequently forgot to report, and were sometimes confused by the error message they received when their location changed without a travel activity.

Field test

According to the GSBPM, a field test or pilot of the statistical process typically includes a small-scale data collection, to test the collection instruments, followed by processing and analysis of the collected data, to ensure the statistical business process performs as expected. Following the pilot, it may be necessary to go back to a previous step and adjust collection instruments, systems or components. This sub-process may be iterated until satisfactory performance. For time use measurement, pilots could address the performance of field procedures designed to maintain the designated day or interviewing multiple respondents per household without relying on proxy informants.

It is important to note that field or pilot testing is separate from interviewer training. Interviewers will certainly need field practice, but pilot testing should be done by those who are already familiar with the survey, not in the process of being trained.

F. Background questionnaires

1. Placement of priority background characteristics

The placement of the selected background characteristics in the survey can have a strong impact on the quality of the time-use data. The options of where to capture this information, however, may vary depending on whether the survey is a fully independent and dedicated time-use survey, a dedicated time-use survey with a sample or panel selected from an existing household survey, or a module attached to another base survey.

Background characteristics may be collected in the household roster, in a section on housing characteristics, or in an individual background questionnaire. The household roster is best suited to capture essential background characteristics needed for all household members. An individual background questionnaire is most efficient to capture essential background characteristics needed only for respondents completing the time-use data component.

Whether as part of the household roster or in an individual background questionnaire, individual characteristics are generally best captured before the time-use data component. This will enable their use to select eligible respondents for the time-use questions, and to optimize the application of the time-use component, for example, by enabling the introduction of selected data quality checks, dependent interviewing, support coding, etc. For stylized questions, responses on household characteristics are used to filter specific questions. For example, in a household without children, questions on care provided to household children will not be asked.

Other essential household level characteristics such as a measure of household income or household wealth are best placed in a section on housing characteristics or household sources of livelihood asked only to a household reference person. To the extent possible, and to minimize potential impacts on the quality of the time-use data, it is recommended that detailed questions on household wealth, if included, be placed towards the end of the survey, after the time-use data component. If using a modular approach, these questions are likely included in the parent survey already.

2. Period of data collection of background characteristics

To serve in the analysis of time-use and activity patterns, it is important that background characteristics be collected at the same time as the time-use data itself or as close as possible. This ensures that background information describes the respondent's situation when the time-use information is collected. If the sample for the time-use survey has been selected from another household survey, it may be necessary to re-administer or confirm responses to some of the essential background

characteristics to ensure these are up-to-date. This is particularly the case for characteristics likely to change over time, such as the household composition, marital status, current school attendance, and the current labour force status and essential job characteristics of respondents and their spouses.

3. Question design to capture background characteristics

Most of the background characteristics identified as priority for inclusion with time-use data collection are generally included in major national household surveys. To promote coherence across sources, countries should endeavor to use the same set of questions to capture these essential background characteristics on a consistent basis across all major national household surveys. To take account of accumulated good practice and support international comparisons, the questions should be aligned with the latest internationally agreed concepts, definitions, classifications and operational guidance. For a list of recommended background characteristics see Chapter II.D.

4. Labour force characteristics of household members

The EG-TUS, with guidance provided by ILO—one of its members—identified "essential" economic characteristics of respondents to be captured during a time-use data collection to facilitate the correct coding of the activities under ICATUS 2016 major divisions 1. Employment and related activities and 2. Production of goods for own final use, and "optional" characteristics to enrich the analysis of time-use data. Model questions and sequences to capture those characteristics are provided as illustration in *Annex 3: Questions capturing economic and labor characteristics of respondent* and are aligned with ILO recommendations to capture employment and production of goods for own final use as defined in the 19th International Conference of Labour Statisticians resolution 1 concerning "statistics of work, employment and labour underutilization".[22]

[22] https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_230304.pdf

Countries are recommended to (a) use the approach already established at the national level to capture those characteristics in surveys, particularly Labour Force Surveys (LFS), provided that the details required for coding time-use activities are captured, or to (b) adapt the national approach in line with the characteristics below, to be suitable for time-use surveys.

Labour force characteristics of respondents to be included in the background questionnaire are the following:

- Identification of persons employed during a specified time (week/7 days)
- For employed persons
    - Multiple job-holding status
    - Core characteristics of the main, second, or other jobs as relevant:[23]
        - Status in employment
        - Occupation
        - Industry
        - Institutional sector of employment
        - Business incorporation for those employed in the private sector
        - Business registration

For countries where own-account work in agriculture or fishing is commonplace in certain regions or among certain population groups, the background questionnaire should additionally capture, at a minimum, the following items:

- Participation in own-account farming, animal husbandry and fishing during the specified week

[23] Some of these characteristics could be derived in countries, when linked with tax data.

- Main intended destination (sale versus own-use) of the products from farming, animal husbandry and fishing
- Main products from farming, animal husbandry and fishing

Box III.3 Supplemental questions to measure volunteering

Most volunteering is infrequent. Time-use surveys are good for measuring volunteering that is done dailyy or weekly. They can be used to determine what daily activities are volunteer work but are not suitable for a comprehensive measurement of volunteer work, volunteer rates or number of volunteers, or characteristics of volunteers. To address the need for this sort of data, the ILO developed volunteering modules that can be added to regular labour force surveys or to censuses (ILO, 2019), as well as a self-guided online course on the topic. NSOs wanting to improve their statistics on volunteering are advised to refer to the Volunteer Work Measurement Guide (ILO, 2021) for a discussion of the issues as well as sample questions. This can help NSOs decide how to best collect statistics to meet their needs.

Whether or not an NSO decides to include a volunteer work module in another type of survey, it is possible to add a few stylized questions on volunteering to a time-use survey to better capture volunteer work (even for diary-based surveys). The main reason to include stylized questions is to allow volunteering questions to refer to a longer reference period, typically four weeks or 30 days.[24]

Drawing on the ILO Volunteer Work Measurement Guide, the main stylized question to ask is:

> In the last [4 weeks / 30 days] that is from [DATE] up to [DATE/yesterday] did you [volunteer/do voluntary work] or spend any time helping ...
>
> ***READ AND MARK ALL THAT APPLY***

[24] It may be advisable to use other reference periods, for example if some event has occurred that may have led to a change in volunteering, such as droughts, storms or other emergencies.

a. Friends, neighbours, strangers? *help given to members of own family excluded*

b. Organizations, associations, clubs, institutions [(such as NGOs, religious organizations, sports clubs, schools, online groups, etc.)]?

c. (The/Your) community?

d. Nature, wild/street animals [(such as dogs, cats, birds, fish, etc.)]?

e. DID NOT PROVIDE UNPAID HELP

If the respondent says they did any volunteer work (a-d above), the survey should collect data on two activities to determine the beneficiaries, amount of time, frequency, reason for doing the work and who organized it. If the respondent did more than two activities, they should choose the two they spent the most time on during the reference period. The recommended questions can be found in Appendix I of the ILO Volunteer Work Measurement Guide (ILO, 2021).

G. Privacy in instrument design

NSOs are familiar with the need to maintain privacy throughout the data collection, processing, analysis, dissemination and archiving processes. In general, time-use surveys are no different in this respect. With increasing digitization, there are new threats to privacy, as data are collected in new ways and new types of data are collected. These are addressed in IV.C Digitizing data collection, but it is important to mention privacy as part of instrument design as well.

"Privacy by design" and "privacy by default" are increasingly accepted as standards for data protection, for example under legislation such as the European Union's General Data Protection Regulation

(GDPR) 2016/679[25], in effect since 2018, and the African Union Convention on Cyber Security and Personal Data Protection[26], in effect since 2014.

P**rivacy by design** is the concept that privacy is an integral part of any data collection and processing activity from the point it is first developed and throughout the process, continuing to its conclusion. It begins not with data collection or management, but with instrument design. Privacy by design is proactive; it calls for anticipating potential privacy risks and preventing them, rather than reacting to them.

Privacy by default is the approach where the default setting of a tool or application is the one with the highest privacy protection. This means that an individual using a digital instrument does not have to do anything proactive to protect their data; if they do nothing, their privacy is intact. Instead, they would have to take proactive steps if they wanted to relax privacy protections, or to allow additional types of data to be collected or shared.

Time-use data collection instruments, like other data collection instruments, should have privacy by default. An important element of privacy by default for instrument design is the principle of data minimisation. That is, only data that are relevant and necessary should be collected at all. Data minimisation would apply equally to types of data (such as geolocation), questions or variables, or even precision of responses (for example, if activities are going to be aggregated into broader categories).

Box III.4 Quality checklist- Survey instrument for collecting time-use data

Type of instrument

- Decisions about whether to use stylized questions, open-interval diaries or fixed-interval diaries will depend on the data requirements and the enumeration model (self-

[25] https://commission.europa.eu/law/law-topic/data-protection/data-protection-eu_en
[26] https://au.int/en/treaties/african-union-convention-cyber-security-and-personal-data-protection

administered or interviewer-administered). Other considerations include data entry and processing procedures. Each of these have quality issues and need to be considered at the survey design phase.

- If only broad high-level data is required for a few key activities, then a set of stylized questions is a suitable option for providing quality data. It should be quicker to develop, administer and process. However, stylized questions will not support detailed data analysis such as time of day analysis. It should also be noted that comparability with diary data may not be possible.

Pretesting

- Undertake cognitive testing to determine whether stylized and diary questions accurately measure the intended concepts and to identify any aspects of the diary that create particularly high cognitive load. Cognitive testing is recommended especially when including probing questions on supervisory care in the survey instrument design.
- Consider the cost of building and testing different collection instruments, particularly an electronic diary, weighed against any saving created in reduced data collection effort.

Recording time

- Consider length of diary time periods (commonly 5, 10 or 15 minutes), balancing respondent burden against the desired level of precision in measurement.
- Consider the number of diary days collected from each respondent – balancing respondent burden against any improvements in accuracy.
- Open-interval diaries are better suited for interviewer-based dated collection. Interviewers can prompt for the next activity and also ask about activities that might be

missed such as eating or travel when the location has changed. Fixed-interval diaries tend to be mostly used for self-administered diaries. These rely on respondents to follow instructions.

Questions

- Design questions to be easily understood and answered by a broad range of respondents. Avoid over-reliance on instructions to explain ambiguous questions or form completion. Cognitive testing can help to identify any aspects of the survey that create particularly high cognitive load.
- Design questions to directly produce data items that meet specific data needs, rather than relying on interpretation during data entry and processing.

Instructions

- Consider usability and respondent experience associated with diary collection instruments. Make use of visual features and layout to alleviate cognitive load and meet respondents' natural ways of thinking about how they spend their time.
- Instructions for any type of self-completed questionnaire should be clear and easy for respondents to understand.
- For interviewer-administered questionnaires, interviewers need survey-specific training. (See chapter VI Enumeration procedures for time-use surveys.)

Privacy

- Consider retention and use of personal details for the purpose of validating match between questionnaire and diary records. Determine whether and how this can be done within applicable legislative and privacy frameworks.

IV. Survey frameworks for collecting time-use data

A. Type of household survey

A dedicated, stand-alone or independent time-use survey is designed specifically for the collection of time-use data. The content, methodology and enumeration procedures are aligned to the collection and production of time-use statistics. A dedicated or stand-alone time-use survey provides optimal outcome for time-use statistics because of the wealth and depth of information it can capture (ECLAC, 2022). A dedicated time-use survey, however, requires an allocated budget and the development of the entire statistical operation. As NSOs have sought to modernise their survey operations, this traditional "*stovepipe model"* of statistical production has come under greater scrutiny. As an alternative, modularisation seeks efficiencies, cost savings, and enhancements to data quality. Survey modularisation refers to the process of splitting—and flexibly reconstituting—sample surveys as a series of "core" and "add-on" modules (i.e., blocks of questions) related to one or more specific topic(s) or sub-topics (Eurostat, 2010). NSOs may choose to collect time-use data through stand-alone surveys or using a modular approach or may conduct a stand-alone survey every 5 to 10 years and use modules in between. As with other design choices, the type of survey used to collect time-use data involves trade-offs. This section describes the advantages and limitations of each approach to help NSOs decide which best aligns with their objectives.

A dedicated survey can be fully independent or use a sample linked to another survey.

- **Fully independent:** The survey is designed specifically for the purpose of the topic, including consideration of the sample, purpose-trained interviewers, and targeted and specific content. (Examples: Canada, Colombia, Mexico, Mongolia, Morocco, South Africa)
- **Linked sample:** An independent survey is designed for the specific measurement objectives, with independent operations, but uses a sample derived from another survey. (Examples:

Belgium (in 1999 and 2005 coupled with the National Expenditure survey, and in 2013 coupled with the LFS), Thailand (LFS), USA)

The alternative type of time-use data collection consists of incorporating a time-use component into another survey process. There are two main options:

- **Fully integrating time-use questions** within a household survey on a related topic.
- **Adding a time-use module** or set of questions to an existing household survey with specific implementation procedures.

Dedicated and modular surveys are described further below. Stand-alone surveys are described much more briefly as they are in effect the default survey described throughout this Guide and in the 2005 Guide. Time-use modules are described in greater detail, based on pilot testing done in recent years.

1. Independent or stand-alone time-use surveys

A dedicated or stand-alone time-use survey is tailored to the time-use data objectives and requirements.

a) Advantages

Background: The background questionnaire is designed to collect information required to support time-use data analysis and properly classify activities.

Sampling: The sample design and frame are appropriately designed to ensure the correct representation of different cohorts of the population (for example, urban and rural areas; areas with higher proportions of older and younger populations). A dedicated or stand-alone time-use survey should be designed to achieve an adequate representation of weekdays, weekends, holidays, and seasons. The sampling methodology and weighting can also be tailored for optimising time-use survey.

b) Limitations

Cost: The main limitation of a stand-alone survey is the cost, in particular because many countries still do not include time-use surveys as a regular part of their statistical programmes with designated budgets to conduct them periodically. When resources are limited, it may be hard to guarantee resources.

2. Time-use module in a multi-purpose survey

a) Advantages

Versatility: The chief attraction of modular survey designs rests on their relative adaptability. While certain questionnaire content (composed of "core" modules) remains constant, *add-on* modules can be incorporated or eliminated in line with required periodicity, or in response to changing social contexts, information needs, and policy priorities (Reis, 2013).

Respondent burden: There is a substantial body of evidence correlating increases in survey length with declining response rates (Reis, 2013; Blumenberg et al. 2019) and reduced data quality (Bradley, 2016), across all modes. Survey modularisation permits overall survey length to be optimised and burden to be managed or dispersed through, for example:

- scheduling the rotation of different add-on modules for repeated surveys, so minimising overall respondent burden and interviewer fatigue (Allen, Fleuret & Ahmed, 2020).
- selectively administering add-on module(s) to a sub-set of the total sample (sometimes termed "*between respondent modularisation*"), and/or by administering core and add-on module(s) at different times (sometimes termed "*within respondent modularisation*") (Allen, Fleuret & Ahmed, 2020).

These strategies may be particularly relevant for modular time-use content, as reflected in some current national practice, and international guidance (ILO, 2023, *forthcoming*).

Analysis: Modular approaches offer an expanded scope for multivariate analysis, a result of having data for the core survey modules and the add-on module(s) for identical sample units (Ioannidis et al, 2016).

Cost: Modular approaches permit economies of scale, with the fixed costs of administering a nationally representative survey largely provided for under the core survey budget. As a result, the mobilisation of funds for time-use measurement may be restricted to the variable costs incurred by the introduction of the additional module(s).

Periodicty: The modular approach allows for topics covered by add-on modules to be embedded within the national survey infrastructure, scheduled for periodic inclusion alongside core statistical topics, and funded centrally (and/or integrated within proposals to mobilise funding for the statistical system). This may result in increased periodicity of statistical collection for important, but historically neglected topics.

Sampling: Established national sample surveys tend to be characterised by relatively large sample sizes, rigorous sampling and data collection methodologies to ensure the representativeness of the data and minimise threats to data quality, as well as protocols for secure data transfer and storage, and timely release.

b) Limitations

Scope and coverage: Careful consideration is required to ensure the base survey aligns as closely as possible with time-use survey requirements. For example, there may be limited survey time available for time-use survey content. The scope and coverage of the base survey may not be ideal for a time-use survey.

Sampling: The target population of the base survey may not align with time-use survey requirements. The number of people enumerated in the household, for example, may not be suitable (enumerating all

adults, a randomly selected person, or any responsible adult). The geographic coverage may not be complete. Time-use surveys should include urban and rural settings to capture the different activities undertaken by people living in different areas. The enumeration profile of the base survey may affect time-use survey requirements such as length of time in the field, follow-up, the requirement for interviewers to return to the household to collect diaries, and the ability to achieve a representative distribution of days, seasons, and holidays. A time-use survey samples both people and time, ideally attempting to cover at least all seasons of the year. Most surveys are less concerned with seasonality or the day of the week. See chapter V.D Sampling for time-use data collection in multi-purpose surveys for a more in-depth discussion of sampling and coverage issues.

Proxy respondents: Time-use surveys require a direct respondent to guarantee the accuracy of the responses and often need to interview multiple household members, however some possible base surveys require interviewing only one person in the household (proxy respondent). In 2022, Grenada compared unpaid domestic and care work reported by direct and proxy respondents and found that direct respondents reported levels approximately twice as high as proxy respondents[27] (Nicholson, Budlender and Haarr, 2022). If the base survey allows proxy respondents, additional sampling and field considerations need to be taken to ensure that the module on time use is responded to by direct respondents.

Respondent burden: One of the justifications for using a module is to reduce respondent burden, yet one of the main challenges of using a module is the limited amount of time available to add to the collection process without overburdening the respondents and compromising the quality of both the parent/base as well as the time-use survey. Even if time-use data collection is separate from the base

[27] The report discusses other variables that may account for some of the difference, such as that proxy respondents were more likely to be used for people who were employed full-time and therefore less likely to be home. However, the researchers used regression analysis to explore the impact of such characteristics as gender, employment, presence of children in the household, and concluded that "Proxy status is a strongly significant determinant with large impact even after controlling for all the other factors" (Nicholson, Budlender and Haarr, 2022, p.10).

survey, it is important to remember that respondents have already completed background information from the base survey. Limiting the number of questions is necessary to avoid overburdening respondents. For instance, modular approaches may be limited in the number of contextual variables that can be included in the instrument design.

3. Choosing between stand-alone and modular survey approaches

As a norm, the choice between types of surveys should be driven primarily by users' and producers' information needs.

Given the specialised nature of time-use measurement, independent/stand-alone time use surveys are the preferred data collection instrument to ensure high quality data. This type of survey requires settings where resources to support their integration within the national statistical systems are available on an ongoing basis.

In settings lacking committed long-term resources for time use measurement, modular approaches can provide a cost-effective alternative, however trade-offs should be carefully considered. Costs are reduced as the survey infrastructure is already established and can be shared across surveys. There are additional advantages to be gained from the rich data included in the base survey, offering greater analytical opportunities.

In a modular time-use approach, a time-use record is integrated or attached to a "host" or "parent" survey—usually an established, nationally-representative household sample survey. The background forms included in an independent time-use survey are omitted, substituted by core content in the parent survey. This shifts the distribution of the survey content away from being weighted towards the time-use record, to being weighted towards the core survey content instead. In this scenario, the time-use record is kept comparatively light, and the survey design and field operations are optimised to the parent survey (though some adjustments to accommodate time-use measurement will normally be

necessary). Adjustments at the survey design and implementation phases are normally restricted to the time-use module, allowing for the parent survey to proceed as normal (unless there are efficiencies or data-quality advances to be gained by modifying the overall design). This results in tradeoffs: ease of implementation and affordability are balanced against depth of coverage, with time-use modules tending to generate informative, but less than fully comprehensive, time-use data results.

Attention to modular approaches has intensified as NSOs have moved to mobilise CAWI-mode (computer assisted web interviewing mode) surveys, and mixed-mode surveys utilising CAWI. This is because CAWI has been found to be particularly sensitive to survey length (and so, particularly fsuited to survey modularisation), especially when mobile phone and tablet-based modalities are supported alongside desktop/laptop modality (Toepoel & Lugtig, 2022).

Recent advances in survey modularisation theory and practice emphasise the adaptability and versatility of modular approaches, capable of accommodating a wide variety of time-use measurement approaches. The modular approach is well suited to a situation where an NSO is exploring the possibility of conducting a time-use data collection with limited resources and objectives that are compatible with an ongoing household survey, or to monitor indicators in between data collections using stand-alone surveys. The timeline for the design and build processes may be reduced. The survey can be mobilized relatively quickly since the sampling frame, the workflows and the field teams are available and background information has already been collected.

The motivating factors underpinning the survey modularisation model more broadly are applicable to modular time use measurement. However, owing to the highly specialised nature of time-use measurement, careful consideration is required before deciding to use a time-use module. Key design features (including the demands placed on respondents and interviewers, the accommodation of highly seasonal dependencies, the need for direct reporting, and the pre-assignment of diary days and

probabilistic within-household respondent selection, where relevant) dictate that where an independent/stand-alone time use survey is feasible, it should be preferred.

This is because independent time-use surveys weight their content towards obtaining a very detailed time-use record sufficient to support key multivariate analyses of the relationships between household and individual characteristics and time-use. The survey population, the survey periodicity and the reference periods, the sample design, and the field operations are optimised towards a single purpose—the production of time-use statistics, for a given target population and reference period, at a specified level of precision.

Integrated questions

In the lightest modular applications, time-use measurement is restricted to a brief series of stylized questions, fully integrated within the parent survey (UN, 2005). Typically, this integrated approach has relied on a "usual" or "typical" (or, where supported by the parent survey, seven-day) reference period for the time-use content. Since this approach has little impact on survey length and fielding protocols, there are few budgetary considerations over and above the fixed costs for the parent survey (some limited variable costs may be introduced at the questionnaire design phase, as well as for targeted piloting, and interviewer training). While simple and inexpensive to implement, such an approach can support only very limited measurement objectives and is not generally recommended.

Time-use module

To avoid compromising data quality and to support a wider range of time-use measurement objectives, a time-use module using a light diary or stylized approach[28] is recommended over integrated questions. Relative to a full or verbatim diary, these light approaches reduce the time it takes to complete the survey, and provide substantial efficiencies at the data-entry, cleaning, and analysis stages. This

[28]This is the model adopted by the ILO for LFS-based modular time use measurement (ILO, 2023, forthcoming), as well as by the World Bank, for LSMS-based approaches (World Bank, 2023, forthcoming)

minimises the time-lag between data collection and data release. Relative to the lightest approach, light approaches allow for the retention of some of the defining methodological features of time-use measurement.

In assessing the suitability of a candidate parent survey, several considerations arise. These relate to the compatibility of the parent survey and time-use module measurement objectives, and the survey design features underpinning them. Candidate household surveys retain sufficient commonality to permit alignment to international statistical standards, and to support comparative analysis, but national implementation practices may differ in key respects. These include temporal coverage, periodicity (including whether continuous or not), data collection mode(s), target population, whether the base survey relies heavily on proxy respondents, etc. Therefore, the most appropriate parent survey may vary from country-to-country, and/or may change over time. Candidate parent surveys include *Labour Force Surveys* (LFS)[29], *Household Income and Expenditure Surveys* (HBS)[30], *Living Standards Measurement Surveys* (LSMS)[31], and *Multiple Indicator Cluster Surveys* (MICS).

[29]Following extensive piloting with partner NSOs and independent research institutes, the ILO has produced freely available time-use measurement toolkits, including CAPI modules (available in *CS Pro software*), methodological guides, national adaption guidance, and interviewer manuals and training curricula to support low- and middle-income countries to periodically undertake modular time use measurement via their national labour force surveys (LFS), published here [link to follow].

[30]Countries including Belarus (2014)…

[31]Following extensive piloting, the World Bank has produced demonstration time-use modules for attachment to LSMS, published here [link to follow].

Table IV.1. Country experiences using modular approaches to collect time-use data

Country and most recent year	**Base survey**	**Characteristics**
Cameroon 2014	Cameroonian Household Survey	• Multipurpose survey on poverty and living conditions: health, education, labour force characteristics, agriculture, migration • Diary using one-hour intervals, up to 5 activities per interval • Mixed mode: PAPI, CAPI • Provides estimates at national and regional level (12 regions)
México 2019	National Occupation and Employment Survey	• Sociodemographic and labour force characteristics of the population aged 15 or over • Stylized questions on time use • Mode: CAPI • Provides estimates at national, state and municipal levels • Proxy respondent: One respondent aged 15 or over provides information on all the household members 15+
Switzerland 2016	Labour Force Survey	• Stylized questions on unpaid work: domestic work, care, formal volunteering and informal volunteering • Mixed mode: CAWI with CATI option • Provides estimates at national and regional level

Tanzania 2019-2020 (Zanzibar) 2017-18 (mainland)	Household Budget Survey	• Household budget survey measuring poverty and living conditions: food security, health, education, • Diary with open intervals • Mode: CAPI • Provides estimates at national and regional levels and above/below poverty level

B. Data collection approaches

In time-use surveys, the mode to collect data refers to a combination of whether the survey is interviewer- or self-administered, and what technology is used to solicit and record responses. This section first compares the features of interviewer- or self-administered approaches in general, then describes how they are implemented with different technologies (e.g. personal interview with paper or electronic device, self-report with paper or device).

National Statistics Offices are facing challenges in conducting time-use surveys, and social surveys in general, due to decreasing response rates, increasing costs, and delays in dissemination of results. They are increasingly modernizing data collection modes as a way to address some of these challenges. In the context of modernizing their national statistical systems, NSOs are exploring alternative ways to use technology to collect time-use data. For instance, mixed modes offer respondents choice in how to provide the requested information. Furthermore, technology is becoming an integral part of the production of time-use statistics in many countries to improve efficiency in data collection as well as increase data quality.

The use of personal computers, tablets or smartphones can improve data quality and reduce respondent burden, thereby increasing response rates. Digital methods enable validity checks, linking context

questions to information from the pre-questionnaire or the use of tags, for example. Technology can increase efficiency by streamlining data processing, potentially reducing costs. Table IV.2 shows how costs compare across modes, and how representative modes are.

Table IV.2. Costs and representativeness of different data collection modes

Mode	Initial investment cost	Ongoing cost	Representativeness
Paper	Low	High	High
Phone	Low	High	Low
Computer/App	High	Low	Can be higher or lower depending on context

Given the initial investment needed for purchasing equipment and developing software applications, digital methods may or may not lead to an overall cost saving in the short term. However, most national statistical offices are making efforts to digitize and modernize statistical operations in general. Modernizing time-use surveys should become a part of these modernization efforts, taking advantage of organizational capacity to adapt time-use data collection and dissemination processes.

1. Interview or self-administered

Traditionally, the most common mode of data collection was a household face-to-face interview. A background questionnaire was followed by either an individual time diary or a list of stylized questions about the activities carried out during the reference period. Most countries still use interviews, whether they are completed face-to-face with the interviewer using paper or an electronic device, or over the phone. Fewer countries, mostly with high incomes, use a self-complete approach where the respondent personally records the time-use information on the survey instruments.

The key advantage of interviews over self-reported surveys is the ability of skilled, well-trained interviewers to use their organizational and interpersonal skills to contact selected respondents, explain the survey and get informed consent, support the respondent in reconstructing their day, and fill out forms completely and accurately. Most of these are interviewer responsibilities for any survey, but they are particularly relevant for time-use surveys. Helping the respondent reconstruct their day is necessary if the respondent is to accurately report total time, whether the instrument uses a diary or stylized questions. Interviewers must understand the coding scheme to be able to correctly translate respondent words into codes, for example, if they are coding on the fly (see VI.D Coding). They must ensure that the household members interviewed report on their activities for the designated reference days or follow procedures for replacement days.

Interviewer-administered surveys require more resources to cover salaries and field expenses.[32] Teams of interviewers need to be moved to the study area and may need to make repeat visits, especially if data are to be collected from multiple household members or on multiple days. Maintaining a balanced sample of days of the week can add to the complexity, compared to other types of household surveys the NSO conducts. In face-to-face interviews, respondents may adjust their responses, over-reporting socially-desirable activities and under-reporting others. Social desirability bias can occur with self-administered questionnaires as well but is generally assumed to be greater when speaking with an interviewer face-to-face (Klausch, Hox & Schouten, 2013; Gnambs & Kaspar, 2015). This is less of a problem with diaries than with stylized questions because of the chronological listing of activities, but the respondent may still edit their day for interviewers. Table IV.3. Comparison of interviewer-administered and self-completed surveys, below, summarizes the main advantages and limitations of self-completed and interviewer-administered surveys.

[32] Diaz de Rada (2022) provides a literature review of studies comparing costs by survey mode in Europe, the US and Australia. He also presents possible ways to implement a sequential mixed-mode design.

Table IV.3. Comparison of interviewer-administered and self-completed surveys

	Options	Advantages	Limitations

Interview	• Face-to-face
	  ○ Paper-assisted personal interview (PAPI)
	  ○ Computer-assisted personal interview (CAPI)
	• Telephone (CATI)
		• Interviewer can probe to record the necessary details
		• Good training and supervision of interviewers improves quality and standardization
		• Appropriate for populations with low literacy or numeracy
		• Interviewers can code on the fly, saving time compared to after-coding
			• Cost of interviewers and travel[33], especially to remote settings
			• Logistics and timing: respondents and interviewers need to be in same place (or on phone) at same time
			• Social desirability: over or underreporting of time

[33] Does not apply to CATI.

Self-administered	• Paper
	• Computer-assisted web interviews (CAWI)
		• No recall bias if completed in real time
		• Not need to allocate budget to interviewers
		• Not biased/influenced by the presence of an interviewer (though still potential for social desirability)
			• Cognitive burden especially for participants with low literacy or numeracy:
			  ○ Understanding concepts and classifying activities correctly
			  ○ Navigating forms
			  ○ Understanding time/time sense
			• Lack of consistency across participants in details of activities reported
			• May reduce response rate or increase errors
			• (For paper diaries) may increase costs associated with printing extensive instructions

2. Data collection modes

This section first gives an overview of the modes available: paper- and computer-assisted personal interviews, computer-assisted telephone interviews and web or mobile questionnaires—then discusses digital tools in more depth.

Outside official statistics, smaller time-use studies with specific research objectives may also use other modes of data collection, such as observation or other qualitative approaches, wearable cameras or other technology. It is also possible to send questions asking respondents about what they are doing right then, or what their mood or stress level is, at random occasions during the day. This is called Ecological Momentary Assessment (EMA) or Experience Sampling Method (ESM)[34]. It is particularly suited to measuring transient states such as subjective wellbeing but might also capture activities that tend to be missed in retrospective studies. These are not included in this guide because to date they are only used with small samples, not national-scale surveys.

a) Paper-assisted personal interview (PAPI)

PAPI is the most basic mode of time-use data collection. The principal advantage, and the reason that some NSOs still use interviewer-administered paper questionnaires, is that they are not reliant on new technologies. NSOs without the expertise or the equipment required for digital collections will require high initial investments to move away from paper. Also, start-up time when moving from paper-based to other collection modes dependent on technologies increase affecting the timeliness of the process. With PAPI, respondents don't need to have any type of technology or technical ability to fill in forms, however might be a challenge for populations with low literacy rates. In many countries and sub-populations, these are important concerns. Even in countries that use CAPI, interviewers still carry paper forms to reach specific subpopulations or as a backup. For example, interviewers in Argentina

[34] This method is described in Shiffman, Stone & Hufford (2008) and Hektner, Schmidt & Csikszentmihalyi (2007).

carry paper questionnaires in case the tablets malfunction and in Mexico paper questionnaires are also used in insecure regions where it is not possible to bring laptops or tablets.

The main limitation, now that digital modes are more widely available, is that it is very labor-intensive and time-consuming. Interviewers and supervisors need to check completed questionnaires carefully before leaving the field, including doing arithmetical checks such as totaling the time reported in stylized questions. Trying to conduct these checks quickly can lead to errors, as can the pressure of trying to appear competent when doing them in front of respondents. The layout of a paper diary, especially a paper light diary, looks more like a timeline and so may be more intuitive for interviewers and respondents. It can be easier to enter anchor points and fill in less-easily-recalled activities around them.

Surveys using paper diaries can be expensive to administer and take longer to process. Costs of printing, distributing, and collecting the diaries, as well as the salaries of the data staff to enter and code the information, add to the total costs of paper-based surveys.

There is a risk of keying error and subjectivity since data entry staff need to interpret handwriting as well as make other editing decisions. Data editing staff should receive thorough training and instructions to apply the rules consistently. The amount of time data entry requires will increase with the amount of editing and imputation such as cross-referencing with the diaries of other household members to complete any gaps in diaries or look for consistency.

b) Computer-assisted personal interview (CAPI)

With CAPI, interviewers enter the data into a laptop, tablet or mobile phone. As with PAPI, CAPI surveys need a longer enumeration period to accommodate the travel and interview time, and this makes them expensive to administer. However, eliminating the need for separate data entry reduces cost and time.

Although they are the main expense, interviewers are also the main benefit of CAPI. Interviewers can prompt respondents and help clarify and explain what is required, resulting in high quality data. As interviewers are doubly tasked with collecting data and ensuring proper coding, longer training sessions may be required to prevent misclassification errors. Unlike with paper forms, which are generally limited to textual content and black and white printing, design of CAPI forms can make use of color and icons to help the interviewer navigate through them. Figure IV.1 Icons from Argentina CAPI forms, below, shows how interviewers can select from different colored tabs (representing major divisions in ICATUS) to get a smaller list of activities. This is the equivalent of cascading dropdown menus, but using images and color instead of text. Images can be especially useful if interviewers are switching between languages, as is the case in some countries.

Figure IV.1 Icons from Argentina CAPI forms

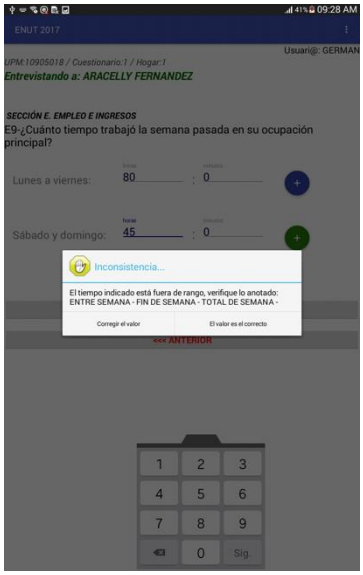
CAPI software allows validation of answers (activities, codes for contextual information) while an interview is ongoing. The interviewer is notified when a value given by the respondent falls out of a

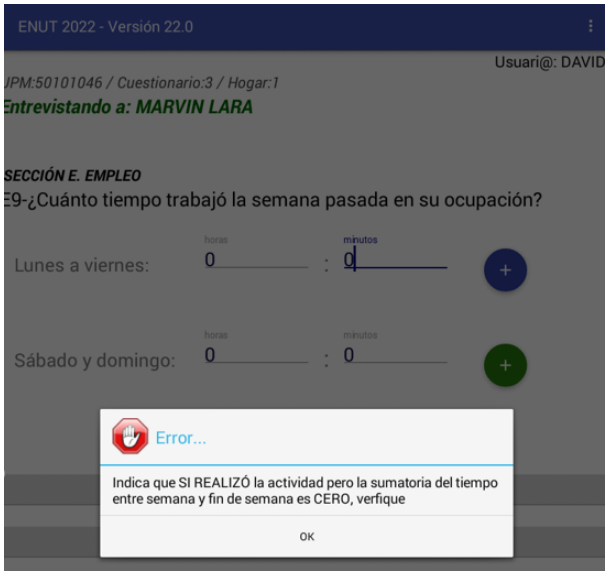
valid range of answers, or when a response is inconsistent with recorded responses to other prior items. This allows interviewers to correct errors immediately, improving data quality. Figure IV.2 shows examples of such alerts from Costa Rica.

Coding software can also be added to CAPI questionnaires to help interviewers to accurately code in the field, rather than simply record the information and then have it brought back to the NSO and a coding team.

CAPI (and CATI) applications can collect paradata on time required to complete the whole survey or subsections, which can be useful for quality assurance or supervision of interviewers.

Figure IV.2. Example of validation checks from Costa Rica: a) Soft check (yellow alert) for activity time out of probable range b) Hard check (red alert) for impossible duration (0 minutes)





Box IV.1. Changing modes in Mexico

Mexico switched from paper-assisted interviews to CAPI in 2009 modernizing their time-use data collection and since then Mexico have introduced new features in their time-use surveys allowing:

- Automated validation of field information, reducing interview times at the same time as reducing human error, improving the quality of the information.
- The inclusion of a time calculator, in 2014, that automatically summed time as interviewers recorded the time spent on activities. In addition to seeing the total time at the end of the questionnaire, the interviewer could see cumulative time as they progressed. This made it easier for interviewers to verify information as they went.
- Controls that ensured that interviewers correctly followed skip patterns, reducing interviewer error.

To facilitate a smooth transition from PAPI to CAPI, Mexico recommends taking the following steps:

- Identify specific needs of the data capture system, including validation checks. Field tests identified the need for a time calculator as well as validations of maximum and minimum times in each activity, with alerts when values were out of range.
- Have adequate personnel for the development of the data capture system and try to ensure that it can be used in subsequent editions of the time-use survey, extending benefits and reducing cost per survey of investments.
- Identify the time required to develop the capture system, from its base through the programming of the validation checks. Once the development time of the system has

been assessed, schedule it in survey planning, adjusting the timing of other phases as needed.

- Acquire devices (laptop, tablet, cell phone) with the appropriate specifications in time to test the application during development, pilot test it in the field and train interviewers on it.

c) Computer-assisted telephone interview (CATI)

With CATI surveys the interviewer calls the respondent on the telephone to complete the survey instead of having a face-to-face visit. As with CAPI, the CATI software includes validation checks.

Telephone interviewing costs are much lower than face-to-face interviewing as neither travelling time nor travel expenses must be paid. Response rates tend to be lower than face-to-face interviews. The over- and under-reporting of socially desirable and undesirable activities may be less problematic since the interviewer and respondent are not face-to-face (see e.g. De Leeuw, 2018; Gnambs & Kaspar, 2015; Kreuter, Presser & Tourangeau, 2008).

CATI relies on respondents having access to a telephone. Depending on how the telephone numbers are sourced, if the population coverage is incomplete, the quality and population representativeness of the data may be impacted. This is particularly relevant in low- and lower- middle-income countries.

In both CAPI and CATI, the interviewer—not the respondent—interacts with the instrument. Interviewers are well trained on how to use their equipment and programs. CAPI and CATI forms therefore will not require the level of instrument design and on-screen instructions that are required for self-complete instruments.

d) Self-administered Paper Questionnaires

Although the respondent completes the questionnaire at their convenience, paper questionnaires either need to be delivered to the house and collected when complete or sent by post. Self-administered paper diaries are not suitable for areas with low levels of literacy and numeracy but may be preferred by those who have sufficient levels of literacy but are not comfortable with technology.

For self-enumeration surveys, the paper diary has long been the method for collecting time-use activities. Japan continues to use paper diaries, and HETUS guidelines recommend them, among other alternatives. Paper diaries are discussed in chapter I.C Survey instruments based on a 24-hour diary, above. Those wishing more detail may refer to the *Guide to Producing Statistics on Time Use* (UN, 2005) or the HETUS 2020 Guidelines.

e) Computer-assisted web interview (CAWI)

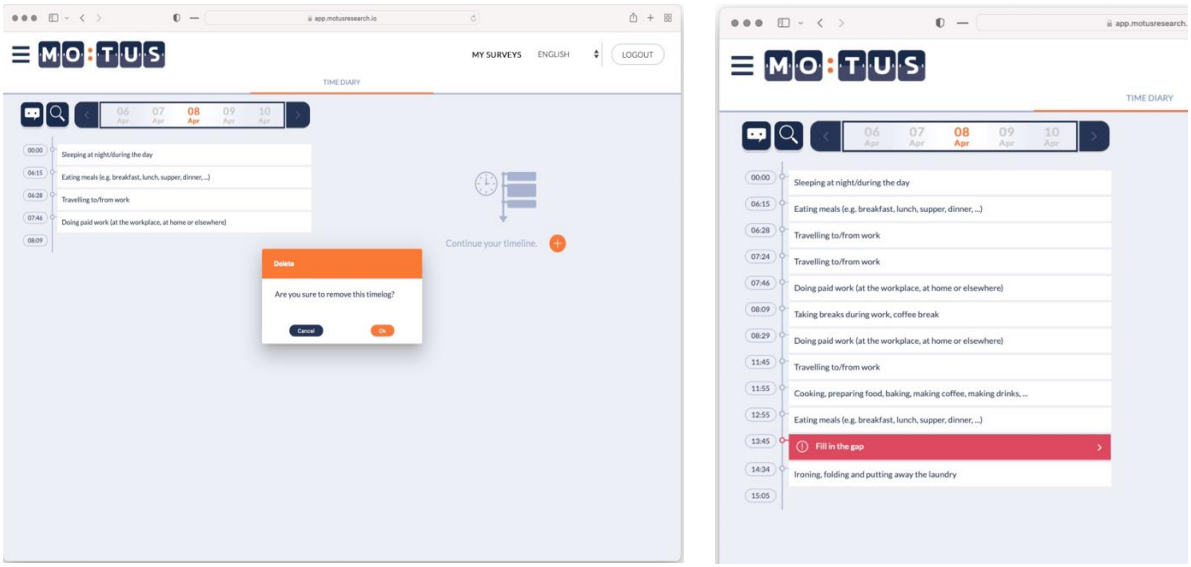
A modernized alternative to a self-complete paper diary is a self-complete web or mobile diary or questionnaire. Although the term includes the word “interview”, CAWI does not actually involve an interview. Instead, the respondent follows on-screen questions and completes the time diary or questionnaire. It can be done on any device via a website or a dedicated app. Using similar notification strategies as other modes, participants are informed about the survey and provided with a link to access the web application. The respondents visit the link when they choose but should be given some direction as to when and how to complete the form. Countries that have developed websites for the self-reporting of activities for time-use statistics include Australia, Austria, Belgium, Canada, France, Germany, Hungary, Japan, Luxembourg, Norway, Poland, and Serbia.

CAWI applications can be similar to CAPI and CATI but will require some modifications. Interviewers are trained to use the tools but respondents are only likely to read brief instructions. Built-in prompts, error messages, sequencing and auto-correction can be coded into the instrument to improve the flow

and help respondents navigate the tool, increasing accuracy and completeness of data. Box IV.2, below, describes how instructions on specific topics are provided via videos in Canada.

Programmers can use soft or hard checks if an error is detected. Soft checks are messages requiring the user to confirm that they meant to do something—for example, adding an unusually long activity. After confirming, the user is allowed to proceed. Hard checks are those that prevent the user from advancing. Hard checks prevent invalid responses but can lead to user frustration and early termination if overused. Figure IV.3 shows examples of such alerts from Belgium.

Figure IV.3. Example of validation checks from Belgium: a) Soft check for deleting activity b) Prompt for missing activity



Online applications can also collect paradata to monitor field progress, providing information on how many surveys are completed, the number of times the diary was accessed, or other measures considered useful for the current survey or improving future ones.

CAWI relies on the respondent access to equipment and the internet. Similar to telephone access for CATI, coverage errors are amplified for CAWI in many countries and for populations with low levels of access to internet and technology or low digital literacy. There are still population groups that cannot or prefer not to participate online. This may be due to preference, computer literacy skills or lack of

internet facilities. Alternatives such as CAPI, CATI and/or paper diaries should also be available or these groups will be excluded, introducing non-response bias.

Another problem with CAWI is related to data quality, whether measured by unit non-response (response rate), item non-response, early termination (dropout), or speed and non-differentiation (satisficing or straightlining). All of these tend to be much more prevalent in self-administered online surveys, though research on this topic is still emerging.

Box IV.2. Providing instructions in Canada's self-administered time-use surveys

A challenge of self-administered surveys is how to provide instructions for participants that are clear and simple yet provide adequate detail. An advantage to online surveys over paper leave-behind diaries is that it is possible to include links to written or video instructions. Pre-testing can help identify areas where respondents are most likely to need support, and then ensure that the materials are understood and useful.

Since participants typically found most of their challenges with the diary, Statistics Canada created a series of three short videos to answer some frequent questions. The videos explain what the 24-hour diary is, how to report simultaneous activities (and a reminder to avoid grouping multiple activities together) and how to report travel activities. During pre-testing, travel was the type of activity that participants most frequently forgot to report, and they were sometimes confused by the error message they received when their location changed without a travel activity.

Statistics Canada sent a brochure along with the introduction letter to respondents. They included links to the videos in the brochure. They also provided a link within the online survey

application itself, right before respondents begin the diary portion. The videos can be found here:

- "How does the diary work and what questions are asked?" https://www.statcan.gc.ca/en/sc/video/time-use-survey-questions
- "What if I was doing more than one thing at the same time?" https://www.statcan.gc.ca/en/sc/video/time-use-survey-activity
- "Reporting travel activities" https://www.statcan.gc.ca/en/sc/video/time-use-survey-travel

f) Mixed mode

The use of mixed modes in the collection of time-use data could help address many of the representation and access challenges discussed, as population segments would be targeted with a different, more suitable mode. For example, highly literate, working age, urban population with good technology access might be best interviewed through CAWI or mobile application, with an initial contact via mail, e-mail, or SMS, while low-literate or rural populations with poor internet coverage may be best interviewed via CAPI, with an initial contact via postal mail if appropriate. Sequential or concurrent strategies in mixing the modes could be selected for effective data collection design based on sample, time, questionnaire, or a combination.

Mixed modes can also address unexpected challenges. Colombia's 2020 survey was conducted during the COVID pandemic. With infection prevention protocols in place, interviewers visited households but offered to conduct telephone interviews with respondents who did not want to have face-to face interactions. The protocol called for interviewing multiple household members. Interviewers also

followed up by phone with individuals who were not at home at the time of their visit. Although only 2% of interviews were conducted via CATI, respondents appreciated the option.

Offering respondents a variety of options for participation (i.e. having a mixture of paper, telephone, and web-based data collection) is likely to improve the response rate and survey quality. Multiple options can also reduce potential bias arising from differing access to internet and technology in the population, since respondents can select their preferred mode.

Many middle- and high-countries have begun using mixed-mode approaches. Denmark (HETUS 2008-09) and Finland in 2020-21 collected data with paper diaries and a web application. Japan did the same in 2011 and 2016, then added a web application for smartphones and tablets in 2021. In Serbia in 2015, respondents had the option of providing data through a paper diary, a web application, or a mobile application. In Australia in 2020-21, CAWI, CATI and CAPI were options for collecting the background questionnaire and paper or electronic diary for the time-use component. In 2022, Canada used CATI and an electronic questionnaire in a web application. Box IV.3 below describes how people were assigned to or selected a mode in Canada and Japan. Japan used a concurrent design, where people were given the choice of paper or online modes concurrently. Finland also uses a concurrent design, but provides paper diaries if requested. Canada was sequential: people who didn't respond online were followed up with CATI.

An area for future research is the extent to which the use of technology is bringing new data comparability issues because of the use of different data collection modes and in terms of the quality of the data. For example, use of technology may produce more episodes or affect the response rates.[35]

[35] A Dutch study that randomly assigned mode found that the important difference was the presence or absence of interviewers (Klausch, Hox & Schouten, 2013). When the presence (or absence) of interviewer was held constant, the medium of paper or electronic device had no effect on responses. Other studies have explored costs and quality for sequential (as in Canada) or concurrent (as in Japan and Finland) mixed mode designs, but there are no definitive recommendations. For example, de Rada (2022) in Spain recommends concurrent as more cost-effective while Mauz (2018) in Germany found no significant difference, but used modeling to project cost savings for a sequential design in a big enough sample.

If only younger populations use CAWI and older populations prefer self-administered paper diaries, the mode effect will be associated with population groups, making it hard to assess whether differences in time use for different population groups are real or confounded by using different modes. Research on mode effects in surveys is young and modes continue to evolve; NSOs should always consider the current standards.

Box IV.3. Assignment of mode in mixed mode data collection

Canada

Statistics Canada's 2022 survey used a combination of Computer Assisted Telephone Interview (CATI) and online electronic questionnaire. Using multiple strategies for collection gave Statistics Canada a higher chance of contacting the selected respondent. It also allowed them to accommodate respondents who prefer one mode over the other. While they wanted most cases to be completed online (and most respondents tend to prefer this over telephone interviews), by providing alternatives means they did not exclude respondents with limited access to a computer or Wi-Fi, or those who are not comfortable navigating an online survey. Those respondents could still be contacted by telephone to complete the survey.

The mode for each respondent was determined by the contact information available in the sampling frame. Statistics Canada was fortunate to have more than one type of contact information for many people in their sampling frame (this is not the case for many countries). All cases that had a mailing address and at least one other contact method (either phone or email) were mailed an introduction letter and a brochure with information about the time-use survey. This letter was sent before collection began and was only to inform the household that they had been selected to participate and would be contacted soon to complete the survey. It could not be

used to access the questionnaire. About a week later, Statistics Canada sent out email invitations for all cases that had an email address in the sampling frame. If the diary was not completed, they sent up to three email reminders, each seven days apart. If the survey was still not completed after the final email reminder and there was a phone number available, an interviewer attempted to complete survey with the respondent on the phone. If there was no telephone number available, the case ended after the last email reminder was sent.

Cases that had a telephone number but not an email address received the introduction letter by mail, and then were contacted directly by an interviewer to complete the survey over the phone.

Cases that had neither an email address nor a telephone number received an invitation letter via mail with their brochure. This letter was different from the introduction letter that was sent in the three other scenarios. In this case, respondents were given a code in their letter that they could use to complete the survey online. If it was not completed, they also received a mailed reminder.

Assigning diary days according to mode, to minimize recall period

Respondents in Statistics Canada's 2022 dedicated time-use survey were assigned to a reference day or the yesterday method according to the mode of collection. In this mixed mode survey, some respondents received emails asking them to complete an online survey, whereas others received phone calls to complete a phone interview.

In 2020, Statistics Canada conducted a pilot test using email invitations and found that in general, respondents completed the questionnaire within 48 hours of receiving their invitation. Since Statistics Canada could guarantee when an email was sent and because of the findings from the pilot, they decided to use reference days for email invitations. The reference day is always the day before (yesterday method) the email is received, and it is a

day of the week, not a specific date. This allows them to send follow-up reminders seven days later without having a long recall period.

Cases that were completed over the phone used the yesterday method, because limitations to Statistics Canada's collection tool prevented from controlling which day interviewers receive any particular case, and they wanted to avoid long recall periods. They also used the yesterday method for the small portion of their sample which only had a mailing address because it was not possible to control when respondents received their invitation letter.

Japan

The Statistics Bureau of Japan's 2021 survey used self-administered paper questionnaires and online questionnaires.

The survey was conducted through the following channel: Statistics Bureau - prefectures - enumerators - households. Within each prefecture, enumerators conducted preparatory surveys in the survey regions and created lists of households and maps. Based on this information, the Statistics Bureau randomly selected sample households. They sent prenotice postcards to sample households to inform them that they had been selected for the survey. Enumerators then visited the target households, explained the purpose of the survey and how to respond, and distributed survey materials for responding both online and by paper. Respondents could freely choose whether to respond via the internet or by paper.

3. Choosing between modes

Each of the digital modes offers some advantages over paper-based interviewing or self-complete diaries and questionnaires, but also comes with some costs. Depending on the national context, there

can be tradeoffs in terms of accessibility and representativeness. In choosing which mode(s) to use, NSOs should consider the following:

- **Literacy** and experience completing complex forms at the population and sub-population level, in order to determine if the presence of an interviewer is required.
- **Reliable access to the internet** to complete online forms, or to access an app and transfer the data to a server when it is complete, if using CAWI, at the population and sub-population level. Internet is useful for transferring CAPI data as well, but data can also be stored and transferred later. For example, interviewers in Mexico use an external storage device to back up their interviews as they go, to prevent any loss of data.
- **Sampling frame** that enables remotely contacting selected respondents. If one is not available, some form of contact is still needed, even for self-complete web or mobile surveys. One possibility is for interviewers to visit households to conduct the background questionnaire and let selected respondents choose how they want to respond to the individual time-use component.
- **Instructions and technical support** to be provided to users in particular when difficulties arise including options for when transfer processes fail or servers go down.
- **Available resources**. Digital tools general have higher initial costs in time and money for set-up, which includes the cost to build and test the tool. However, the costs and times for data collection and data entry will be reduced. The NSO must invest in strengthening the technical capacity of their staff (e.g. coding software, hosting the website with related infrastructure) if the tool is being developed and maintained in-house.

Box IV.4. Changing modes in Finland

Before 2009, Finland used only face-to-face interviews. To reduce costs, half of the 2009–2010 sample was randomly assigned to telephone interviews. They found no significant differences in the quality of diaries by interview mode, but the telephone interviews had a higher response rate.

Following this positive experience with telephone interviews, Statistics Finland decided to do all background interviews by phone (CATI) in 2020-21. They considered phone interviews to be the most suitable mode due to the COVID-19 pandemic.

There were two kinds of background interviews: household interview and personal interview. One adult household member who knew the circumstances of the household completed the household interview. All household members aged 10 and over completed a personal interview and were provided with a time-use diary to fill in.

For the time-use part of the survey, there were two kinds of diaries: online diary (primary option) and paper diary (if requested). Both diaries were free-text full diaries. Diaries were coded manually afterwards. Of the returned diaries, 79 % were web diaries and 21 % were paper.

Not every country is ready to move to web and mobile solutions. Modernizing the production of time-use statistics may have different meanings in different contexts and countries. It should be seen as a journey for which the most important question for each country is what its next step may be.

Regardless of the technology chosen, further data validation should be conducted to ensure the accuracy of the converted data. There must be ongoing maintenance of software and revision to ensure that it is producing clean text, particularly if the next step is to automatically code responses, once they have been scanned or recognized. Clean text ensures that scanned/repaired text will autocode but

without regular review, mis-scanning/repair can lead to special characters be presented and then autocoding/matching not working or miscoding, and the coding index revision may become an issue.

For some countries, modernization may result in moving from PAPI to CAPI. A target that may be achievable for many countries is using mixed-mode and mixed technology solutions. In the longer term, statistical agencies may get the benefits modernisation allows by stretching out the costs across time, and across different statistical operations, since investing in CAPI, for example, will allow multiple surveys to adopt the technology.

In some settings, particularly where literacy, numeracy or access to technology may be limited or unevenly distributed, face-to-face or telephone-monitored interviews might still be needed. In others, self-completed approaches for data collection can be a suitable solution to lower costs and reach some population groups.

C. Digitizing data collection

Differences in access to technology, internet, devices, and capacity to use digital tools mean that NSOs are at different stages of digitalization. For countries that will continue to use PAPI as the principal mode of data collection, it is recommended to refer to the UN Guidelines 2005. For those countries that are in a position to move from paper-based to digital data collection, this section describes how digitization can improve time-use surveys and discusses considerations for choosing devices and designing tools for those countries ready to digitize time-use surveys, and options for incorporating digital modes into the time-use survey process.

1. Benefits of digitizing data collection

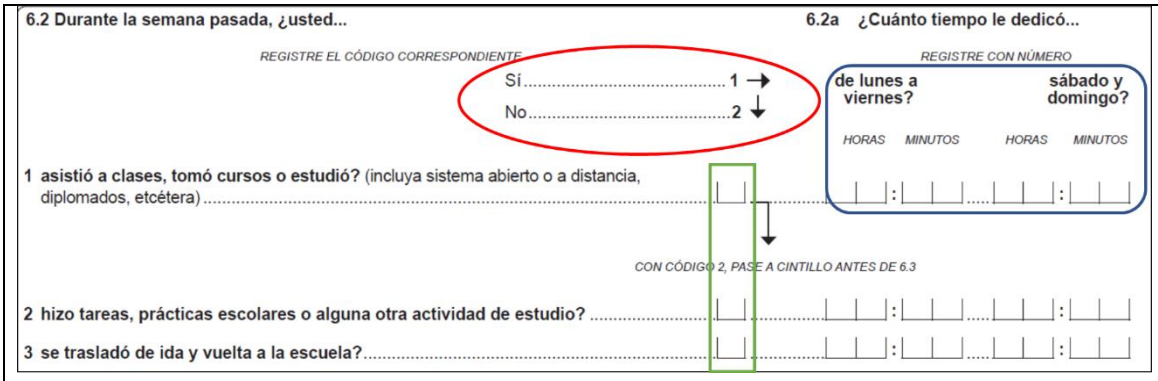
Using digital technologies addresses a number of the challenges of time-use surveys. These include offering various options to respond, reducing respondent burden, improving the response rates and

increasing representativeness (de Rada 2022; De Leeuw, 2018; Stern, Bilgen & Dillman,2014) improving monitoring and management of data collection operations, and improving contact and communication with respondents (such as sending invitations and reminders). Information technology can reduce costs of survey programs, improve data quality, address certain sampling problems, such as difficulty accessing individuals for face-to-face surveys, and allow deeper survey questioning by integrating different data sources.

A key advantage of electronic tools is that they may contain validity checks to improve the quality of the data collection and/or to avoid registration errors. These are most flexible and effective with web or online technologies. Direct checks are linked with the activity registered and check the consistency of the registered information. An example is a warning when a user attempts to register activities in the future, reports a change of place without transportation, or records inconsistencies such as travelling at home or gaps and overlaps in time. Digital tools can also be programmed to conduct summary checks at the end of the questionnaire, for example counting the number of episodes in a diary or totaling up hours in a stylized questionnaire. Survey managers can use information such as the time to complete a survey to help with supervising field staff.

Box IV.5. Validation criteria for Mexico's National Survey on Time Use (ENUT) 2019

INEGI Mexico's National Survey on Time Use (ENUT) uses CAPI and asks stylized questions with a reference period of one week. Respondents are first asked whether or not they did an activity in the previous week. If they did, they report how much time they dedicated to the activity separately for Monday to Friday and Saturday to Sunday. (See Figure below shows an example of three questions about education-related activities.)



The total time for all activities reported should add up to approximately 168 hours (excluding time spent on simultaneous activities), but sometimes the sum of activities is higher or lower. Due to the complexity, the amount of data to be analyzed and the timeframe to carry it out, INEGI does not adjust the numbers after data collection. Instead, they incorporate validation and data quality control measures into the data collection process. One of these is the use of time intervals for each activity.

There are minimum and maximum ranges for each time use activity (101 variables). Intervals are constructed by estimating the 2.5 and 97.5 percentiles for each activity in the previous ENUT. In cases where the activity did not appear in previous surveys, intervals are established empirically. When an interviewer enters a response is outside the interval, they are notified of a potential error. This allows the interviewer to check whether they made an error entering the data, or to confirm the respondent's answer. Using these intervals minimizes the variance of reported times and improves the precision of estimates.

Examples of ranges used in the ENUT 2019

MNEMONIC	ACTIVITIES	PROBABLE TIMES (HOURS)			
		MONDAY TO FRIDAY		SATURDAY TO SUNDAY	
		MIN	MAX	MIN	MAX
NEEDS AND PERSONAL CARE					
During the last week, how much time did you spend in total…					
Q6_1_1	to sleep (include nap)	20:00	60:00	8:00	24:00
Q6_1_2	to eat your daily meals (breakfast, lunch, lunch, dinner, etc.)	1:30	15:00	0:30	6:00
Q6_1_3	to your grooming or personal grooming such as bathing, going to the bathroom, brushing your teeth, etc.	0:50	10:00	0:20	6:00
STUDY ACTIVITIES					
During the last week, have you…					
Q6_2_1	studied, took courses or classes? (include open or distance system, graduates, etc.)	4:00	45:00	1:00	12:00
Q6_2_2	did you do homework, school practices or any other study activity?	1:00	20:00	0:30	8:00
Q6_2_3	moved back and forth to school?	0:20	10:00	0:10	5:00

Data outside the interval is considered a potential error. It triggers a soft check, which suggests to the interviewer they should check the time and correct it if needed, but allows them to keep the time if they consider it valid (e.g. a person spending an unusually high number of hours asleep because they were sick).

In addition to time ranges, other validations are incorporated to reinforce quality of the information, such as:

- Each activity registered as carried out during the past week must have a recorded time.
- Personal care activities (sleeping, eating, grooming, among others) must always have recorded times.

After the survey, validation tasks are mainly focused on correcting logical inconsistencies between other types of variables.

Another big benefit to using a modernised mode of collection is the potential to capture more question-specific information from respondents. Digitization enables having specific questions related to the background questionnaire. For example, a digital tool can ask those with multiple jobs for clarifications of work activities to link to these specific jobs. The tool could ask more targeted questions on location or co-presence, some of which may even be partially automated allowing for a smoother respondent experience and lower burden. People with young children in the household might get different response options than those without. Or it could probe for details about with whom or for whom an activity was performed. Although paper questionnaires also ask these context questions, they place a greater reliance on interviewers' (or respondents') abilities to navigate complicated skip patterns and recall information across different parts of the questionnaire.

Other questions relating to the diary day and giving a more complete picture of time use across both activities and related information (enjoyment, location, activity-specific follow-ups etc.) are more naturally integrated into a digital tool. Questions can be presented more sequentially by using links, shortcuts, and inference of related categories to reduce cognitive overload. For example, travel activities could offer only travel modes for "location". Hence researchers do not have to restrict collection choices as much as they may do when using limited space in physical paper diaries. The automated linking of activity-related questions can reduce interviewer error.

Using paper questionnaires requires the questionnaires to be transferred to a central location where the data is entered and verified. This takes time and costs money for salaries and facilities, and is also an opportunity for errors to be introduced. Data entry clerks may not be able to read handwriting, may not understand what is written, or may make keystroke errors. The use of devices to collect data can help

bridge the time gap between data collection and reporting phase by automatically or manually uploading the data to the server when it is in the network and eliminating the data entry process from paper surveys. The automation of post-interview processes, like processing, cleaning, and digitization of data, reduces the cost of operations. In addition, devices can be used for other statistical operations in the NSO, such as other household surveys and censuses.

Digital tools respond to the public's preferences and expectations. Many people are accustomed to filling out online forms and prefer that method of participation.

2. Considerations for technology selection

Web-based or app-based tools

Current modern technology choices for survey data collection are:

- web-based surveys, which work through an internet browser and require a device to be connected to the internet, and
- applications (or apps) that are downloaded to a device and may be able to run without an internet connection.

Either of these can operate on a smartphone, a tablet, a laptop, or a desktop computer. Since respondents will use the device they have available and are most comfortable with, web-based surveys or apps need to be optimized for both large and small screens. Mobile phone screens can fit much less content, usually one or a few questions at a time. In adopting new technology, NSO will need to consider a number of tradeoffs. A country's needs, existing infrastructure, and expertise, as well as where they are on their journey towards modernisation of data collections, will determine how they prioritize these considerations.

Extra functionalities enable new opportunities. For example, communicating with respondents can be done directly through the smartphone to prompt them to complete the diary, as well as other reminders

or prompts. Extra information can be gathered automatically from each respondent, such as the time spent on the device, time using certain categories of apps such as social media, banking etc. (subject to full transparency to the respondent and their consent). The app can be tailored to suit the device's operating system more accurately than a web-based solution, allowing for a cleaner user experience.

But extra functionalities also provide some new types of risks. An app typically has to be downloaded through an app store, which may be confusing for some users. It also requires approval from the app store to make sure that the proposed app abides by its terms and conditions. This may cause privacy concerns depending on the restrictions of these terms. The development of the app requires specialist skills such as programming on iOS or Android. In fact, multiple versions of the app may be required to cater for users across the multiple operating systems. As these operating systems change, more regular updates may be required to ensure the app still functions. There may be further specialist skills required by the tool developers in the form of data security relating to mobile data storage and transfer.

Screen and keyboard size

Tools should be designed to be usable on both computers (desktops and laptops) and mobile devices (tablets and smartphones). Some respondents will only have one or the other available, or prefer one over the other. Especially in low- and middle-income countries, smartphones (including old smartphones) may be most people's only access to the internet.

Computers have a large screen, and a keyboard and mouse. The space makes it possible to include more content on the screen and incorporate greater use of color or formatting to highlight content. The keyboard and mouse allow for easier typing and use of such functions as drag and drop. Mobiles have smaller screens which means less content (whether follow-up contextual questions or long activity lists) can fit on a single screen. It is more difficult to type, so typed text will contain more errors. (See 3. *Promoting accessibility* for more on features to enhance accessibility.)

For both types of devices it is possible to program tags that lead to suggestions in the predefined list of activities, and since tags usually refer to short words or even a part of a word, typing tags on a smartphone is not an issue for most respondents.

Portability

One of the main advantages of a smartphone is that most people who own one carry it with them all the time. As such, the smartphone is always available to register activities on the go. If completing the diary is made more convenient and easier for respondents, they might be more willing to fill in more days and at a more detailed level of completion, resulting in higher quality by eliminating recall bias. If they do not, the expected quality improvements may not be realised.

Since the smartphone is frequently available, it is possible to program a time tracker to record activity time or send push notifications to the respondent with reminders to respondents to complete prospective diaries. The advantages of the smartphone that go with its constant availability are dependent on one important condition: the battery. If the battery is low, the device is no longer available for input and registration.

Desktop computers tend to be connected to the internet, facilitating input and synchronization of data, but laptops and smartphones are not always connected. Limited or unstable internet access might be a problem for web-based tools, potentially leading to loss of data. Applications can be developed to be completed offline and to upload data once they reconnect to the internet.

Smartphones are better adapted to the more advanced means of input such as an external GPS and wearable sensors and of course also smartphone-native applications (GPS, camera, user statistics, etc.) can be used as input for the diary. This is not available on a PC or not useful if the device is not carried all the time by the respondent.

3. Promoting accessibility

Technology functionality should reflect all abilities. Considering different user experience with the modernised tools should include systematically testing areas of functionality that may have been overlooked for people without disabilities. Some examples:

- Consider how screen readers interpret the information on the form. Speech recognition can be programmed for both a PC and a smartphone and is native in later mobile and PC operating systems.
- Applications should function for those who only use a keyboard and not a mouse. Drag and drop and certain hover options are difficult or impossible for keyboard-only users to navigate easily.
- General design choices for a clear user experience helps everyone including people with dyslexia and those with vision problems: positioning of the least amount of information necessary; avoiding simultaneous, multiple-field collection on a screen or mobile page, etc.
- Relying purely on shapes or colours to convey information to users disadvantages blind and visually impaired respondents.
- Interactive elements as a core standard of the collection should be avoided for people with cognitive impairments.
- Timelines for the diary should be integral to data collection rather than for simply representing more traditional data collection approaches.

Survey managers should consider accessibility even when using more traditional forms of collection. Being able to hold a writing implement or telephone (if reporting through an interviewer) might be difficult for those with arthritis. Telephone interviews may exclude those with hearing disabilities unless there is equipment or help already provided. An online-based tool that is inclusive, allowing for

participation using adaptive technologies, may actually enable greater response rates and foster inclusion. These factors point to the importance of accommodating mixed modes of data collection.

Specific countries, statistical unions or other bodies provide accessibility guidelines. Within the European Union, there is the *Web Content Accessibility Guidelines* (WCAG 2.1) in line with EU Directive on Web Accessibility (EN 301 549)[36]. The New Zealand equivalent set of guidelines can be found online.

4. Design considerations for digital tools

Hardware and software limitations can impact the design of the survey. The way respondents interact with an online diary is very different to an interviewer-based diary or self-administered grid-based paper diary (Stern, 2014). This needs to be taken into consideration in the design phase. Digitization is not just about turning the paper form into electronic. In some respects, the design for mixed modes should be electronic first, with paper as a by-product.

Significant testing across the most common operating systems, devices and platforms is required to ensure the survey displays and performs as designed. If respondents experience performance issues and/or difficulties, they may not complete the survey.

An online tool should keep the respondent engaged. How the page sends and receives information affects the user experience. Some examples of considerations survey teams should explore with their IT departments are:

- How often should the tool save or send data? Saving or submitting the last few responses—perhaps one episode with two activities and three context questions—before moving onto the next reduces the chance that the user will enter a great deal of data and then lose it if the device

[36] See the Web Accessibility Initiative at https://www.w3.org/WAI/ for resources.

loses connectivity or the website times out. But submitting each entry individually and waiting for a page to reload can also frustrate users.

- After how long a period of inactivity should the application time out, requiring the user to restart? Automatic time-outs (both for online and mobile tools) balance potential exposure of personal data against the needs of people who take more time to fill in the form.

Some of these considerations may interact with expected costs for server usage during collection. Typically many respondents will log on to the tool at peak times.

There are several free and proprietary software solutions for designing and conducting CAPI data collection. These include CSPro, ODK, Survey Solution and Blaise. Using open-source software lowers software costs, reduces application development and testing time, avoids vender lock-in and facilitates scaling.

Box IV.6. Privacy and data protection in digital modes

NSOs are experienced at protecting privacy in data collection, but digital modes add certain data protection needs above paper modes.

"Privacy by design" dictates that instruments were developed to protect privacy from the start. (See I.G Privacy in instrument design.) The principle of "privacy by default" is relevant to mode, especially CAWI, whether web-based or app-based tools are used. Devices used by interviewers for CAPI should also have privacy by default, but it is possible to cover data security features of an application in interviewer training. Respondents completing a survey on their own are less likely to understand and be able to manipulate security settings. Therefore, tools should be configured so that users automatically have the highest privacy settings enabled. They may have the option to change the privacy settings to be less strict, but this should require proactive steps.

Electronic data are vulnerable on the device where they are entered and stored, and during the transfer process.

- **Devices.** CAWI tools should have some form of protection, such as a unique user ID or link, or a login with a password. It is important to remember that CAWI tools may be completed on shared devices, and are vulnerable to theft. CAPI devices should be password-protected, and have the ability to be remotely erased if they are lost or stolen. Enumerators should transfer data from the devices frequently to minimize the data stored on the device.
- **Transfer and storage.** Data transfer should be encrypted. Once transferred, data should be stored on a secure server, following NSO data security protocols.

Digital data collection and storage must obviously be consistent with relevant national or regional laws and policies on data protection, such as GDPR in Europe, the African Union Convention on Cybersecurity and Personal Data Protection (also known as the "Malabo Convention").

For example, MOTUS[37] has a privacy policy that describes how data from respondents are collected, managed, stored and processed through its services, as well as how the data and privacy are secured in each process. Data collected by MOTUS are stored spread across different secure servers and digital keys are required to combine these data. In addition, MOTUS can capture location information using sensors available in the mobile application to improve quality of data. In order to protect respondents' privacy, MOTUS stores location information only during the period when the respondents are asked to complete questionnaire or diaries, while they are completing the task or when they entered/exited the specific geographical area.

As discussed above, smartphones and wearable devices introduce the possibility of collecting new types of data, such as GPS points, biometrics or photos. While this may add to the richness of time-

[37] MOTUS is one of the CAWI tools for time-use surveys developed by the Research Group TOR of the Vrije Universiteit Brussel (VUB).

use data, the value of this data should be weighed carefully against privacy and data security concerns. The data might be inherently identifiable—for example, where a person sleeps at night. It might include not only the respondent, who has consented to participate, but others who have not, in the case of photos. As technology continues to evolve, so will data protection challenges and solutions.

D. Survey frames: illustrative examples

Frameworks are combinations of survey instrument and mode of data collection that are feasible for national-level or large sample surveys. **Table** IV.4 shows frameworks used by some countries in the past decade. Diaries are increasingly being offered in self-complete or mixed mode, but background questionnaires and stylized questions are still largely interview-based.

Table IV.4. Illustrations of national time-use survey latest frameworks

		Background questionnaire	Full diary	Light diary	Stylized questions
Independent or stand-alone survey	**Interview**				
	Face-to-face (PAPI)	South Africa (2010) Bangladesh (2021)	South Africa (2010) Bangladesh (2021)		
	Face-to-face (CAPI)	Thailand (2014-15) Mexico (2019) Mongolia (2019) Colombia (2020) Argentina (2021) Australia (2021) Uruguay (2021)	Thailand (2014-15)	Argentina (2021)	Mexico (2019) Colombia (2020) Uruguay (2021)

	Telephone interview (CATI)	Colombia (2020) (Finland 2020-21) Australia (2021) Canada (1986, 1992, 1998, 2005, 2010, 2015, 2022)	Canada (2022)	Canada (2015)	Colombia (2020)
	Self-administered				
	Paper	Japan (2016, 2021)	Japan (2016, 2021) Australia (2021) (Finland 2020-21)	Japan (2016, 2021) Mongolia (2019)	
	Web-based (CAWI)	Japan (2016, 2021) Canada (2022) UK (2020-21)	Japan (2016, 2021) (Finland 2020-21) UK (2020-21) Australia (2021) Canada (205, 2022)	Japan (2016, 2021)	
	App (CAWI)	UK (2020-21)	UK (2020-21) Australia (2021)	Mongolia (2019)	
Module in multi-purpose survey	**Interview**				
	Face-to-face (PAPI)	Argentina (2013) Cuba (2016) Dominican Republic (2016)			Argentina (2013) Cuba (2016) Dominican Republic (2016)
	Face-to-face (CAPI)				
	Telephone interview (CATI)	ATUS (2003-present) Switzerland (2016)	ATUS (2003-present)		Switzerland (2016)

Box IV.7 : Quality checklist – Survey frameworks

- Consider the cost of building and testing different collection instruments, particularly an electronic diary, weighed against any saving created in reduced data collection effort.
- Consider implementing electronic collection methods to improve accessibility and reduce collection costs.
- Ensure appropriate security and privacy provisions in both electronic and paper collection.
- Reduce complexity of user interface and form completion process, to reduce cognitive load and respondent burden.
- Plan to build iteratively, to allow time for usability testing and resulting improvements.
- If a new collection mode is being introduced, consider selecting independent samples to offer each mode, so that statistically valid tests can determine whether there is a mode effect.
- Consider placement of time use collection on a stand-alone or combined survey vehicle to maximise participation and reduce respondent burden.
- Consider usability and respondent experience associated with diary collection instruments. Make use of visual features and layout to alleviate cognitive load and meet respondents' natural ways of thinking about how they spend their time.

- Consider whether any content included in previous collections can be removed.
- Undertake cognitive testing to identify any aspects of the diary that create particularly high cognitive load.
- Consider the data entry and processing requirements for the included content, and the impact on timely data dissemination.
- Consider coherence of content with other data sources available.
- Ensure coherence of data collection modes (e.g. paper diary vs electronic diary).
- Consider comparability with previous iterations of this survey, and with international Time-use surveys.
- Offer different modes to allow preferred response style.
- Offer interviews at a wide range of times of day to suit respondents.

V. Sample designs for time-use surveys

A. Standard considerations in sample design for time-use surveys

Most of the issues relevant to sampling for time-use surveys are the same as those for other household surveys NSOs carry out. This section will only raise some issues that are particular to time-use research and provide some general guidance.

1. Population of inference

In addition to the standard issues on population coverage that are addressed in household surveys, time-use surveys require additional decisions concerning the reference population. The main complexity of sample design in time-use surveys is incorporating the time dimension in the design. Since people's activities vary by day of the week and season of the year, time-use surveys need to ensure that the sample design provides a suitable representation of the time period for which estimates are wanted, typically the full year.

The population of inference for a time-use survey covering an entire year can be viewed as a two-way grid, with persons arrayed along one axis and days of the year along the other axis, as illustrated in table V.1. The cells in the grid represent person-day combinations. For example, the top left cell designates person 1 on the first day of the survey year and the bottom right cell designates person N on the last day of the year. The collection of person-day combinations or cells may be viewed as constituting the population of inference of the survey. With unlimited resources and a cooperative population of individuals, data could theoretically be collected for all the applicable cells of the grid. In practice, however, only a sample of person-day cells is selected to represent the full population of person-days.

Table V.1. The population of inference for a time-use survey

Person	**Day**

	1	**2**	**3**	**4**	**…**	**364**	**365**
1					…		
2	X	X	X		…		
3					…	X	X
4					…		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
N					…		

The population of persons to be covered by a time-use survey will change to some extent over the time period of the survey owing to new entrants to or to exits from the population. Entry into the population can occur through "birth" (that is to say, reaching the defined minimum age for the survey), through immigration, or through entering the non-institutional population by leaving an institution (for a survey confined to the non-institutional population). A person may leave the population through death, emigration, or entry into an institution.

Such changes in the population of inference are shown in Table V.1 by the cells in the grid that are marked with Xs. These represent situations where a person-day is not in the target population. For example, the cells for days 1, 2 and 3 for person 2 are marked with Xs; this means that person 2 had not been in the target population prior to day 4 but entered on day 4. Similarly, the cells for days 364 and 365 for person 3 are marked with Xs; this means that person 3 had been in the target population prior to day 364 but left it on day 364 and remained outside the population. It is also possible for Xs to appear in the middle of a year, for example, when a person goes abroad or enters an institution for a period but then returns to the population at a later point in the survey year.

For some sample designs and forms of analysis, the variation in the composition of the target population over time due to "births" and "deaths" may be readily accommodated. This variation raises problems, however, for sample designs that involve repeated interviews with sample persons to collect time-use data for several days (particularly when the interviews are widely spaced across the year) and for analyses at the person level, where a person's time-use data for several days are aggregated.

2.Time of year coverage

It is important at the design stage to consider when the survey should be enumerated to capture seasonal variation in activities. For example, the activities undertaken in cold winter months are likely to be different to those in warmer summer months, with more indoor activities in winter and outdoor activities in summer. Agricultural activities are also closely linked to the changing seasons, as are home-based crafts-making for which raw materials are available on a seasonal basis. Ideally, enumeration should be evenly spread across the year to reflect changing activity patterns. Alternatives to approximate 12-month coverage are discussed below in C. *Technical and operational considerations specific to sampling for time-use surveys.*

3. Day of week coverage

The duration and frequency of time spent on an activity may vary depending on the time of day or the day of the week as well as the season of the year. Personal care activities such as eating and sleeping and housework are typically carried out every day, but some activities like house repair or buying a refrigerator are undertaken much less frequently. Some people have regular working hours or are in school on weekdays and have weekends off. Many informal sector work activities do not have the same regularity in working hours. Other activities such as worship are often organized on a weekly basis and would predominantly occur on a particular day. Based on survey objectives, decisions will have to be made on:

- *Unit of time to be observed*. Should the reference period be a day, for example, or a week?
- *Days of the week.* Should all days of the week be covered? If so, should coverage include each day or is it sufficient to distinguish between weekdays and weekends only?

The implications of these choices are discussed above under IIA3, Reference Period.

4. Age limits

The age limit will depend on the survey data requirements, survey organisation guidelines, and applicable legislation. For example, should the survey exclude those older than the maximum working age limit? People of retirement age may be excluded from some economic indicators, but their time use is relevant to many health and wellbeing indicators, and social policy. From what age should the survey cover children? It is important to ensure that the sample matches the objectives of the time-use survey. Inferences can only be made in relation to the surveyed population.

If the survey is a time-use module rather than a stand-alone survey, the sample will be dictated by the needs of the base survey. Survey managers may not have any choice about age limits, but they should be sure to explicitly state what they are when reporting results. If a labor force survey only includes the working age population, for example, the survey cannot provide information about the elderly, which might be necessary for survey objectives. Such a survey might provide information on children as recipients of unpaid work, but not as performers of paid or unpaid work. Some countries include children in their time-use surveys to better understand how children's time allocation affects key outcomes related to their well-being, including early childhood development, health, educational achievement, and gender equality.

In a pilot study, Romania found that children aged 8 and above are able to complete their own diary, sometimes with assistance of an adult. They used proxy respondents for children aged 2 to 7. Mexico conducts face-to-face interviews with children aged 12 to 17 in the presence of the parents. Bolivia

conducted a pilot test with children aged 10 and up in 2019. They found that although minors can provide more detailed information, it is not always easy to gain access to them for the survey, owing to distrust by their parents or guardians. One of the objectives of the survey was to "provide information on the interrelation between market work and unpaid domestic and care work". Since the official minimum working age in Bolivia is 14, they decided that the time-use survey should sample Bolivians aged 14 and older.

See I.F Time-use surveys of children for more about including children.

B. Analytical considerations in sampling for time-use surveys

1.Number of respondents per household

While all household members are enumerated in the background questionnaire, time-use surveys are varied in the number of people in the household that must complete the time-use component of the survey. Some countries choose one person, others select every adult, or everyone including children. Some select one adult and one child. Examples of the number of respondents sampled per household for some countries are included in the hub. Regardless of how many household members are selected and how, they must each report on their own time use.

Different objectives may involve different units of analysis and so require different sampling combinations of days and persons. The analytical objectives determine which level of analysis is appropriate: (a) the *person-time unit level*; (b) the *person level*; and (c) the *household level*.

a) Person-time unit level analysis

Many analytic objectives require only estimates of average levels of time use in different activity categories (and for different population subgroups). This is the case for developing estimates for satellite accounts of household production, or for measuring progress on SDG indicator 5.4.1, the

proportion of time that women and men spend in unpaid domestic and care work, can be estimated regardless of how the basic unit of time is defined. Analyses of average levels of time use only need a probability sample of person-days and do not require time-use data for more than one day per respondent. However, if data are collected for more than one day, these data can be readily incorporated into the analysis by constructing a person-day data file, with one record and associated weight for each sampled person-day.

For some analyses, the preferred unit of analysis may be a person-week rather than a person-day. While stylized instruments may use a reference period of a week, it is not necessary (or advisable) for diaries to do so. Instead, a common alternative is to construct a synthetic week based on sampled days, using weighting factors.

b) Person-level analysis

For some other analytic objectives, the appropriate unit of analysis is the person rather than the person-day combination. For example, an analysis may aim to measure the extent to which the amount of time women with children spend on childcare affects their children's intellectual growth. Here the focus is on how the outcome is associated with variation among individual women, averaged over a period of time, rather than averaged over a group of women at a single point in time. Multiple days of time-use data are needed for each sampled person for this type of analysis; a sample of a single day per person is inadequate because of the substantial within-person or intra-person variation in time use from day to day that applies to many activities. Researchers are often interested in questions requiring person-level analysis. Such questions may be of lower priority for some NSOs. For most NSOs, the aim for more granular data to be able to account for individual well-being is the greater priority and challenge.

c) Household-level analysis

Of more relevance to many NSOs is intra-household analysis, such as examining the division of labour between couples. While SDG indicator 5.4.1 compares women on average to men on average, this type of analysis examines the time use of the household as a whole and the trade-offs between different household members. This helps explain power and task dynamics within a household. For such analyses, time-use data are required for multiple household members and for the same days.

2.Sample size considerations

a) Analysis level

In person-day analysis, it can be more efficient to collect multiple days of data per respondent. As with all surveys, multiple related observations tend to be correlated. Collecting data on multiple days per person, or multiple people in a household, can reduce the precision of estimates. Because this is not unique to time-use surveys, it is not discussed here, but those wanting more detail can refer to *Section 3, Sample size considerations* in the Guide to Producing Statistics on Time Use (UN, 2005). It is important to remember that in intra-household analysis, the unit of analysis is the household, not the individual. Therefore, the required sample size refers to households, not persons or person-days. This may reduce the cost-effectiveness of sampling multiple members per household.

b) Sub-populations of interest

Another important determinant of overall sample size is often the need for estimates for various domains. Frequently time-use estimates are needed separately for different regions of the country, for urban and rural areas, for a variety of population subgroups. Population subgroups are commonly defined by age and sex, but other subgroups may be of particular interest as well. If a survey objective is to provide information to design family-friendly policies, subgroups might be defined by family structure—for example, number of parents present (single-parent households being different than two-

parent households) or age of children. Many surveys have as a goal to measure gender disparities, but other disparities may be important, based on characteristics such as ethnicity, disability status, education or income level, mobility status, or the intersection of several characteristics. Conducting robust analysis incorporating intersectionality requires an adequate sample of people with the intersectional characteristics.

Producing domain estimates of specified precision often requires sampling smaller domains at higher sampling fractions. For geographical domains, the sampling fractions can be set separately to produce the domain estimates. In 2019, Mexico oversampled localities with high levels of indigenous language speakers to make it possible to estimate total work time separately for indigenous language-speaking and Spanish-speaking women and men.

In most cases, population subgroups cannot be pre-identified for sampling at higher rates. Thus, a two-phase sample design may be needed. In the first phase, a large-scale screening sample is selected to determine subgroup membership. In the second phase, the samples in the smaller subgroups are retained whereas subsamples are selected from the larger subgroups in order to produce the desired sample sizes for each of the subgroups. Multi-stage sampling is a common sampling approach for household surveys so is not discussed here, but is described in greater detail in Guide to Producing Statistics on Time Use (UN, 2005).

C. Technical and operational considerations specific to sampling for time-use surveys

1.Seasonality

In the ideal design for a time-use survey, data are collected over a 12-month period. Sometimes a fieldwork plan can be developed to satisfy this requirement, spreading the interviews evenly over the

12 months both nationally and at subnational levels. But this may not be feasible, depending on operational requirements such as interviewer availability, funding, and timing constraints. When it is not feasible, the aim should be to approximate the ideal to the extent possible. One alternative is to take a sample of time periods, such as weeks or months, and concentrate the data collection in those periods. Strong efforts should be made to choose a set of periods that are representative on average of the full 12 months. The more periods can be covered, the better. In practice, the number of time periods selected is generally small, say, from two to four, in which case they may best be chosen by purposive selection. Within the chosen months, the sample can be spread across weeks and days of the week according to the survey specifications.

An unbalanced representation of certain times of the year may result in over- or under-reporting of particular activities. It is important that the enumeration dates and any such quality considerations are included in the published survey documentation so data users can understand the potential limitations of the data. This is standard practice but especially important in the case of unbalanced time samples.

2.Sample selection for online surveys (online only or mixed mode)

Many countries use multi-stage sampling for household surveys and create a sampling frame by physically mapping residences. Any country can create a sampling frame in this way. The same is not true for surveys conducted remotely, which require a sampling frame with some sort of contact information. There are several options for dealing with the absence of a complete sampling frame with the information to contact respondents remotely. One alternative is to use the sampling frame from another household survey where contact information is available. It may be possible to use administrative sources to match selected household addresses to phone numbers or emails. This is what Canada does. Or interview teams can follow the sampling procedure for face-to-face surveys. During an initial visit, they can collect some background information, such as how many household members

are of eligible age for the survey, and select household members for the time use component, giving the respondent the option to complete the survey online. Japan uses this approach.

3. Number of persons sampled in a household and number of days collected for each sampled person

Survey managers generally want as large a sample as possible given the resources available. The least expensive way to increase the sample size of a time-use survey is by (i) increasing the number of persons in the survey (selecting more than one household member) or (ii) increasing the number of days each selected person reports on (assigning, for example, a weekday and a weekend day).

NSOs should be familiar with choosing the most efficient cluster sampling design to minimize the sampling errors of the survey estimates for a given budget. To determine an efficient design therefore requires an evaluation of the effects on sampling error of clustering the sample of persons within households. This evaluation involves both the effect of weighting for unequal selection probabilities and the effect of cluster homogeneity. For time-use surveys, the household or individual can be conceived of as a cluster.

If it is feasible and consistent with survey objectives, selecting all eligible persons per household is recommended. In addition to enabling intra-household analysis, this makes it possible to cross-check household members' diaries at the data entry and editing phase if information is missing. The household-level burden will be increased, however, as will the complexity of field or data collection operations. Households may consider interviews with all household members to be an excessive burden and so be more likely to refuse than if one or two were selected. Selecting two respondents in the household may still support some of intra-household analysis but reduce the collective household burden. Choosing one person means intra-household analysis cannot be undertaken. The division of labour within the household cannot be examined but analysis of gender gap in the division of labour is possible across households.

Box V.1. Sampling in Finland, 2020-2021

Sampling frame: The sample was drawn from Statistics Finland's statistical register. A household-dwelling unit was formed of individuals with an identical address code in the register. In most cases, one household-dwelling unit was equal to a single household. The household-dwelling units were used in the sampling.

Type of sampling: One-stage cluster sampling, where household-dwelling units served as the clusters and individuals were the elementary units.

Respondents per household: All eligible respondents in the household were selected.

Age limits: Individuals who were aged 10 and over at the time of the survey.

Time of year coverage: The sample was allocated 52 survey weeks with a weekly sample of 170 households. The sample was updated four times during the data collection (September 2020–September 2021).

Day of week coverage: The sample was allocated to survey weeks and diary days uniformly, giving the same number of households for each weekday. The weekly sample was portioned out to diary days from Monday to Friday with a daily sample of 34 households. All weekdays were joined with a weekend day, selected randomly to previous or next weekend and further randomized to Saturday or Sunday.

4.Methods for sampling days

There are different approaches that can be used in selecting the reference day or date for which the time-use activities will be reported. See chapter I.A.2 Reference period for further discussion.

Designated day

A method for sampling days is for selected households to be allocated a particular day (or days) of the week. Regardless of when contact is made with the respondents, they will be asked to complete the diary for the allocated day (the previous occurrence in retrospective surveys or the next one in prospective surveys). This approach ensures the right distribution of days will be achieved. Some countries, for example Australia and Chile, allocate diary dates to the selected addresses.

One approach is contacting the household in advance to complete the background questionnaire, a few days ahead of the allocated diary commencement date so respondents are prepared and ready to commence their diary on their designated day. This approach relies on contact being made ahead of the diary commencement date. If not, the dwelling is treated as non-contact. Close field management is required to ensure non-contact is minimised. The expected degree of non-contact should also be considered at the sample design stage, so the sample size can be adjusted accordingly.

When choosing a designated date approach, non-contact may be higher if communication is not established with respondents ahead of their allocated diary commencement date.

Yesterday

In the yesterday approach, households are not assigned to a specific day but report on the day before the survey. The field phase of the yesterday methodology needs to be managed carefully to ensure there is an appropriate representation of days across the week. This may require interviewers working on days that are generally treated as non-work days such as Saturday and Sunday.

Convenience day

If the survey is in the field for an extended time and the survey manager is confident that a good distribution of days can be achieved in that time then the reference can be aligned to when the background questionnaire is completed. For example, if the background questionnaire is completed on

Monday, the yesterday diary or stylized questions can refer to Sunday, the preceding day. If the tomorrow methodology is being used the respondent is instructed to complete the instrument for tomorrow—Tuesday.

Survey managers must be confident that a suitable distribution of days will be achieved and that there are no biases associated with different days. For example, in households where the occupants are at work Monday to Friday, interviewers may only be able to make contact on the weekend and if the yesterday methodology is used there will be a higher representation of Fridays and Saturdays amongst the employed group.

Substitute or postponement day

Unavailability of respondents on designated days poses the problem of whether to substitute days. Allowing a substitute day may reduce survey non-response. Survey managers will need to consider their approach to respondents who wish to alter their allocated diary dates, who forget or otherwise fail to complete the diary on the designated day, or for whom contact could not be made ahead of the allocated day.

If the respondent feels that the designated day is unsuitable, they may simply not respond. Selection of a substitute day should not be left to the discretion of either the interviewer or the respondent, as this might affect the sampling design and introduce bias. If respondents are allowed to select their day they may choose a "less busy" day to reduce the burden of completing the diary. Or they may choose a day where they were engaged in more socially desirable activities.

To maintain representation of days in the sample and avoid bias, it is advisable to select the same day the following week (that is, postponement). If this is not an option, empirically similar days may be substituted. These may be weekdays for weekdays or weekends for weekends.

If the initial diary day cannot be achieved, it is preferred that postponement is used rather than substitution.

D. Sampling for time-use data collection in multi-purpose surveys

When using a sample designed for another household survey, careful consideration is required to ensure the sample aligns as closely as possible with time-use survey requirements. Sample requirements include the age of the respondents, the number of people selected per household (all adults, one randomly-selected adult, etc.), and geographic coverage (representative of urban and rural areas), among others. The enumeration profile of the base survey vehicle may have an impact on time-use surveys requirements such as length of time in the field, follow-up, requirement for interviewers to return to the household to collect diaries, and the ability to achieve a representative distribution of days, seasons, and holidays. Another major concern is whether it is possible to create an efficient dual-purpose sampling design in which the objectives of the time dimension are properly represented. Because this sampling typically reflects the objectives of the base survey, it will help if the time-use module has matching objectives. Few other household surveys need to spread their data collections over a 12-month period—or over any period—in a balanced way, as do time-use surveys.

Representing the time dimension appropriately in a combined survey usually requires modifying the data-collection procedures that would be used by the base survey if it were a stand-alone survey. Since the modification will almost certainly impose restrictions on the timing of interviews, it will increase field costs. It may lead to a lower response rate for the combined survey than would be achieved if the other survey was conducted alone.

A time-use survey will most readily fit together with another survey that also involves spreading data collection over time. The other survey may itself require a similar representation of the time dimension

as, for example, is often the case with a nutrition or household budget survey. The main concern here is that of response burden. The response burden in such surveys is often substantial so that, when combined with the high burden of a time-use survey, the overall burden may become excessive and affect quality.

Another type of survey that involves data collection over time is a continuous survey that is repeated at regular intervals to chart changes in population characteristics over time. A labour-force survey is the most obvious example. If a continuous survey is conducted at short intervals, say, monthly, it may give a good representation of the time period. Even a quarterly survey may give adequate time representation. If a continuous survey is used, the issue of the selection of days for collecting time-use data within each round of the survey still needs to be addressed. Additional possible challenges include the number of respondents per household, the type of respondents (proxy respondents being common in some surveys), and the age of target population the target population, among others.

If a time-use survey is to be combined with a single cross-sectional survey, the timing for the combined survey is an important consideration. Can the data collection for the combined survey be conducted during a period that is thought to be reasonably "typical" for a year? If it can, then issues of arranging the data collection to give proper representation to days and perhaps weeks for time-use data across the sample need to be resolved. Given the high response burden involved in collecting time-use data, a combination with another survey that has a low burden is preferable, other things being equal.

Key sites of compatibility to be assessed in selecting from available parent surveys or evaluating the feasibility of a particular parent survey for modular time-use attachment include:

- Temporal coverage
- Reference periods and diary days
- Target population

- Respondent selection

Temporal coverage

The temporal coverage of the parent survey may form a key consideration when assessing available options for modular time-use measurement. As discussed in above in *Standard considerations in sample design for time-use surveys*, while deviations in practice are not uncommon due to practical considerations, independent time-use surveys are ideally organised over the 365 days of the year on a continuous basis. This design permits indicators to be generated at the level of activity domain, accounting for seasonal variations in participation, volume, and intensity over the course of a calendar year. It also (ideally) negates—or (at least) minimises—reliance/dependency on model-based assumptions to support "satellite" or "extended" valuation exercises—whereby non-market orientated "productive activities" are accorded shadow monetary values—as analogous to GDP contributions.

In practice, however, this design feature (continuous sample distribution across the 365 days of the year), may be absent from—and implausible to implement in—candidate parent surveys. In this scenario, it may be necessary to compromise the temporal coverage of the time-use component to consider (in order of preference, based on sensitivity to seasonal effects) candidate surveys with i. monthly, ii. quarterly, iii. biannual, or iv. annual/less than annual temporal coverage.

While this consideration is not unique to modular time-use measurement (the same considerations will often apply to independent time-use surveys in more resource-constrained contexts), it may serve as a decisive factor-all else held constant—in ranking exercises to select candidate parent surveys for modular time use measurement.

Reference periods and diary days (including number of diary days)

A second temporal consideration relates to the compatibility of the parent survey and time-use module reference periods. The relevance of this consideration is amplified for light diary or stylised formats

utilising an actual 24-hour reference period, especially in contexts favouring face-to-face interviewer-administered survey modes.

As set out in *Standard considerations in sample design for time-use surveys,* this design implies the randomised pre-assignment of each sample unit to one or more designated "diary days". The random assignment of respondents to designated diary days directly conditions the survey participation day (i.e., the day immediately following the diary day).

While it is relatively straightforward to extend a parent survey's sample design to obtain a probability sample of days of the week (supported by adjusted sample weights), the designation of a specific diary day presents challenges for survey operations. Upholding the design increases the time and effort required to obtain a complete response, since a proportion of sampled individuals will be unavailable, unable, or unwilling to participate in the survey on their assigned day.

This feature of time use design can present a particular challenge for modular time use measurement, presenting risks for data quality, via the introduction or inflation of non-response bias. In a modular design, this may risk undermining response rates for the parent survey as well as the time use module.

Noting that response-rates for time use surveys tend to be lower than those of other nationally representative household sample surveys, in this scenario, semi-separate administration of the time use module can offer a means to insulate the parent survey from this heightened risk.

Target population and eligibility criteria

The parent survey's target population and eligibility criteria may deviate from that preferred for the time-use component. Nationally-representative household surveys will typically specify the target population as the resident population of the country living in private households (therefore excluding persons resident in collective or institutional settings). This will normally be compatible with general population time-use content, though there may be instances where the target populations deviate.

Additionally, the parent survey may set eligibility criteria for some, or all, of the core survey content. In scenarios where the parent survey's standard eligibility criteria are too narrowly bounded to support the measurement objectives for the time-use content (for instance, regarding lower/upper age bounds) adjustments may be considered on a limited basis. A key consideration will be the extent to which widening eligibility for the time-use content can occur in isolation – that is, without imposing a parallel expansion of eligibility for the parent survey as a whole.

While the parent surveys household roster form will record basic demographics for all members of surveyed households, more detailed individual level information will be limited to those meeting parent survey eligibility criteria. In such cases, expansion of eligibility may not be feasible due to logistical and/or variable cost constraints.

Within household respondent selection

Number of respondents per household sets out available within-household sampling strategies for time-use surveys, noting the trade-offs each may represent in terms of sampling efficiencies, measurement objectives, analysis capabilities, and variable costs. In the most comprehensive *within household respondent selection* scenario, all eligible household members complete the time-use content. In the lightest scenario, a single, probabilistically-selected, eligible household member completes the time use content. Between these poles, alternative scenarios allow for multiple household members to be probabilistically selected.

In a modular approach, this feature of the design will usually require scrutiny and careful planning at the design and budgeting stage. While not an obvious site of incompatibility, an important consideration in this content is whether—and to what extent—the parent survey utilises proxy response to gather individual level data. Proxy response refers to situations in which individual level data is reported indirectly. Usually, this means that one "reference person", chosen for convenience, provides information for all eligible residents of their household. The suitability of proxy response *vs* direct

response varies by topic. For some topics, including time-use, proxy response is generally regarded as unsuitable. (Exceptions may be made for young children or others who are unable to provide direct reports.)

Where a candidate parent survey is characterised by extensive proxy-reporting, the addition of time-use content has the potential to inflate the variable costs by intensifying and/or extending the data collection period, especially if coupled with probabilistic assignment to days of the week (discussed above). In this context, depending on several factors—including household size and composition, and the accessibility/cooperativeness of eligible persons—the choice of *within household respondent selection* scenario may prove decisive in determining feasibility/and or the operation of the available parent surveys may limit the choice of *within household respondent selection* scenarios.

Box V.2: Quality checklist – Sample design

- Consider the representativeness of enumeration periods across the year (seasons, holidays, school terms).
- Understand the implications of the timing of different aspects of the data collection process, such as the length of the enumeration period, the lag between completion of the background questionnaire and the time-use component, whether and how to allow substitution of designated days for a selected household.
- Consider for how many days respondent will recall, how much information is collected.

- Consider population required to meet data needs (only one or every adult in the household), are children included, what is the age at which a respondent is treated as an adult.
- Consider the number of diary days collected from each respondent – balancing respondent burden against any improvements in accuracy.
- If a new collection mode is being introduced, consider selecting independent samples to offer each mode, so that statistically valid tests can determine whether there is a mode effect.

Part Three. Collecting and processing time-use data

VI. Enumeration procedures for time-use surveys

Basic considerations in the design and implementation of field procedures for conventional household surveys apply to time-use surveys as well. These include: pre-tests and pilot tests; survey publicity; field organization and recruitment of interviewers and supervisors; training and supervision of field staff; determining workload and remuneration; interview scheduling and procedures; quality control over fieldwork; control of non-response; and considerations regarding the use of incentives for respondents.

The present chapter discusses some of these aspects as they relate specifically to time-use surveys. Of special concern are the known difficulties in inducing respondents to accurately describe their activities and in translating these verbal descriptions into the chosen classification system. Time-use surveys typically involve a household questionnaire and as well as a personal questionnaire or diary, sometimes for multiple household members or multiple days. This may lead to high respondent burden and refusals, which may in turn jeopardize data quality. However, willing respondents should not report on the time use of another household member who does not consent to participate. Only in exceptional circumstances, or for young children, should proxy respondents be allowed. If interviewers are used, they may have to make multiple visits to households on specified days to get all the required data.

A. Main considerations in planning field procedures

Interviewers and their supervisors are critical to the success of data collection in interviewer-administered surveys and should thus have appropriate training and be provided with effective

tools to complete their tasks. The amount of training to be given depends on the complexity of the survey, and the field staff's background and experience with surveys in general and with time-use surveys in particular. Even enumerators with extensive survey experience who have not done time-use surveys before will need thorough training in the time use instrument, as the process of eliciting accurate information is less structured and more like a conversation than in many household surveys. Recommendations on training practices for household surveys are found in several United Nations publications. Training for time-use surveys should additionally cover how people remember and report their time, probing techniques, and for stylized questions, how to aggregate time over multiple episodes of an activity.

Other difficult tasks such as sampling of respondents, and maintaining the required allocation of reference days, should be covered in training. These processes may be different from other surveys enumerators have participated in, and determine the quality of the survey.

Detailed instructional and training materials must be developed for supervisors and interviewers. Instruction manuals, coding tools, survey instruments translated into the local languages, home-study materials and materials for group training are the basic types of materials usually needed by the field staff.

Prior to the training, all field staff should be required to complete their own time-use diary or stylized questionnaire. They should also be asked to complete diaries or questionnaires with household members, friends or others so they have an understanding of the issues for respondents with different time-use patterns than themselves. They can bring these completed instruments to the training sessions and used them as a basis for discussing the difficulties and problems involved in collecting time-use data and for coding and editing exercises.

Field staff should be trained to properly respond to questions raised by reluctant respondents. In discussing the importance and uses of time-use data, various responses may need to be prepared depending on the characteristics of the respondents—for example, whether they are families with children, the elderly or young people, people from lower or higher socio-economic classes etc. In their 2017 survey, INEC Costa Rica found that interviewers did a better job after being trained on gender and human rights as well as on using the survey tools. The gender and human rights training helped them to better understand the purpose of the survey and explain it to respondents, and also encouraged them to take more care on difficult areas such as simultaneous activities.

Interviewers should have a good understanding of how people normally report their daily activities, the difficulties in translating these verbatim reports into the diary or stylized question format, and the errors that may arise when activities are not recorded accurately. Training should include intensive practice sessions for both interviewing and coding. Collecting time-use data—whether in a diary or stylized questions—requires more back and forth with respondents than many structured surveys. Interviewers accustomed to simply reading questions and recording answers might be uncomfortable engaging in conversations with respondents, asking probing questions to elicit complete descriptions or correct ordering of activities. Practice interviews should include not only the mock interviews designed for illustrating specific situations but also actual field interviews. Box VI.1, presents Bangladesh approach to build rapport with respondents.

Box VI.1: Bangladesh 2021, building rapport with respondents.

At the training for their 2021 survey, Bangladesh Bureau of Statistics placed special emphasis on building rapport with the respondents. Interviewers were instructed to use the local language so that respondents could easily understand and communicate. Interviewers were encouraged to

behave positively under all circumstances. Enumerators began each interview by introducing themselves and describing the objectives of the survey to the household members. If any household member showed reluctance to participate, the enumerators tried to persuade them by explaining the usefulness of time use data and how it would benefit them as well as the country, including helping policy makers to design specific laws, policies and programmes to address unpaid care and domestic work. Interviewers stressed confidentiality and trust during the informed consent process and throughout the interview.

For a discussion regarding the period of data collection of background characteristics, please see Chapter III.F.

B. Field procedures for interviews

Face-to-face interviews, whether using paper or electronic devices, continue to be the main form of data collection in many low- and middle-income countries, as well as for sub-populations with limited literacy, numeracy or access to the internet. Interviewers can correctly record what respondents tell them as they do in any survey. They can also help respondents to remember and report their activities accurately, which is a particular challenge for time-use surveys.

1. Understanding how people report their daily activities

One way to help respondents recall their activities on the reference day is to start out with some context-setting questions. These context-setting questions are part of building rapport with the respondent. Interviewers can employ the interpersonal communication skills they practiced in training to ask appropriate context-setting questions. Especially for diaries but also stylized

questions, it can be useful to ask what time the respondent woke up, ate meals or was at work or school (if relevant). These activities tend to occur at regular times and other activities are often structured around them, so they are called “anchor points”. If a respondent has trouble recalling how long an activity took, the enumerator can help them locate the start and finish relative to anchor points, narrowing down the time window.

Another context-setting question—one that is also useful for analysis and interpretation of results—is whether the reference day was a normal day, and if not, what happened out of the ordinary. This can explain unexpected activities that might otherwise be considered errors, like sleeping for over 12 hours. In the interview, it can help the respondent focus on the particular reference day. Thinking about whether anything unusual happened can refresh their memory on the whole day, as can asking about other small details. In their first national diary survey in 2021, Argentina found that interviewers who were comfortable adopting a less formal, more conversational tone often elicited more information.

Encouraging respondents to remember and report their activities in detail, including irregular or simultaneous activities, is a challenge for time-use surveys. The greater the detail, the greater the cognitive burden and the longer the interview lasts. If respondents feel under pressure, or that the interviewer is becoming impatient, they may be more likely to gloss over activities or report less precisely in order to finish more quickly. Interviewers in Bangladesh’s 2021 survey were trained to keep the respondents engaged in the questions. They were encouraged to use different kinds of probing or follow-up questions to get complete information. Small interview breaks sometimes helped respondents recall difficult answers. The Bangladesh team also found that women were sometimes reluctant to speak freely about their activities if someone else was present. Although it was standard procedure to discourage the presence of a third person during interviews, the COVID

safety protocols requiring physical distancing provided an added justification to maintain the respondent's privacy.

2. Measuring time without a clock

In some societies or areas of a country, people may relate their activities not to clock hours but to other markers such as fluctuations of nature (sunrise, sunset), religious activities during the day (calls to prayer) or other traditional cultural practices, productive activities, schedules of daily radio and television programmes, and routine activities included in their daily schedules. In order to collect time-use data in such societies or households, survey designers need to give special attention to translating the local perception of time into a standard 24-hour timetable. In this case, it is necessary to understand how the society identifies the hours of the day and how its members calculate the amount of time it takes them to perform an activity. This understanding of time can be integrated into the time diary, and used to develop individual questions and answer codes. Table 9 illustrates how a study in southern Ghana translated time markers used by the local households into hours (Grosh and Glewwe, eds., 2000).

It is also necessary to determine how respondents might answer questions regarding duration of an activity such as, "How much time did you spend fetching water?", and to determine how to convert certain answers into time—for example, what it would mean for a given activity to have taken "all morning" to be completed. Interviewers must be trained on standard conversions to minimize subjective interpretations.

Table VI.1. Illustration of time terminology and corresponding "clock time"

Standard time	Time indication used by farmers (English translation)
Midnight	Deep darkness

1.00 a.m.	First cockcrow
4.30 a.m.	Third cockcrow or inability to recognize other faces
6.00 a.m.	Morning
6.30 a.m.	Farm-going period or day is on
9.00 a.m.	Sky is dry
10.30 a.m.	Sun about to be still
Noon	Sun still
1.00 p.m.	Sun turning
2.00 p.m.	Sun has turned
3.00 p.m.	Closing time
4.00 p.m.	Palm wine tapping period
5.00 p.m.	Sun about to set
6.00 p.m.	Sunset
7.00 p.m.	Sleeping agent
9.00 p.m.	Day is over
11.00 p.m.	Night is advanced, town is dead silent

Source: Grosh and Glewwe, eds. (2000).

Since the literacy rate in some regions of Bangladesh is low, especially in rural areas, the Bangladesh Bureau of Statistics thought it would not be feasible to use short time intervals in their diary. They decided to instead use a 30-minute interval. Respondents could report up to three activities in an interval. The diary began at 4am, when most people are sleeping. The majority of the population is Muslim, and even those who are not can hear the regular calls to prayer. People may relate their morning activities like waking up, self care and religious activities with the call

for prayer. Interviewers helped respondents divide the day around events like sunrise, sunset, work times, prayer times, television programmes, natural or weather changes, or their habitual breakfast, lunch or dinner times.

3. Probing techniques

Certain types of activities tend to be under-reported in both diaries and stylized questions, in particular those that are brief and those that are done passively or while doing other activities. Probing questions can help respondents remember activities they may have forgotten. (See chapter I.B Simultaneous activities, for further discussion.) As a key objective of all time-use surveys is to measure unpaid work including care, it is recommended to ask probing questions about simultaneous activities, or even specifically about care, of all respondents. Box VI.2 gives examples from Bangladesh, Colombia and Paraguay. These questions can be included in both interviewer- and self-administered surveys. Mexico includes a question about childcare similar to Paraguay's, but does not collect data on other simultaneous activities.

Box VI.2. Examples of probing questions

Bangladesh (2022), at the end of the diary

Did you spend time taking care of children/aged person/persons with disability or sick person?

Yes, but not filled out properly or not mentioned all...1

Yes, mentioned all the time …2

No …..3

*If 1, please go back and fill out again the time diary using * symbol*

Colombia (2012–2013; 2016–2017), after each activity in stylized questions

Of the activities you undertook on [...], did you do some of them simultaneously?

a. Yes, if so which and for how long?

b. No

Paraguay (2016), at the end of the section on care for other household members

1. During the past week, did you provide care to any household member subject to permanent dependency and difficulty, while doing other things?

2. During the past week, did you look after any household member aged 0 to 5 while doing other things?

3. During the past week, did you look after any household member aged 6 to 14 while doing other things?

Other probing questions are more individualized and thus better suited to interviews. These techniques can help respondents who are having trouble reporting detailed and precise activities or who report activities that are inconsistent (for example, incompatible or overlapping). Unlike in most structured questionnaires where interviewers stick closely to a script, a time-use interview can be more like a conversation. Interviewers often need to ask follow-up questions in order to correctly classify activities, but need to do so in a way that respondents don't feel that their privacy is being invaded or become suspicious.

4. Field checks

Certain checks can help improve quality assurance before the time-use questionnaire is finalized. Digital tools can be programmed to include automatic checks if probable errors are detected. Interviewers can do checks, and respondents can also be asked to do limited checks of self-complete diaries. If the diary or stylized questionnaire fails to meet these checks at the time of the interview and the respondent is cooperative, the enumerator can go back through the instrument and attempt to add activities or correct time estimates as needed.

Some basic checks include:

- Instrument includes at least 12 hours of activities, excluding activity not specified. Instruments should include 24 hours but respondents may choose not to report activities in specific time slots. See chapter 0

- Processing of time-use survey data, for thresholds various countries use to determine whether the day is complete enough to accept.
- Instrument includes at least 3 activities (for stylized questions) or 3 activity episodes (for diaries), excluding activity not specified.
- No essential activities are missing, such as eating or sleeping.
- For diaries only:
    - There are no time slots without activities (if fixed intervals) or gaps between the end time of one activity episode and the start of the next (if open intervals).
    - Simultaneous activities are recorded (if instrument was designed to collect).
    - Includes appropriate contextual variables (e.g. location or mode of transportation, with whom, for whom, use of ICT).

For stylized questionnaires only:

- Total number of hours reported does not exceed (much) over 24 daily hours or 168 weekly hours, except for simultaneous activities such as supervisory care. There can also be a time counter that reports cumulative time as each question is answered, rather than just at the end.

C. Design and administration of digital and mixed mode data collection

Field procedures are determined by the type of survey, mode of data collection, survey instruments and sample design. This section highlights enumeration procedures for digital and mixed mode approaches[38].

1. Identifying respondents and scheduling data collection for CAWI

Initial communication may be more challenging with modernized time-use collection, if email address lists are unavailable or internet access is restricted. Very few countries have a sampling frame including email addresses. Some online survey programs have continued to initially reach out to households' addresses, before providing log-in information bypassing the requirement for an email address, or even permanent internet access. The initial contact may be made by posting a letter to a physical addresses or by visiting. Letters require less effort but are also associated with lower response rates If a sampling frame includes phone numbers or email addresses, these can also be used to make contact. Canada makes initial contact with sampled households through a letter, but invitation to participate to the Time Use Survey is done via e-mails or phone calls. In Japan (2021), enumerators visited households to inform them of the survey and identified the number of household members of eligible age for the survey. In Mongolia (2019), enumerators visited households and did background surveys in person. They then gave respondents the option of doing a paper or a web-based diary. Most developing countries use household visits as a first point of contact.

[38] Countries using face-to-face interviews using paper forms are encouraged to see the Guide to Producing Statistics on Time Use (UN, 2005).

2. Anticipating technology challenges

There are potential technology challenges during enumeration. Using digital modes presumes adequate levels of access to a device as well as the internet. Even if respondents (for CAWI) or interviewers (for CAPI) normally have access to the necessary technology, contingency plans should be made to deal with lack of network services, technical failures, loss of mobile devices or other circumstances that could prevent the survey from being completed on a mobile device. Unlike most other surveys, a time-use interview team cannot just postpone a field visit by a day. How to accommodate schedule adjustments and assign replacement days is discussed in chapter V. For self-administered instruments, broken links or changes in the look and feel of webpages can also confuse respondents. While most surveys are brief enough that changes in operating systems are not normally a concern, they may be more likely in time-use surveys conducted over a year. Certainly people with lower incomes including those living in low- and middle-income countries are likely to have older devices, requiring digital tools to be able to function with earlier operating systems.

Other technology challenges include accessibility considerations when accessing tools online and data protection requirements to make sure individuals' access is specific to them and other individuals cannot see their data. This is the case if the whole household is filling in their individual information. These are discussed in chapter IV.C Digitizing data collection

D. Coding

The process of coding responses is relevant to diaries only, as stylized questions ask about specific pre-coded activities or groups of activities, but all types of instruments require a coding index and coding rules. This is because all of the following activities depend on a coding index.

- Developing stylized questions or categories for self-administered instruments
- Programming automatic checks or question flow (e.g. different follow-up questions depending on a response) in digital instruments
- Interviewers coding on the fly. Interviewers asking stylized questions also need to be able to tell respondents whether their activity fits into the definition
- After-coding free-text diaries
- Classifying or editing, especially of self-administered instruments or diaries coded on the fly

Coding rules should

- Consist of a basic set of instructions on how to apply tools for coding and what actions to take when situations arise that are not covered by these instructions
- Be easy to understand and to be applied consistently regardless of who does the coding and when

1. When to code: on-the-fly vs. after-coding

When collecting time-use data in the respondent's own words (verbatim), activities can be after-coded or on-the-fly coded. With digital tools and some paper diaries, activities are coded into a list of activities or classification of activities by interviewers at the time of the interview, or self-coded

by the respondents (usually using an abbreviated list). This is on-the-fly coding and it is part of the enumeration process. In after-coding, activities are coded as part of the data processing phase, usually by a centralized team of coders or experts although coders may be decentralized.

However it is done, coding requires the development of an appropriate **coding index** for activities and for contextual information. Provisions for developing and testing the index must be built into the survey timetable. The coding index and coding rules should be developed in parallel with the data collection instrument. Coding rules also need to articulate the use of residual categories for unidentifiable or hard-to-code responses.

After-coding

After-coding occurs when information previously collected in the respondent's own wording is later coded by experienced coders who choose codes from a coding index. This is the usual coding process for paper diaries and sometimes for other modes (e.g. self-complete electronic diaries with open-text fields).

In manual coding, a coder reads the activity description and selects a code. Manual coding is described extensively in the 2005 Guide. An alternative for digital data is to use an automatic or semi-automatic coding tool to select the relevant code from the coding index. Automatic coding reduces the potential for bias in interpretation of responses.

Automatic or semi-automatic coding may be supplemented by manual coding. It is possible to record the verbatim information provided in the diaries along with the selected code, or to record the coder's decision only. The first option is more expensive but allows the use of text during the editing phase, as in the Italian Time-use Survey. It is also important to consider the value of manual coding if it is done in addition to automatic coding. Often when using automated coding

supplemented by manual coding, the value of manual coding is limited; what does not match automatically may not have enough detail to be coded reliably. Manual coders can fix data entry errors that prevent automatic systems from assigning a code, or review assigned codes.

In order to ensure identical work habits, after-coding should preferably be arranged centrally. Bangladesh used this approach for its 2021 survey, employing a team of five coders. If central coding is not possible, consistent training and supervising of the coding staff is crucial. Providing a system where more complex coding cases could be shared by email or a central helpdesk can also support consistent application of coding rules. Like all after-coding, the process is constrained by the description provided by the respondents, which may be lacking enough detail to allow for a correct assignment of the code.

On-the-fly coding

On-the-fly coding is when the respondent or interviewer codes the respondent's activities directly into the survey categories. This is one of the methods used for self-complete electronic diaries. Chapter 0

Scope and coverage of time-use data

The wide range of possible objectives and applications of time-use data affect decisions relating to the scope and coverage of time-use data collection. Specific goals will require particular data items and affect the choice of the population to be covered. The basic content of a time-use survey are the activities of individuals and the amount of time they engage in the various activities. Other dimensions also need to be included in the data to be collected to the extent that they are essential to the survey objectives; context gives meaning to activities and groups of activities. The background characteristics of the population covered serve to provide information about the respondents and their behaviours.

Box II.1

Considerations before developing a time-use survey

Engaging respondents

- It can be difficult to explain to potential respondents how they will benefit from participating.

Sampling

- In many cases, only one member per household is sampled; multiple members of a household need to be sampled for intrahousehold analysis
- An unbalanced representation of certain times of the year or days of the week may result in the overreporting or underreporting of particular activities. In order to develop internationally comparable satellite accounts on the basis of a time-use survey, the sample should be representative.
- The sample distribution should be geographically representative of the population distribution (e.g. people living in urban areas and rural areas, as different areas may be associated with different activity types).
- The sample distribution should be representative of different subpopulations, in particular vulnerable populations.

Mode of data collection

- The mode of data collection (e.g. interview, full-text diary, web diary with a limited list of activities) can affect the information provided.

- If a survey offers respondents a choice of mode and different modes are associated with specific characteristics of the population (e.g. if only younger populations use CAWI and older populations prefer paper diaries), it will be difficult to isolate the effects of the mode from true subgroup differences.

Classifications and coding

- Activity classification systems need to be able to respond to the different uses of time-use data. International harmonized classifications should be used for cross-country comparisons. It is recommended that countries use ICATUS 2016.
- Time-use surveys may require significant coding of activities, for example activity, location, with whom. Thorough training on and procedures are needed to ensure consistent coding and categorization of responses.

Simultaneous activities

- People do more than one thing at once, but a day has only 24 hours. The collection and dissemination of simultaneous activities is encouraged.

Recall and reporting

- Most surveys require respondents to report on a previous day and to accurately estimate the time spent on each activity. How well they do this can vary depending on the respondents and types of activities.
- There is a trade-off between collecting comprehensive data and minimizing the respondent burden. Excess burden reduces quality (people provide responses that are not

very precise in order to finish more quickly) and response rate (people consider time-use surveys too time-consuming or intrusive).

D. Activity and time

1. Describing activities

Activity may be defined as human behaviour in terms of what is being done and it may be characterized by the context in which it occurs, as well as its timing, duration, sequence and the frequency with which it takes place.

Activity classifications are used to classify activities into groups to support policymaking and facilitate the collection and organization of statistics. (United Nations, 2020a) A detailed, comprehensive, systematic listing of activities serves as the basis for assessing completeness of coverage of activities. The activity listing is used as a guide in the design of survey instruments and selection of methods. Furthermore, it defines the framework for analysis of the time-use survey data, serving as the basis for defining analytical and tabulation categories of activities. The activity listing specifies the level of detail required from respondents in both diaries and stylized questions and is used for developing coding rules and indexes for full diaries.

With a view to harmonizing the collection and reporting of time-use statistics across countries and over time, the Expert Group developed a light survey instrument. As its fifty-third session in 2022, the Statistical Commission endorsed the minimum harmonized instrument for the production of time-use statistics, which comprises a minimum set of background questions, as well as a minimum list of daily activities for the collection of time-use data, including for the measurement

of Sustainable Development Goal indicator 5.4.1, in line with ICATUS 2016 and other international standards.

The minimum list of activities covers all possible activities that could be carried out by a person in a day. It consists of 25 activities (including "other" to account for activities that are not listed). The list of activities was developed for use in light precoded diaries and stylized questions, based on the information available in 15 light diary-based surveys and 15 time-use surveys based on stylized questions around the world. It represents the minimum requirements to enable the production of time-use statistics in line with ICATUS 2016 (second-level activities in most cases). It was acknowledged, however, that the minimum list may need to be adapted to reflect different national contexts. In total, 9 of the 25 activities are related to unpaid domestic work (7 activities) and unpaid care work (2 activities) and are recommended for the collection of data to measure indicator 5.4.1. In tTable II.1, a description is provided of the 25 activities included in the proposed minimum harmonized instrument using common language that is suitable for application in digital diaries.

Table II.1. Minimum harmonized instrument activity categories

No.	*Category*

1.	Working for pay or doing activities to generate an income for yourself or your family
2.	Unpaid activities done to produce goods for use by your household or family
3.	Helping neighbours, friends or others without receiving payment
4.	Cooking, preparing or heating meals, setting up or clearing the table or washing the dishes
5.	Cleaning the inside or outside of the dwelling; disposal of garbage or recycling, watering plants
6.	Making minor repairs to the dwelling, repairing or maintaining furniture, appliances or household vehicles
7.	Washing, ironing, hanging clothes to dry, mending clothes or cleaning footwear
8.	Budgeting, paying bills, organizing or planning household-related activities or completing administrative forms such as passports, contracts, applications or collecting social programme benefits
9.	Taking care of a family pet, feeding, bathing, taking them for walks, cleaning their space or using veterinary or pet services
10.	Buying household supplies, food or clothing for family members, when done in person or online
11.	Taking care of children in your household or family by feeding, dressing, putting to bed, talking, playing, assisting or supervising homework or school activity, accompanying to appointments, providing health care

12.	Taking care of adults in your household or family by feeding, bathing, dressing, putting to bed, talking, listening, providing or planning for health-care services or helping with personal business management
13.	Education, attending classes or courses on-site or online or education-related assignments, homework
14.	Getting together with others for social purposes, talking, chatting, writing or reading personal emails or texts
15.	Joining in community festivities or events, attending civil obligations or participating in religious celebrations or practices
16.	Attending cultural, entertainment or sports events
17.	Participating in hobbies such as painting, music or photography, playing games, or relaxing
18.	Participating in a sport or exercise
19.	Reading for leisure (e.g. newspapers, books, e-books, social media, magazines)
20.	Watching television, listening to the radio or streaming
21.	Sleeping
22.	Eating or drinking
23.	Own personal hygiene, such as showering, getting dressed, getting a haircut or personal health care, including resting, being sick or visiting doctors or specialists
24.	Travelling to and from places
25.	Other (activities not listed or unknown)

The minimum list makes it possible to construct indicators based on comparable activities, regardless of whether a precoded diary of activities or stylized questions are used. It is recommended that all time-use surveys, regardless of the mode of data collection or type of instrument, include the minimum activities as a starting point. If more granularity is desired, countries can expand the list, as long as the categories can be aggregated with the 25 activities and adhere to the ICATUS framework.

The time-use survey launched in India in 2019 survey provides an example of a different category list that can be aggregated with the minimum harmonized list (Government of India, 2020). The survey had separate codes for the following:

6. Childcare and instruction
7. Care for dependent adults
8. Help provided to non-dependent adult household members
9. Other activities related to unpaid caregiving services for household members
10. Travelling and accompanying goods or persons related to unpaid caregiving services for household members

In order to compute unpaid work, to report on indicator 5.4.1, India can include all of these categories. For consistency with the 25 categories of MHI, India can combine code 2 “care for dependent adults” and code 3 “help provided to non-dependent adult household members” into MHI activity 12 “taking care of adults in your household or family”. Code 4 “other activities related to unpaid caregiving services for household members” could be classified under MHI activity 25 “Other” and code 5 “travelling and accompanying goods or persons related to unpaid

caregiving services for household members" under MHI activity 24 "travelling to and from places".

The underlying principles of a classification should be consistent with the objectives of the survey.

Box II.2.
Quality considerations for activity classification

- Consider which activity classification will be used. If ICATUS 2016 is not used, consider using correspondence tables to compare data collected using the classification chosen and this international standard.
- If the MHI activity list is used, ensure that it covers the key activities of interest and understand the limitations.
- Consider activity classification from the perspective of data users to determine whether category groupings make instinctive sense. Activity classifications are a hierarchy.
- If designing your own activity classification, avoid duplication and the overlapping of categories.

2. Reference period

The reference period is the time frame over which survey respondents are asked to report their activities. Time-use surveys benefit from a mixture of work and rest days in their sample to support analysis across the week, in particular the different activities that might be undertaken on workdays compared to rest days. For example, some unpaid care and domestic work occurs throughout the week but may be concentrated at weekends.

When deciding how to attain full week or workday/rest day coverage, survey managers should consider:

- The length of time over which information will be sought from each respondent, for example one day, two days or one week.
- The type of day, for example if a reference day is chosen, they should decide whether to sample all days of the week or only two days, that is one representing a workday and one representing a rest day (weekend).
- The modality of reporting, be it retrospective or prospective.

j. Length of time (day versus week)

Referencing a single day makes it easier for respondents to recall and estimate the time that they spent on different activities. However, if the survey objective is to measure the difference in time use across different days of a week (or even a longer period of time, for less frequent activities), a longer length of time will capture more activities and data, making it possible to measure differences in time use for each person between the selected days. While a diary of a week is generally considered too burdensome, several countries in Latin America use a week reference period with stylized questions. However, even with stylized questions, a reference period of one week is more challenging for a respondent than one day, as they must recall their activities over a period of seven days.

The decision with respect to the length of time must be balanced with the respondent burden and the risk of recall error. Time-use surveys are relatively burdensome compared with other types of household surveys. In all surveys, increased burden tends to discourage response or encourage the respondent to take “shortcuts” in reporting (Krosnick, 1991; Andreadis and Kartsounidou, 2020).

In the case of retrospective diaries, reducing the length of the reference period substantially reduces the respondent burden and the possibility of recall error in a time-use survey.

k. Type of day

If survey managers decide on a single day as the reference period, they must then decide if it is necessary to ensure a balanced distribution of all the days of the week or whether only the workday and rest day cycle should be measured. In the latter case, one workday and one rest day per respondent might be selected or one type of day might be randomly assigned to each respondent. The benefit of this approach is that the respondent burden may be much lower than the "week" approach, since respondents are only asked about two days, but it still allows for comparative analysis of the different activities undertaken on workdays and rest days.

If single days are assigned, it is necessary to ensure a balanced distribution of all the days of the week across the sample. To guarantee the representativeness of the seven days of the week, field operations must be carried out from Monday to Sunday. In some countries, hiring staff on Saturdays and Sundays is complicated or adds to costs. Furthermore, if rest day data are going to be output separately, for example weekend days versus weekdays, the sample design will need to allow for the oversampling of weekend days to ensure that the sample of those days is sufficient to produce accurate data outputs.

l. Modality of reporting

The mode of data collection is a factor that determines whether a retrospective or prospective approach is best.

Retrospective approach. The retrospective approach is best for interviewer-administered diaries because the interviewer can prompt the respondent and methodically work through the reference

period from one activity to the next. A well-trained interviewer can also prompt for typical activities that might have been missed, such as travel or eating, and probe for other details, such as whether others were present. In retrospective surveys, the respondent is generally asked about "yesterday" or "last week"; however, to achieve a balanced sample, sometimes it is necessary to ask about a day two or three days past. Ideally, the reference day should be the day before, since recall diminishes with time, so a gap of much longer is not recommended.

In the retrospective approach, regardless of whether a diary or stylized questions are used, respondents are asked about all the activities that they undertook on the designated day, starting from a particular time (often 4 a.m.) and continuing for 24 hours. This approach places the least burden on selected respondents, because the reference period is only one day and their activities should be relatively fresh in their minds. With the retrospective week methodology, respondent report their activities over the previous week.

Prospective approach. This methodology is used for self-enumerated diaries. In theory, it is possible to give respondents a questionnaire with stylized questions in advance, but since they report the cumulative time spent on each activity category throughout the day, the questions are answered after the day is over.

After the household questionnaire is completed, the interviewer gives respondents a diary and asks them to complete it for tomorrow or a designated date in the near future (usually a few days later). Online diaries can become available "tomorrow" or on the diary date. Diary dates are kept close to the date the household questionnaire is completed to minimize the risk of respondents forgetting to complete it or of household characteristics changing.

If respondents complete a prospective diary throughout the day, they are not required to remember as much information, which should increase the accuracy of reporting. However, evidence shows

that respondents tend to record their activities in one or two sessions per day, rather than continuously throughout the day. Organizations conducting the surveys have little control over when the respondents complete the diary, in particular for paper diaries. It is theoretically possible to add a feature in an online diary to prompt respondents regularly to complete it during the day. Reminders should, however, be managed carefully; they can annoy respondents and result in them abandoning the survey.

"Typical" versus specific day or week approach. In the past, respondents have been asked about a typical day or week. However, this approach is not recommended for time-use surveys. If respondents are asked to report on an actual day or week, the information provided will be more accurate. It can be difficult for respondents to conceive of what a "typical" day or week is. The cognitive burden of first determining what "typical" is and then estimating the quantity of time spent on an activity means that some activities are likely to be unintentionally overreported and others underreported. Furthermore, the amount of time spent on socially desirable activities is more likely to be over-estimated and the amount of time spent on socially undesirable activities underestimated to a greater degree when imagining what "typically" happens than when recalling a specific time period.

Box II.3
Quality considerations for the reference period

- Decisions about how many days of the week and which days to cover (workdays or rest days) will depend on the data output requirements. For example, if rest day activities are to be reported separately from workday activities, survey managers must ensure that the sample size corresponding to each type of day supports these data output requirements.

- It is important to maintain a balance between how many survey days the respondent is required to complete and the respondent burden. The longer the reporting period, the more respondent fatigue is likely to affect the data quality.
- Retrospective or prospective assigning of the day will have different quality implications. For retrospective collection, the further the recall day is from the survey day, the less likely respondents are to remember all the activities undertaken and accurately reflect the duration of those activities.
- The timing and duration of the survey can also potentially affect the quality of data. It is, therefore, preferable to collect data over an entire year in order to include all seasons and capture variations in activities across the year. For example, activities carried out in summer may differ from those carried out in winter, as is also the case with activities undertaken during holiday periods and non-holiday periods. Enumerating the survey across the full year may not always be possible due to operational, resourcing or other constraints. Survey managers need to have a good understanding of their environment and plan the survey for the right time to best reflect the activities of their community.

3. Recording time

Time has several dimensions relevant to activity: *timing* or the point in time at which actions occur (for example, weekday or weekend, morning or evening, between 9 a.m. and 10 a.m.); *duration* or the period during which actions occur (for example, 45 minutes, 3 hours); *tempo* or the frequency at which actions occur (for example, twice a day, once a week) and *sequence* (before or after, past, present or future). To capture all of these dimensions, it is necessary to use a time diary, to record the beginning and ending times of activity episodes. Stylized questions are used to ask the

respondent to report on the total amount of time they spent doing an activity, by providing the cumulative duration for the day (or week), rather than in distinct episodes; start and end times are not collected. Stylized questions provide information on the duration of the activity, but not on timing, tempo or sequence.

In a time diary, the time interval relates to the units of time in which respondents report their activities. Time diaries may use open intervals or fixed intervals. For a more detailed description of these options, see chapter III.C.

E. Simultaneous activities

2. What are simultaneous activities?

People regularly engage in more than one activity at the same time. People who are multitasking may actually be performing concurrent activities (cooking and taking care of a child, reading while travelling by bus or watching television while eating) or they may be doing activities sequentially and thus frequently switch back and forth between activities (gardening and doing laundry). The terms “simultaneous” and “secondary” are often used interchangeably. A simultaneous activity is one that is carried out at the same time as another. There is no hierarchy or value judgment. The term “secondary” activity generally refers to an activity that is considered to require less attention or be less intense than the simultaneous “primary” activity. In a diary, the primary activity is typically the one that the respondent describes first and any secondary activities are those that they were “also” doing. If they are asked to specify, the primary activity is the one that the respondent considers to be the most intense in terms of focus or energy.

3. Why measuring simultaneity is important?

If respondents experience their activities as simultaneous occurrences, then including the opportunity to report and record secondary activities in collecting time-use data enhances the accuracy of the resulting data. Some activities that are very important for time-use research are frequently reported as secondary activities. However, while collecting data on simultaneous activities in a time-use diary adds to the respondent burden, it enhances the accuracy and completeness of the data. Time-use surveys should, therefore, always explicitly ask about simultaneous activities.

One of the main purposes of time-use surveys is to measure unpaid work. Unpaid work, and unpaid care work in particular, is often done while carrying out other activities. Collecting data on simultaneous activities can help to identify routine unpaid domestic and care work that otherwise may not be reported or would typically be underestimated if only primary activities were covered. Capturing the extent to which people engage in unpaid domestic and care work is essential for the development of extended accounts to SNA, to monitor well-being, evaluate the economic empowerment of women, develop policies on caregiving and assess work-life balance.

4. Challenges of measuring simultaneous activities

The main challenges of measuring simultaneity relate to collecting and analysing the data. They are discussed in more detail in chapters 0 and 0 of this *Guide*. Survey managers must decide whether and how they will distinguish between primary and secondary activities and how they can convey that to respondents. In principle, the survey instrument may offer the possibility of collecting data on more than one activity. When time-use diaries are used, it is possible to collect data on all simultaneous activities with the same level of granularity. However, it is also possible to provide the respondent or interviewer with fewer options for those activities considered to be

secondary, using on a subset of activities that are relevant for analysis, and thus reduce the survey time.

Analysts can sometimes infer a simultaneous activity, such as childcare, based on the "for whom" and "with whom" context data. A protocol for using context information to code activities must, however, be developed.

There are some activities that respondents will not report consistently in the diary (as a primary or secondary activity). To address this problem, survey instruments (diaries or a stylized questionnaire) can include summary or probing questions. Supervisory care is one activity that is underestimated in time-use surveys. Owing to its pervasive nature and the fact that it is generally performed in the background, respondents may omit to report it and more often report personal activities, such as watching television or listening to the radio, even when specifically asked about simultaneous activities ("What else were you doing?"). In box II.4, an explanation of the relevance of measuring supervisory care is provided, as well as a definition of supervisory care for statistical purposes and some recommendations for improving the reporting thereof in time-use surveys.

Box II.4.
Measuring supervisory care

Defining supervisory care

Caring for dependent household or family members (e.g. a child, an adult with a disability, a family member who is sick) entails an active element whereby the care provider is directly interacting with the dependant to meet their care needs, such as feeding them, bathing them or, administering medical care or helping a child with homework. The responsibility for care also involves a supervisory role, where the care provider is not actively engaged with the dependant, but is "on call", meaning that, for example, they are nearby to provide immediate assistance to

the dependant. In practical terms, this implies that supervisory care is undertaken simultaneously alongside other activities and, if measured, the relevant data are collected as a secondary activity. In some contexts, the provision of supervisory care is also a legal obligation as children under a certain age cannot be left alone and unattended.

Care, and all the components thereof, plays a fundamental role in social reproduction and cohesion. Gender gaps in the provision of care are widely documented, with women disproportionally providing the bulk of unpaid domestic and care work. According to data on the minimum set of gender indicators, women are responsible for two thirds of unpaid domestic and care work. These gaps may be further exacerbated during crises and in contexts where public or private caregiving services are not easily accessible or affordable, thus affecting carergivers' opportunities to participate in other important life spheres, including the labour market, politics, learning, leisure and sports.

Measuring both active and supervisory care also inform a wide range of policies and strategic frameworks in the care economy, which are deemed to be increasingly relevant in view of demographic changes and ageing populations.

There are several challenges associated with measuring supervisory care. Respondents may perceive supervisory care as a background responsibility. To improve measurement approaches, the Expert Group formed a subcommittee on supervisory care in 2021. The subcommittee worked on developing a reference concept for measuring supervisory care in official statistics, reviewed country practices and identified main data uses. The following definition acts as a reference concept for measuring supervisory care in official statistics:

Unpaid supervisory care refers to the time the caregiver is in hearing or visual proximity to a dependent household or family member to provide unpaid caregiving services, should such need arise. The provision of supervisory care does not require the active involvement implied in the provision of those caregiving services where an interaction between the caregiver and dependent household or family member is needed. Supervisory care may occur at any location where the dependent household or family member is present and in close proximity with the caregiver. There is no requirement for bodily proximity of the caregiver with the dependent household and family member, such being in the same room.

This definition is in line with relevant international statistical standards, namely the resolutions concerning the measurement of working time (2008) and statistics of work, employment and labour underutilization (2013) adopted by ICLS and ICATUS 2016. More specifically, the definition draws a parallel with the concept of on call time related to employment and extends it to other forms of work.

Supervisory care in ICATUS 2016

Unpaid supervisory care includes time when the caregiver is *on call* to provide unpaid caregiving services. In ICATUS 2016, it is an activity classified under Group 416 (minding children (passive care)) and 425 (passive care of dependent adult).

More specifically, the provision of unpaid supervisory care includes:

- Time when the caregiver engages in other activities in parallel, including the remunerated activities listed in ICATUS 2016 Major Division 1, provided that the

caregiver remains accessible and in proximity should the need to provide caregiving services arise.

- Time when the caregiver is not necessarily interacting with the dependent household or family member, but is on call should caregiving services be needed. This includes time when the dependent household or family member is engaged in activities alone, including sleeping or when the caregiver is engaged in personal activites.

Measuring supervisory care

The following recommendations are provided by the Expert Group:

- In diary-based instruments, summary or probing questions should be used after the main time-use information is collected. This is called a "recovery sequence". Some examples of probing questions from the American Time Use Survey are provided below in this box. This recommendation was further supported by the outcome of cognitive testing conducted in Mexico, which highlighted that probing questions after each activity (rather than at the end) can disrupt the flow of the interview and place an unnecessary burden on the respondent.

- In order for retrospective stylized questionnaires to accurately capture the time spent on supervisory care, the reference period should be the previous day. It is more challenging when the reference period is a week, as respondents' estimation strategies usually fail to accurately account for simultaneity.

- To avoid double counting, reporting should distinguish between active and supervisory care. This distinction is important for calculating SNA extended accounts. When respondents are providing active care, they are not also providing supervisory care.

- Each country should set an upper age limit for children with respect to the adult's obligation to provide supervisory care, based on the laws and norms established therein. To determine the specified age for the identification of children, the upper age limit:
    - May be set by taking into consideration the minimum age for employment and exceptions specified in national laws or regulations or the age of completion of compulsory schooling;
    - May align with country regulatory frameworks on custodianship. Such regulatory frameworks are expected to identify the age limit of a child, for which any legal liability (neglect) arises from when the child is without adult supervision. It is linked to the legal concept of guardianship of children. When necessary, other lower age limits could be introduced for reporting purposes only, taking into consideration national legislation, among other things.
    - May align with the Convention on the Rights of the Child, according to which a child means every human being below the age of 18 years.

Respondent perspective

To support the work of the subcommittee on supervisory care, in 2022 UN-Women, the Global Centre of Excellence on Gender Statistics and El Colegio de Mexico conducted cognitive testing to assess the understanding of the concept of supervisory care and determine the best phrasing for it (UN Women, 2023). The research confirmed the expected challenges associated with the measurement of supervisory care. For respondents to accurately report supervisory care time, they must have a grasp of the conceptual difference between active and supervisory care, but many carers are not used to thinking in this way. Based on the study, it was recommended that

supervisory care questions be preceded by an explanatory task that includes examples, vignettes or visual aids, as appropriate. Furthermore, participants in the study generally recalled having performed supervisory care only when they were asked a probing question.

The research found that respondents used many terms to describe different types of care, with "estar al pendiente" or "estar pendiente", which means "minding" in Spanish, the phrases that were spontaneously mentioned the most often. Based on the study, it was recommended that cognitive testing be carried out to determine the best way to describe supervisory care before designing the questionnaire. Descriptions might include vernacular languages used in rural areas, as the phrasing is likely to vary even within countries.

An essential part of the definition of supervisory care is that the carer is in close proximity to provide immediate assistance if needed, for example if a child calls from another room or the garden. The study found that some respondents considered being reachable by phone to be a form of supervision; if the care recipient needed the carer, they could call the caregiver for assistance. The researchers caution that the explanation should clarify that being "on call" by phone is not included in supervisory care and that the type of proximity has to be spelt out to aid accurate responses.

Country-specific examples of probing questions for supervisory care

The correct wording for probing questions will vary across cultures, in particular as family structures differ. For example, questions in the American Time Use Survey refer to childcare only. Separate summary questions would be necessary to measure care for adults. In a pilot study conducted by ILO and UN-Women in Indonesia, respondents were asked about the care of adults and children separately.

It is essential to cognitively test survey questions to ensure that they convey the concepts to respondents.

American Time Use Survey

In the American Time Use Survey, when the diary is completed, the interviewer asks follow-up questions about childcare, as well as paid work and volunteer activities. There are childcare-related questions for four groups of children: (1) the respondent's own children who live in the household; (2) the respondent's own children who live in another household; (3) other (non-own) household children, such as siblings or grandchildren; and (4) non-own non-household children, such as neighbour's children.

For each group of children, the interviewer first asks what time the first child woke up in the morning and what time the last child went to bed. The interviewer then asks the following:

> I'd like to ask you about children who live with you. A child was awake between [time first child up] and [time last child to bed]. At which times or during which activities during that time period was/were [name(s)of all the respondent's own children under 13 in the household] in your care?

The interviewer then asks the probing question: "Any other times or activities?"

Pilot study conducted by UN-Women and ILO in Indonesia

This pilot study tested a light diary module attached to a labour-force survey. The questionnaire was administered by means of CAPI, which allowed interviewers to probe and to easily call up previous episodes to record supervisory care reported during the recovery sequences. The

separate roster permits the timing, sequence and duration of supervisory care episodes to be recorded in fixed 15-minute episodes.

It is important to note that the description of supervisory care, namely locally-tested expressions for looking after, minding or keeping an eye on a child, should always be cognitively tested in all local languages that the survey will use, as it will vary, as shown in the case of Mexico described under *Respondent Perspective* above. The questions have been translated into English.

During the diary, after reporting each activity, respondents were asked:

> Were you doing anything else at the same time as [activity 1]?

The first time no simultaneous activity is mentioned, the interviewer asked a probing question:

> For instance, were you talking with a family member, friend or neighbour or [locally-tested expression for looking after, minding or keeping an eye on a child] or listening to the radio or watching television?

The second probe question was not repeated, but respondents were asked about a simultaneous activity for each activity reported.

When the diary was completed, the interviewer asked the recovery sequence questions on supervisory care separately for children and then for adults. An example is provided below:

> Thinking back to yesterday, were there any times when you were responsible for [locally-tested terms for supervising/minding/watching over] a child under the age of 18, staying close by and being ready to respond in case of need?
>
> If yes:
>
> When was this?

What is their relationship to you?

The interviewer recorded each episode of supervisory care separately if there was more than one, for example before school and after school. The respondent was then asked about dependent adult household/family members (aged 18 and over) who require assistance from others to undertake daily activities due to illness, injury, frailty or disability, whether temporarily or long-term. For example:

> Thinking back to yesterday, were there any times when you were responsible for [locally-tested terms for supervising/minding/watching over] an adult aged 18 or over who needs help with daily life, staying close by and being ready to respond in case of need?
>
> If yest:
>
> When was this?
>
> What is their relationship to you?

For more details about the pilot study, see Prospera et al. (2023) and ILO (2023).

When stylized questions are used, it is possible to ask respondents about the time that they spent on different main activities and subsequently ascertain which activities were carried out simultaneously and the frequency of this simultaneity. To reduce the respondent burden, only questions relating to activities that are relevant to the survey objectives may be asked. In order to ensure that data are comparable with data that are obtained from time-use diaries, it should be clear that the questions are relating to activities that are often secondary, that is "while you were doing something else."

When it is reported that time was spent on two activities at the one time, the total time spent on all the activities may extend beyond a 24-hour period. Survey managers must decide how time should be allocated, if estimates need to be limited to the 24 hours of a day. It can be divided equally among simultaneous activities, it can be divided unequally according to a hierarchy or weighting system or simultaneous activities can be reported separately. For more information, see chapter IXPreparation of survey outputs.

Box II.5.
Quality considerations when collecting data on simultaneous activities

- Collecting data on simultaneous activities (providing that they are collected correctly) provides more accurate time-use data.
- If simultaneous activities are not reported I detail, this can result in the underreporting of activities, in particular the amount of time spent on unpaid care and domestic work.
- When the diary format is used, data on the main activity should be collected, but also on a secondary activity, if possible. It is, therefore, important that respondents are aware that this information is required and that, based on the instructions and examples in the diary, they should report on all activities and not just those demanding their greatest attention.
- In the case of self-completed diaries, as respondents tend to group activities in broader time slots, collecting data on simultaneous activities can provide insight on missing episodes or time.
- Collecting data on simultaneous activities increases the respondent burden and cost, so the trade-offs need to be considered at the survey development stage.

- Cognitive testing is important to ensure that respondents understand the concept of simultaneous activities.

F. Contextual information

5. Importance of studying context

An episode, also called an activity episode, refers to one occurrence of an activity, without a change in any of the contexts. In time-use statistics, contextual information refers to features of the environment in which a specific activity episode takes place (e.g. location, with whom), additional defining characteristics of the activity (e.g. for whom, paid/unpaid) or subjective aspects (enjoyment, stress and well-being). In diaries, contextual variables are collected at the activity episode level. Stylized questions include contextual information in the wording of the question, for example “Did you work for pay or profit?” or “Did you care for family members without receiving payment?”

To understand the significance of any activity, it is important to understand the context in which the activity took place. Activity-related contextual information can be used to help code activities properly. Contextual information can also help to answer specific research or policy questions, for example relating to remote working, means of transport, the use of information and communication technologies (ICTs), health and quality of life (such as the time that children spend outside, that time that older persons spend alone and the time that parents spend with or without their children).

Context also improves data quality by aiding recall. When respondents considering where they were or who they were with, it helps them to put what they were doing into perspective.

6. Defining context variables

c. Location

Location is an important objective contextual variable. It facilitates recall and supports important areas of analysis, such as spatial mobility, social integration and isolation, and the accessibility of utilities, services and infrastructure. It can also aid data quality by imposing checks on activities that succeed one another. In the time-use surveys conducted by Belgium in 2013 and Canada in 2022, activity episodes where the location changed without a travel episode were flagged.

The Minimum Harmonized Instrument (MHI) recommends collecting location for all activity episodes (see Annex 1: Minimum Harmonized Instrument - Model Diary). In most surveys, location is given as a generic description from the respondent's perspective (home, non-home workplace, school, etc.). If the respondent is travelling, location is defined in terms of how they are travelling (car, walking, bus). In Europe, the Harmonised European Time Use Surveys (HETUS) guidelines provide for 17 types of location and means of transport, but European countries can include more (e.g. in the Italian time-use survey, there are 36 typesof places and means of transport). Typically, the location of each activity is recorded by asking respondents where it took place. Digital tools allows the use of drop-down menus to provide interviewers or respondents with a list of locations to choose from. Where respondents can provide free text answers, the level of detail required is indicated in an example for respondents of self-administered surveys or a list of possible options for location provided to interviewers in the case of interviewer-administered surveys. Table II.2 shows examples of the types of locations and means of transport in MHI, the 2021 Bangladesh time-use survey, the 2022 Canadian time-use survey, the HETUS 2018, the 2010 New Zealand time-use survey and the 2010 South African time-use survey.

Table II.2.

Examples of response categories for "location"

Instrument	*Location*	*Transport*
MHI	1 At home 2 At one's place of work or school 3 At another residence 4 Outdoors (away from home) 5 At store or place of service 6 Other (non-travel)	7 Car, van, truck as a driver 8 Car, van, truck as a passenger 9 Public transportation such as bus, tramway, subway, light train, ferry 10 Bicycle 11 Walking 12 Taxi, limousine service 13 Plane 14 Other transport 99 Refusal, no answer
2021 Bangladesh time-use survey[a]	At home At one's office/workplace At school/college/university At shop/grocery store At marketplace At a restaurant At a mosque/place of worship At a hospital/medical centre In an agricultural field	Walk Bicycle Motorcycle Bus Car/truck Van/rickshaw Train Launch Boat

	Sports field Neighbour's home Relative's home Household farm Outdoors/Near to one's home On a public road/in a public space	Airplane Other (specify)
2022 Canadian time-use survey	At home or on property At place of work or school Away on business At someone else's home or property In the neighbourhood Outdoors Grocery store, other stores or mall Library, museum or theatre Sports centre, field or arena Restaurant, bar or club Place of worship Medical, dental or other health clinic Elsewhere	Car, truck or van - as driver Car, truck or van - as passenger Walk Public transit (bus, streetcar, subway, light-rail transit, commuter train) Airplane Bicycle Motorcycle, scooter or moped Taxi, limousine service Ride-hailing Boat, ferry Other
HETUS 2018	Home	On foot

	Weekend home or holiday apartment Workplace or school Other people's home Restaurant, cafe or pub Shopping centers, malls, markets, other shops Hotel, guest house, camping site Other specified location (not travelling) Unspecified location (not travelling)	Bicycle Moped, motorcycle or motorboat Passenger car Other private transport mode Public transport Unspecified location/transport mode (not known whether respondent is travelling or not) Unspecified transport mode
2010 New Zealand time-use survey	At home At other people's home Workplace or place of study Public or commercial area Bush, beach or wilderness Marae and other sites of cultural significance to Māori	Travelling by foot or bicycle Travelling by car, motorcycle, truck or van Travelling by bus, train, taxi, ferry, plane Other locations or modes of transport
2010 South African time-use survey	Own dwelling Someone else's dwelling Workplace	Walk Bicycle Private transport

	Educational establishment Public space	Public transport Other

[a] In the 2021 Bangladesh time-use survey, respondents were asked where they were when the activity took place and they provided a free text answer. The responses were then categorized as shown in the examples in the table.

With global positioning system (GPS) enabled devices, it is possible to use geolocation to record locations more accurately, rather than relying on respondents to report their location. The absence of travel descriptions in self-completed diaries is one of the most frequent problems that needs to be solved in the data-editing phase. By recording not only locations but also travel times, and even suggesting modes of travel that could be confirmed by respondents, geolocation could help to improve the accuracy of travel information. However, the use of geolocation raises many potential quality, privacy and operational concerns, which must be weighed against the benefits (see 4.2 Contextual information in Quality considerations for Time-use surveys (UN, 2022) for further discussion). While the geographic coordinates of a location are useful in that they provide information on travel episodes, they do not provide any information on the relationship between the place and the respondent, thus limiting its usefulness to providing details of where activities took place.

m. With whom

The contextual variable “with whom” records social contact. It can be used to understand the amount of time people spend alone and with others, and as a strategy for improving the recording of supervisory care (UNECE 2013:17). It is therefore recommended for inclusion with all activities, except sleeping.

Respondents might use multiple interpretations of the “with whom” question if no direction or definitions are provided. They might focus on those persons with whom they had an intentional

relationship or with whom they were interacting, thus leaving out someone in the same room watching television, for example. They might report those persons who were in the same physical location (for example, in the same area or in the same house). It is, therefore, important to clarify the meaning of the question being asked. Making the question "Who was with you" a two-part question ("Who was present, but not participating?" and "Who was participating?") results in more accurate information being provided, but places an extra burden on the respondent. Most surveys, therefore, define being "with" someone as being physically present, regardless of the level of interaction. This does not necessarily mean that they must be in the same room or within sight.

Responses to "with whom" questions can be recorded verbatim, but it is more common for respondents to choose from a list of types of persons present. Understanding how this information will be used will help to determine the response categories. If the intent is to use the information as a proxy for care work, then it would be best to include a detailed list of household members for respondents to select from. In the case of childcare, the list can be further divided into age groups for children, in recognition that younger children generally require more parental attention than older children. In Italy, where data are also collected in children's diaries, the list of household members that may be chosen consists of "mother, father and siblings", so that the type of activities performed in the presence of the various household members can be studied. If the aim of data collection is to understand how much time people spend alone and with others, less detail is needed.

Table II.3.
Examples of response categories for "with whom"

Instrument	*For whom*

MHI	1 Alone 2 Spouse or partner 3 Household children 4 Other household or family adult 5 Friends 6 Workmates, colleagues, classmates 7 Other
2021 Bangladesh time-use survey	Alone/unknown persons (e.g. in public) Own household: • Husband/wife • Children up to 9 years • Another adult household/family members Other people/members of other households

2022 Canadian time-use survey	On my own Own household: • Spouse, partner • Household children - less than 15 years old • Household children - 15 years or older • Parents or parents-in-law • Other household adults • Other family members from other households Friends Colleagues or classmates Other people
HETUS 2018	Alone (also with unknown persons, alone in crowd) Own household members: • Partner • Parent(s): mother, father • Children up to 17 years • Other household member(s) Other people/members of other households

2023 Italian time-use survey	Alone (also with unknown persons, alone in crowd) Own household members: • Mother • Father • Partner • Children • Siblings • Other household member(s) Other people/members of other households

n. Activity-determined context

Other context variables can be added to study specific aspects related to particular activities.

For whom. context variable for identifying the purpose (motivation) of an activity and classifying activities correctly using ICATUS 2016. A typical difficulty encountered in classifying activities is producing descriptions of activities that correspond to the boundaries that make sense to analysts, for example the "general production boundary", which separates non-market work from other non-market activities. The context variable "for whom" has been found to be useful in providing information for clarifying these situations.

The "for whom" context variable should identify for whom the activity was performed, with four minimum recommended categories to choose from:

- For paid work or own or family business
- For use by own household member(s)

- For use by family members residing elsewhere
- For use by others

The “for whom” variable can be used to help to code other data items of interest such as volunteering. For example, in the Australian time-use survey, if an activity such as baking a cake was undertaken for a school event (“school fete” was the answer to the question “for whom”), it was coded as voluntary work under the Australian activity classification, whereas baking a cake for the family (“family” was the answer to “for whom”), it was coded to food preparation. In the diary form that is recommended in the HETUS 2018 guidelines, the “for whom” context question has been excluded to avoid burdening the respondent. However, in the explanation of how to describe activities, respondents are asked to specify for whom they are doing the activity when describing helping others, in order to distinguish between unpaid domestic services for household and family members and direct or organized volunteering.

The transition to digital diaries means that it will be possible to link context variable questions, such as “for whom”, to particular types of activities where appropriate rather than to all the activity episodes reported in the diaries.

In aAnnex 1: Minimum Harmonized Instrument - Model Diary, there is provides an example of the category options for different types of activities under the “for whom” context variable.
Table II.3.

Examples of response categories for “for whom” context variable in the 2021 Bangladesh time-use survey and 2010 New Zealand time-use survey.

Table II.3.
Examples of response categories for "for whom"

2021 Bangladesh time-use survey	Self Own household/family children up to 9 years Other own household/family members Other households Community/organization Work for pay or profit
2010 New Zealand time-use survey	Own household (including self) Household member aged 0-13 Household member aged 14 or over with an illness or disability Another household or individual Non-household member aged 0-13 Non-household member aged 14 or over an with illness or disability Organization or group Non-profit organization Government organization

Paid and unpaid activity. The definition of work adopted by the nineteenth ICLS in 2013 created the need to measure all forms of work, whether paid or unpaid. The integration of unpaid work

into SNA extended accounts has also stimulated interest in the extent to which people allocate time to paid and unpaid work activities. The distinction between paid and unpaid work also informs policy on the advancement of more gender-equitable divisions of labour.

Use of ICTs. The increased use of computers, smartphones and the Internet in almost all activities (shopping, work, entertainment) has prompted countries to increasingly ask about the use of ICTs. The HETUS 2018 guidelines recommend that a variable be included to identify whether the respondent was using ICT when carrying out the activities indicated in the diary. In some countries, specific surveys have been conducted to measure Internet coverage and use and the computer skills of the population, but they fail to assess the pervasiveness of the Internet in terms of daily time use, so the inclusion of this context variable was considered important, at least in the European context.

When a respondent is using ICT, the activity recorded should be classified according to the purpose for which time is spent, with ICT use recorded as a contextual variable. "Using ICT" is not an activity. For example, if a person uses the Internet for shopping, the activity should be classified as shopping and the ICT contextual variable should be marked. Some other examples of the classification of activities when performed using ICTs are shown in Table II.4.

Interpretation of sample ICT-reported activity.

Table II.4.
Interpretation of sample ICT-reported activity

ICT activities reported by respondents	**Classification according the MHI list of activities**

Reading mail for work	Working in paid job or income-generating activities
Reading mail for school	Education
Doing homework on the computer	Education
Browsing pages for a school research project	Education
Browsing pages looking for school uniforms for my kids	Shopping for own household and family
Texting with husband on cellphone	Socializing and communication
Looking for a job online	Seeking employment

o. Subjective context variables

Adding subjective dimensions to the typical objective ones for activity episodes may help to tap into the emotional and psychological side of behaviour. If the survey objectives are extended to measuring quality of life issues, surveys can incorporate subjective context variables, such as how stressed people are when performing an activity and how much people enjoy what they are doing, or their reasons for doing it. For example, the time-use surveys conducted in Italy between 2013 and 2014 and France in 2010 collected a pleasantness variable using a full paper diary. In the time-use survey conducted in Finland between 2020 and 2021, the variable was also collected using both paper and web-based diaries. In the United States of America, ATUS has periodically collected a module on well-being in an electronic diary via CATI. See section 3A.3 of *Harnessing Time-Use Data for Evidence-based Policy, the 2030 Agenda for Sustainable Development and the Beijing Platform for Action* for further discussion.

Subjective context variables can be complex to interpret and difficult for respondents to complete. Is the level of enjoyment a person experiences associated with the activity, the time of day, who they are with, their location or all of these? Data collected in the ATUS well-being module are typically presented as comparisons, for example "people report higher levels of stress when doing activity x compared with activity y". These data are published as a research data set only. Respondents should be informed as to whether they are expected to assess the level of enjoyment associated with individual episodes or as an overall daily rating.

Subjective dimensions may not be essential to the survey objectives of a general-purpose national time-use data collection. In countries where the aim is to reduce the respondent burden by having as light an instrument as possible, it may be decided not to include those dimensions. For example, in the HETUS 2018 guidelines, an additional column for self-assessed "well-being/satisfaction" in the model diary for HETUS wave 2020 is not recommended. Instead, there are four questions at the end of the diary, which ask about the diary day in general and the most pleasant, unpleasant and stressful activities (HETUS 2020, p.17).

Box II.6.
Quality considerations when collecting contextual information

- Contextual information included in the diary should be tested to ensure that respondents have a clear understanding of the requested information and answer correctly. The concepts should be well understood and easy to answer.
- Asking too much contextual information adds to the cognitive load and may affect the overall response rate quality of responses. There should be a sound data requirement for adding these items.

H. Background (covariate) information

The collection of time-use data using a diary or stylized questions should always be accompanied by a questionnaire on the selected background characteristics of the respondents and their households. For a theoretical discussion on the need for background information, see the section entitled “Analytical framework for background questions” in the *Guide to Producing Statistics on Time Use* (UN, 2005). The inclusion of priority background variables is discussed therein and suggestions are made as to how they should be selected and where they can be placed when using a minimum harmonized survey instrument. The timing between the collection of background data and time-use data and guidance on question design are covered in chapter III below.

Background characteristics, such as the sex and age of respondents, and their household composition, are critical to supporting the analysis, interpretation and use of time-use data, including through a gender lens. The background characteristics of household members may be needed to determine which respondents are eligible to complete the time-use data component of the survey. The information can also improve the quality of data by enabling checks and validation or by linking information such as unpaid care time with children or adults with disabilities listed on the household roster.

7. Priority background characteristics

The recommended minimum set of background characteristics for households and individuals are listed in Table III.. The table also provides suggestions for other characteristics that may be critical, depending on the national context. Together, these data are considered high priority for time-use analysis.

Table II.5.
Priority background characteristics for time-use data collection

Household level	All persons eligible as time-use respondents
Minimum	
Household size Household composition: classification based on age and sex Place of residence (urban/rural) Household income	Age Sex Marital status* Educational attainment* Current school attendance (and grade)* Current employment status* Labour force status* Labour force status of spouse/partner*
Additional as relevant in national context	
Access and use of care services Presence of persons requiring help with daily living activities Access to utilities Household wealth	Disability status* Race/ethnicity General health status Access to timekeeping devices*

** Only individuals selected as respondents*

When deciding which background characteristics to capture, it is important to consider:

- Their relevance in supporting the analysis, interpretation and intended policy uses of time-use data;

- The national context;
- The characteristics of the survey, in particular its coverage, sample design and size, and expected duration of the survey interview.

Careful consideration of these aspects will greatly contribute to the overall quality and relevance of time-use data.

8. Selection of priority background characteristics

At a minimum, the background characteristics should include both the personal and household-level information needed for respondent selection and the basic analysis of time-use and activity patterns and data quality considerations.

d. Minimum individual data

For all persons eligible to provide time-use data, data on their sex, age and relationship to each household member must be collected are required to create a respondent selection grid should the need arise. For respondents to the time-use component, the following additional data are required: marital status, level of educational attainment, current school attendance and grade or current labour-force status, current employment status and labour-force status of their spouse or partner.

e. Minimum household data

Individual data on sex and age provides information on household size and composition. In addition, information on place of residence (urban and rural) and household income are required.

f. Additional data depending on the national context

Depending on the national context, additional household information may be required on access to and use of care services, the presence of members requiring help with activities of daily living,

access to public services or utilities or measurement of household wealth. Questions relating to public services may focus on access to electricity, indoor plumbing or public transportation. Household wealth questions may be relating to the ownership of labour-saving technologies, such as a laundry machine, dishwasher or other assets. Such information can enhance the analysis of time spent on unpaid domestic and care work, which is a primary objective of time-use surveys. It can also help to inform policies on care work and time poverty, among other things. However, the relevance of including these topics will depend on their prevalence in the national context. Where there are important gaps in data on public services or household wealth, with respect to the general population or priority groups, for example rural populations, low-income households and single parent households, their inclusion as part of the minimum set of background characteristics is recommended.

Some characteristics that are deemed important may have low prevalence in the population or be concentrated in certain geographic regions or among groups that are difficult to reach. In such cases, it is necessary to assess whether or not the survey can support disaggregation to enable robust subgroup estimation or analysis with a sufficient level of precision. Only those background characteristics identified as relevant to meet user demands that the survey can capture with sufficient precision should be considered for inclusion.

Users' needs and data quality concerns should guide the choice of additional background characteristics to include, if any. For example, to support the analysis of unpaid domestic and care work, information on access to and use of care services should be considered. This includes public, private or community services that may be used to substitute for the unpaid work of household members, such as childcare centers, nursing care, domestic workers and nannies. A general measure of self-perceived health may be included to support the basic analysis of how subjective

health status is associated with daily activity participation. This may be important in ageing societies where age-related declines in population health, as well as associated care needs, must be monitored over the medium to long term. As part of quality control mechanisms, capturing basic information on the use of timekeeping devices may be considered, particularly in contexts where the rhythms of daily life are less regulated by "clock-oriented" time for a significant part of the population.

In all cases, to ensure that the quality of the time-use data is not affected by respondent burden, the number of background characteristics to be included should be limited to the extent possible.

To serve in the analysis of time-use and activity patterns, it is important that essential background characteristics be collected at the same time or as close as possible to the time-use component. In cases where the sample for the time-use survey has been selected from another household survey, it may be necessary to re-administer or confirm responses to some of the essential background characteristics to ensure that they are up-to-date. This is particularly the case for characteristics that are likely to change over time, such as household composition, marital status, current school attendance and current labour-force status, and the essential employment characteristics of respondents and their spouses.

Box II.7.
Quality considerations relating to background information

- Background information provides a richer data file, which supports more detailed data analysis. However, the amount of information collected must be balanced with the cognitive load associated with collecting data.

- Users' needs and data quality concerns should guide the choice of background characteristics to be included.
- Background information should be collected as close as possible to the dates of the time-use component. For example, if the background questionnaire is collected well before the diary dates, the individual circumstances may have changed, for example a respondent who reported that they were unemployed in the background questionnaire and then reported employment activities in the diary.
- Any background information that is provided by a proxy or the "any responsible adult" methodology,[a] should be recorded.

[a] Individual time-use information should be collected from direct respondents. Some surveys, such as labour-force surveys, collect some household information using the any responsible adult. The Australian Bureau of Statistics (ABS) describes the approach as follows: "The Any Responsible Adult (ARA), or proxy, method of interviewing is used in a number of ABS household surveys as an alternative to personal interviewing. This involves obtaining information about all the persons in a selected household who are in scope of the survey, from the first responsible adult with whom the interviewer makes contact (rather than speaking to each individual personally). The method is only used for collecting information on topics where other members of the household are likely to be able to answer the question. If the ARA is unable to supply all of the details for another individual in the household, a personal interview is conducted with that particular individual." (Australian Bureau of Statistics (15/02/2022). Labour Statistics: Concepts, Sources and Methods. https://www.abs.gov.au/statistics/detailed-methodology-information/concepts-sources-methods/labour-statistics-concepts-sources-and-methods/2021/methods-four-pillars-labour-statistics/household-surveys. Accessed 28 February 2023.)

I. Survey population

The survey population of a time-use survey consists of two dimensions, namely the persons or "population of interest" dimension and the time dimension. The unit of analysis is a measure of person-time, which is typically person-days or person-weeks over a year. Representation of the time dimension is a feature that is unique to time-use measurement and is discussed in more detail in chapter V below.

The population of interest for time-use surveys is defined in the same as for other surveys and the inclusion criteria are often set on the basis of geography, sex and the age of respondents, although socioeconomic, racial, ethnic and other characteristics may be considered (see box II.8 for considerations when collecting information on time-use from Indigenous populations.) As with all surveys, it is important to align the survey population with the objectives of the survey. This is of particular concern when adding a time-use module to another survey. For example, if the objective is to measure all forms of work, the working age population must be included. A different survey population would, however, be necessary to measure transportation for school-age children or time spent alone among older persons. In order to produce data to report on indicator 5.4.1 of the Sustainable Development Goals, the lower age limit is 15 years old and no upper age limit is required.

Box II.8.
Indigenous populations

Collecting data from Indigenous populations and some ethnic groups presents certain challenges.

Language. If the group speaks a language other than the primary survey language, it will be necessary to translate the survey instruments and supporting materials or engage interpreters. Interpreters need to receive training in the survey objectives, methods and elements of informed consent in order to be effective. As with all surveys, the relationship between local interpreters and the respondents may affect the information reported.

Concepts. Indigenous concepts and variables are often more fluid and dynamic than mutually exclusive western or Eurocentric ideas. Members of Indigenous communities should be involved in providing and/or adapting questions, collection methods and output requirements. The Indigenous perspectives need to be identified and provided by those communities, as often the underlying

concepts used in time-use surveys are not necessarily reflective of Indigenous realties. In other words, it is important not to simply translate an Indigenous concept into, or equate it with, a western concept for example, because of the nuances and contexts that influence them. Instruments and classification systems should reflect relevant activities that may be different from the main population.

Customs and structures. It may be necessary to adapt field procedures or workflows or request permission from traditional authorities, such as tribal elders, who can validate the process and share insights on appropriate approaches for data collection.

The goal of many time-use surveys is to measure disparities among social groups. If that is the case, the subgroups must be sufficiently represented in the target population to enable precise estimates.

Direct (not proxy) respondent. In order to obtain the most detailed, accurate information possible, time-use surveys should be conducted with direct respondents who report on their own time use, without the participation or being heard by other household members. Proxy respondents report on the time use of other individuals and may be required to report on the time use of very young children (see chapter II.F below on Time-use surveys of children for more information). Some countries also allow proxies in other situations, such as when the respondent's ability to communicate is affected by a disability or language barrier and there is no alternative way to obtain the information directly from the respondent. To the extent possible, NSOs should translate questionnaires into relevant languages and use inclusive data-collection modes and instruments to minimize the use of proxy reporting.

J. Time-use surveys of children

Many countries have successfully collected data from children aged 10 and older. Some countries include children as young as 3 years old, in which case caregivers serve as proxy respondents. There are additional considerations to those taken in account with adult surveys when collecting data on children's time use.

9. Why collect data on children?

For children and adolescents to enjoy a healthy childhood and adolescence, they require opportunities for education and developing life skills, creative outlets, such as sports and hobbies, and supportive social networks, which include both peers and adults. Time-use surveys can provide data on these aspects. (The contextual variable "with whom" provides a proxy for supportive social networks). Time-use statistics shed light on the competing demands on children's time that should be spent on activities necessary for healthy development, thus highlighting the extent to which paid or unpaid work is associated with reduced time spent on education or training activities or leisure.

Many children are engaged in own-account agriculture or informal labour for their family, as well as in collecting firewood or water and doing other domestic chores. Gender differences in time use begin early, with girls spending more time on household chores and care work than boys at the global level (Bruce & Hallman, 2008; Mmari et al., 2017; Charmes, 2015; UNICEF, 2016). The burden of unpaid work limits girls' opportunities to study and develop marketable skills. While primary school enrolment has reached gender parity in approximately three out of four countries worldwide, girls still leave school earlier than boys in many countries, often as a result of competing demands on their time to carry out household chores (Putnick & Bornstein, 2016; Bruce & Hallman, 2008; Larson & Verma, 1999).

In high-income countries, time-use statistics can inform policy priorities relating to aspects of health and well-being other than work. Activities and variables relating to exercise, screen time, active travel and independent travel, time in school or studying, and time with parents and peers can inform steps to improve outcomes with respect to child and adolescent lifestyles, sleep, learning and psychosocial well-being.

10. Ethical issues

Ethical issues relating to surveying children on time use are the same as those for surveying children on other topics, but they are important to consider at an early stage. NSOs need to develop informed consent and assent tools and procedures that are tailored to children and secure ethical approval. Survey programmes that do not normally collect data directly from children should consult a comprehensive reference on ethical approaches to collecting data from children.

Surveys should be conducted in accordance with national laws and conventions, but the usual procedure is to obtain informed consent from the parent or guardian of the child and then verbal assent or agreement from the child. Even if the age at which children are able to grant their consent is under 18 years of age, it may be necessary to obtain permission from the head of household or a parent to ensure that they can take part in the survey.

The informed consent statement for adults must be adapted using language that is appropriate for children. While younger children might not understand all the details about privacy and confidentiality, it is important that they understand what is expected of them and that they can choose whether to participate or not, and that if they participate, they can take breaks or stop whenever they want to. Moreover, while child respondents should have the same degree of confidentiality, anonymity and data protection as adult participants, when it comes to matters of

child protection, there is a clear duty to ensure the safety of the child over any responsibility to guarantee confidentiality.

In order to ensure the protection of the child and that of the interviewer, it is important that a parent or an adult known to the child is in the vicinity, but not too close to where the interview is taking place, for example within view or calling distance, but not able to overhear what is being said. However, if a child wants their parent or caregiver to be present, this should be agreed.

11. Population sample

Selecting the sample. Including younger children in the sample does not affect the two-stage sampling approach whereby the household is selected first, followed by the respondents within the household. The inclusion age is lower, but household members are listed in the same way, and either all the household members are selected or the respondent is randomly selected from the household listing, according to the survey protocol (see chapter V).

Minimum age. Different countries have different minimum ages. In the 2020 HETUS guidelines, the minimum age recommended is 10 years of age. Italy and Romania collect data on children from the age of 3 years old. Other countries in Europe start collecting data from 7 years of age (Bulgaria), 8 years of age (United Kingdom of Great Britain and Northern Ireland) and 9 years of age (Norway). In Morocco, data have been collected from children from 7 years of age, in South Africa from 10 years of age and in Mexico from 12 years of age.

Proxy respondents. Proxy respondents are needed for very young children. From the age of between 8 and 10 years old, most children can report on their own time (Eurostat, 2016). A proxy respondent, however, has the potential to improve or reduce the quality of the data. Quality is improved because adults are better at estimating time and may be better at recalling activities

carried out. Most children, however, spend significant amounts of time away from their primary caregiver every day, so proxy respondents may not report activities carried out accurately. Individual children vary in their abilities and maturity, which means that some are better at self-reporting than others. In Italy and Romania, the quality of self-report children's diaries were assessed in terms of the number of episodes per day, simultaneous activities and non-response (failing to complete the diary). In Italy, it was found that the quality of data was similar for children and adults. Romania found that the quality of answers provided by children between 8 and 9 years of age was lower, but the quality of data provided by children over 10 years of age was comparable to that of adults. (March 2022 HETUS presentations)

Different countries have different policies on proxy respondents. In Italy and Romania for example, proxy respondents or assistance from a parent is permitted for children under 14 years of age. In Morocco, the ethical review board allowed the parents of children up to 14 years of age to be present if they chose and to provide assistance if the child wanted it. In the United Kingdom, proxy respondents are not used. Surveys should be flexible and allow proxy respondents or at least assistance by parents if the child wants it.

Where proxy respondents are used, this should be flagged in the database and explained in dissemination products. Mixing proxy respondents with self-responses might affect comparability.

12. Time sample

Number of days. One option for reducing the burden on children is to ask for only one reference day, even if the diary calls for two days for adults.

Seasonality. Children's time use is often structured around the school day and term. Survey managers must decide how the school year will be represented if a survey covers only part of the

year. Since schools play an important role in for design programs' interventions and stablish policy priorities, it is recommended that time-use surveys of children always include the school term. As with all time-use surveys, comparisons between surveys should consider how days were sampled.

13. Survey instrument

Many smaller studies use a mix of qualitative and quantitative methods, for example the pilot study conducted in Hungary (Viragh, 2018) or research carried out by Young Lives in Ethiopia, India, Peru and Viet Nam (Espinoza Revollo and Porter, 2018). At the national level, however, surveys, whether they based on stylized questions or light or full diaries, tend to use the same instruments for children and adults, with some modifications.

Children will need simplified instructions and tailored examples for self-complete diaries. For a light diary with predefined categories or stylized questions, the examples of what activities fit into each category should be relevant to activities that children do, using language that they understand. In settings where children often provide care for younger siblings, it is necessary to clarify how to distinguish between playing together and providing care.

Depending on the survey objectives, the activity categories may need to be more detailed and perhaps distinguish between physically active and more sedentary recreation or types of study or education. As an example, Romania has three separate categories for formal school/university, homework and free-time classes. The contextual variable “with whom” may require different options, to distinguish between time with siblings, peers and adult non-relatives.

For free-text diaries that are post-coded, it may be necessary to add categories for when insufficient information is provided, for example if a child reports being with a parent or other person but does not specify an activity or traveling with a parent for an unspecified reason.

Layout and structure. In pilot tests in Italy and Hungary, as well as the Growing Up in Australia study and Millennium Cohort Study, it was found that children were more engaged by visually appealing self-complete diaries and visual aids in interviews. In Hungary, a five-point emoji scale was used for rating subjective well-being, which children preferred more than selecting a text description of how they were feeling. While having them choose from the 15 text descriptions resulted in more accurate information being provided, it was much more time-consuming. To get young children to report on eating and drinking, children were provided with stickers to put on paper diaries as part of the Growing Up in Australia study. They were also given pens with a built-in clock so that they could record exact times.

For light diaries in Hungary, it was found that a list of "favourites" or common activities worked better than hierarchical menus where the child first chose the broad category, then a more specific activity.

14. Mode and enumeration procedures

Children are better at remembering what they did and the order that they did it in than they are at estimating how long it took. Rather than start with waking up and proceeding chronologically through the day with activities and times, it may be better to first record the most memorable activities of the day and then fill in other activities and durations to reconstruct the day around these anchoring points. On a school day, children will have regular times for waking up and going to school at least. On weekend days, they may have other structured activities or even television programmes that they watch that can be used as a guide. This type of non-linear reconstruction of the day is important to consider when designing a diary. It should be possible to navigate back and forth in a digital diary to fill in less memorable activities around the anchor points, as well as to correct mistakes, adjust times or add forgotten activities.

Mode choice. Children should be able to choose between interview-administered and self-completed diaries and between paper and digital self-completed diaries, if those options are offered to adults. Some children will feel more comfortable using a digital diary, while others will prefer a paper diary. If there is no paper diary option, children may be given instructions suggesting that they jot down the activities for the day on paper first, before starting the CAWI diary, for those who would have preferred to use paper. This can be especially helpful for parents who are helping young children, as young children are more prone to forgetting activities and need more back and forth to recall them all.

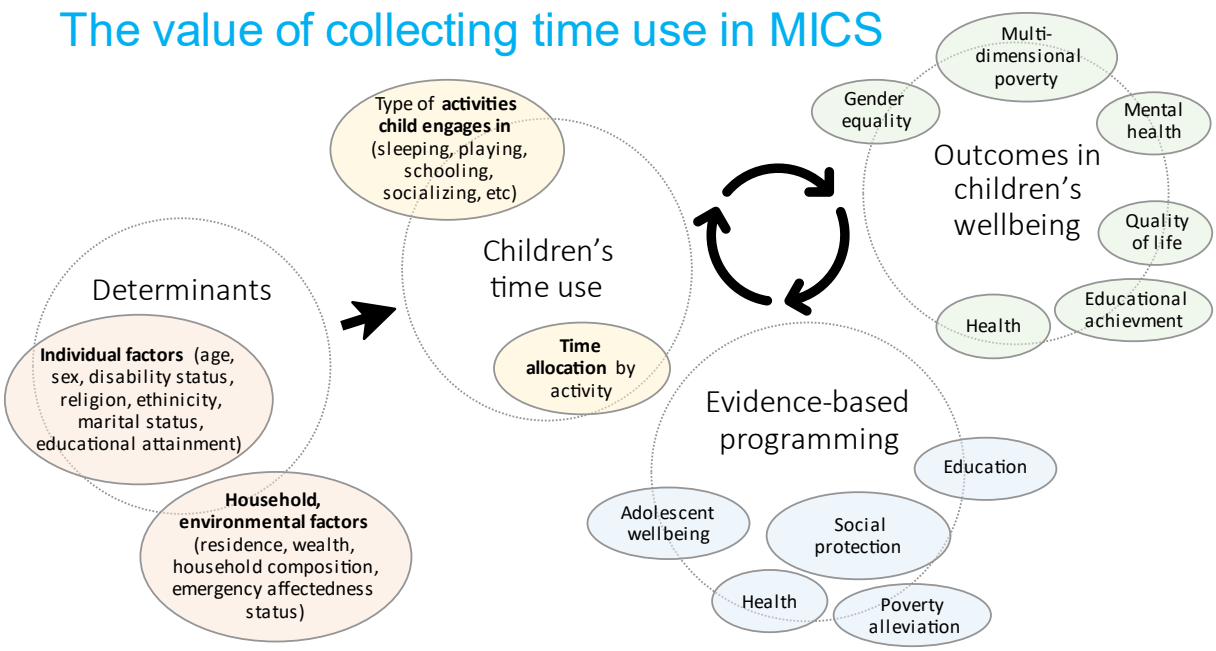
Box II.9.

Measuring how children spend their time in multi-topic household surveys: New United Nations Children's Fund supported Multiple Indicator Cluster Surveys children's time-use module

While a number of dedicated time-use surveys collect information on children's time use, most data-collection efforts focus on the adult population. The lack of standardized data-collection instruments to measure children's time use hinders the ability to understand how it affects their well-being and shapes their opportunities.

The UNICEF-supported Multiple Indicator Cluster Surveys currently collect data on a range of outcomes in children's well-being, such as their educational achievement and health, and their living conditions, including time spent on household chores and economic activities. With the development of a full time-use module to capture the types and durations of all activities children engage in, it will be possible to assess how patterns in children's time use differ by age and sex, and how these patterns correlate with their well-being. These data will also enable the analysis of the impact that girls' disproportionate burden of unpaid work has on other activities that they may have less time to engage in, such as playing, learning and socializing. Overall, countries

will have a better understanding of children's lives and their participation in society, which can inform policy and programming for children more effectively.



Considerations for time-use data collection in MICS

The process of developing and testing the MICS children's time-use module was guided by the following considerations:

- Activities had to be representative of how children spend their day across a range of settings globally and be relevant to UNICEF policy and programming on children.
- A compromise was needed between the desired granularity of the information obtained and the complexity of activity coding and interviewer training.
- Introducing time-use data collection into MICS should not adversely affect the overall quality of the survey.

The following issues were explored by reviewing existing literature and time-use instruments and conducting three rounds of field testing, in Malawi, Belize and Zimbabwe between 2017 and 2022:

- Stylized questions versus time diaries.
- Child reports versus caregiver reports.
- Adaptation of ICATUS 2016 to prioritize children's activities.
- Inclusion of contextual questions.
- Additional respondent burden and implications for interviewer training in the context of a multi-topic survey.
- Feasibility of implementation in more traditional rural societies where tracking time may not be culturally relevant.

	Malawi (2017)	Belize (2019)	Zimbabwe (2022)
Instrument	**Stylized questions with 2 reference periods** (7 days & 24 hrs.)	Survey-based **time diary** (past 24 hrs.) **Adaptation of ICATUS 2016 to prioritize children's activities**	Survey-based **time diary** (past 24 hrs.) **Further adaptation of ICATUS 2016** Introduction of **contextual questions**
Sample design	Split purposive sample of 447 households in 2 rural districts (Nkhata Bay and Balaka)	Probability-based sample of 680 households in 2 districts (mostly rural; urban)	Split purposive sample of 250 households in urban, peri-urban and rural settings in Mutare
Respondent	Proxy reporting by **primary caregiver** of children aged 5-17	Proxy reporting by **primary caregiver** of children aged 5-17	**Self-reporting by adolescents aged 15-17 and proxy reporting by primary caregiver** of adolescents aged 15-17
Implementing partners	UNICEF Malawi & Malawi National Statistical Office	UNICEF Belize & Statistical Institute of Belize	UNICEF Zimbabwe & Zimbabwe National Statistics Agency

Key findings from the field-testing process

- In general, respondents were pleased to speak about their day or their child's day.
- In Malawi, stylized questions required detailed probing for accurate reporting and assistance from the interviewer to aggregate the information over the reference period of one week. Respondent fatigue was observed, potentially owing to the cognitive burden of recalling activities and summing time spent on them. The 24-hour reference period proved easier for respondents. In fact, respondents usually provided answers for the previous 24 hours even when asked about the past week.
- The experience in Malawi confirmed the expected challenges of collecting accurate time-related information in rural, low-literacy settings where respondents provided non-numeric responses (e.g. "not long", "a bit") that required time estimation after extensive probing.
- Some limitations were observed with proxy respondents in all the field tests. In Malawi and Belize, caregivers were not able to report what activities their child had done or for how long on a day that the child was away from home. In Zimbabwe, where the reports of direct and proxy respondents were compared, it was noted that caregivers found it harder to report activities engaged in by adolescents than the adolescents themselves. The preliminary results of this field test show that there are differences between proxy reports and self-reports, but the extent and meaning of these differences need to be further analysed.
- The time diary method was considered a better fit for measuring time use in MICS. Time diaries are a facilitated conversation rather than a scripted set of questions. They require

special interviewing techniques that differ from the way that typical survey questions are administered. Chronological reporting in time diaries seems to help respondent's recall and is not too time-consuming, even though probing is needed to avoid gaps in the accounting of activities. It is also challenging for interviewers to identify the main activity when simultaneous activities are reported (e.g. eating while watching television).

- The use of CAPI can minimize entry and estimation errors through prompts and consistency checks, but it can also interfere with the interview flow and the interviewer's performance.
- Developing a time diary that is meaningful for children involved two steps:
    3. Reclassifying and regrouping the ICATUS 2016 activities and introducing new activity labels to prioritize children's activities and align with UNICEF programming, for example school attendance in person or remotely, gaming as a distinct activity that is different from play, socializing in person or using digital technologies, social media as entertainment.
    4. Introducing contextual questions related to homework support and tutoring as well as digital or online engagement associated with learning, socializing and civic participation.
- Overall, the ICATUS 2016 adapted activities and contextual questions were well understood by interviewers and respondents.
- In general, the quality of time-use data depends on whether there is a good interviewer-respondent rapport and whether the interviewer has strong interviewing skills. With adequate training and practice, interviewers' probing and activity coding skills

significantly improved. The customization of training manuals to provide country-relevant examples can help to make activity coding easier for interviewers. Sufficient time for training is central to obtaining quality time-use statistics.

Roll out of the Children's Time-Use Module in MICS

The seventh round of MICS, which were officially launched in March 2023, offers a complementary module on time use for children aged between 10-17 years in countries wishing to collect these data. The module is included in three individual questionnaires and administered to different respondents as described below.

For children aged between 10 and 14 years, the module is included in the *Questionnaire for Children and Adolescents Age 5-17* and administered to the mother or the primary caregiver of the child randomly selected for interview, if that child is aged between 10 and 14 years.

For adolescents aged between 15 and 17 years, the module is included in the *Questionnaires for Women and Men Age 15-49* and administered directly to the adolescents.

The module and accompanying tools, including administration guidelines, interviewer instructions, protocols and ethical considerations for interviewing children and adolescents, are available at https://mics.unicef.org/tools .

K. Use of harmonized classifications of time-use surveys

ICATUS 2016 is a classification of all the activities on which a person may spend time during the 24 hours of a day. It is intended is to serve as a standard framework for time-use statistics based on activities that are grouped in a meaningful way. It is important that countries that are starting

to conduct time-use surveys use an international classification system. Harmonized classification systems make it possible to compare statistics across countries and time.

ICATUS 2016 provides a framework that includes standardized concepts and definitions for the systematic dissemination of internationally comparable time-use statistics, regardless of the type of instruments used for data collection. ICATUS 2016 can also be used to guide the collection of time-use data or adapted by countries to develop classifications that reflect the national context and needs.

ICATUS 2016 was developed on the basis of internationally agreed concepts, definitions and principles in order to improve the consistency and international comparability of time use and other social and economic statistics. These include the production boundaries defined in SNA and the definition and framework for labour statistics adopted by the nineteenth International Conference of Labour Statisticians. In ICATUS 2016, the basic principle applied in classifying activities is that daily activities can be categorized into those that are considered productive and those that are considered personal activities or "non-productive" from an economic point of view. The resulting structure highlights time spent on all forms of work, as well as time spent by people on personal activities, to obtain statistics on time spent studying, socializing, exercising and on many other activities defining the general well-being of the population.

ICATUS 2016 serves as an important input for monitoring progress made towards the achievement of the Sustainable Development Goals and targets, including indicator 5.4.1 on the proportion of time spent on unpaid domestic and care work, by sex, age and location. MHI is based on ICATUS 2016. Annex 4 shows how the MHI activity categories are mapped onto ICATUS 2016, HETUS and CAUTAL.

ICATUS 2016 was developed to achieve:

- Mutually exclusive and exhaustive categories.
- Comparability with other related national and international standard classifications.
- Categories that are well described.

Box II.10.
Quality checklist: scope and coverage

- Consider the extent to which the survey content addresses the identified data needs.
- Ensure that the highest priority needs are addressed.
- Consider the level of detail required in activity classification to meet data needs, but balance this against how easily responses can be coded to that level.
- Where data collection is new or has been substantially redeveloped, consider keeping activity classification flexible enough to be iterated in response to issues encountered when coding diary entries (e.g. removing a category if very few responses are coded to it).
- Undertake cognitive testing to determine whether diaries or stylized questions accurately measure the intended concepts.
- Consider the mode of data collection, for example self-administered or interviewer-administered, retrospective or prospective.

- Consider the length of diary time periods, which are most often 5, 10 or 15 minutes, while balancing the respondent burden against the desired level of precision in measurement.
- Consider the number of diary days collected from each respondent while balancing the respondent burden against any improvements in accuracy.
- Consider providing examples of a completed diary to increase the respondent's understanding of the expected responses and level of detail.
- Consider retaining and using respondents' personal details for the purpose of validating the match between the background questionnaire and time-use records. Determine whether and how this can be done in accordance with applicable legislative and privacy frameworks.
- Consider the data entry and processing requirements for the content included, and the impact on timely data dissemination.
- Consider whether the content is coherent with other data sources available.
- Ensure that data-collection modes are coherent (e.g. paper diary versus electronic diary).
- Design a method for reliably matching questionnaire records with diary records.
- Consider comparability with previous iterations of the survey and with international time-use surveys.
- Consider implementing electronic data-collection methods to improve accessibility and reduce collection costs.

- Consider activity classification from the perspective of data users to determine whether category groupings make instinctive sense.
- Consider which activity classification will be used, for example ICATUS 2016, HETUS or another classification.
- If country comparisons are a data requirement, consider using internationally recognized activity classifications.
- If using MHI activity categories, ensure that it covers the key activities of interest and understand the limitations.
- If designing your own activity classification, it is important to avoid duplication and the overlapping of categories.
- Undertake cognitive testing to identify any aspects of the diary that create a particularly high cognitive load.
- For interviewer-administered dairies, provide survey-specific training for interviewers.
- Consider the usability and respondent experience associated with diary collection instruments. Use visual features and the layout to alleviate the cognitive load and aid respondents' natural ways of thinking about how they spend their time.

Survey instruments for collecting time-use data and chapter IV.B Data collection approaches discuss different formats to providing instructions and helping respondents correctly code their activities into the categories. In interviews, the respondent describes the activity in their own words and the interviewer selects the correct code from an activity list, or uses an activity classification provided by a tool. This type of coding process allows interviewers to confirm their understanding of the meaning of the activity by asking the respondent directly, if there is any doubt.

In the past, one drawback of coding on the fly was the lack of a paper trail, in case something needed to be checked against the questionnaire. Given the coding software and capabilities that now exist, the ability to code on the fly should be less risk-adverse than previously. As-you-type lists enable respondents to be more specific, robust coding indexes using open-source or well-established coding software or web services can make this so efficient, and it can be done on any device. There are sufficient metrics/analytics that the tools can use to mitigate the loss of a paper trail.

Even a survey with on-the-fly coding will have some after-coding if it uses an open-text "Other—specify" category. After-coding is covered briefly under chapter 0

Processing of time-use survey data, and more extensively in the Guide to Producing Statistics on Time Use (UN, 2005), paragraphs 449-473.

5. Developing a coding index and procedures

Coding, whenever it is done, affects the quality of time-use surveys data and the usability of the results, due to the multiple dimensions referred to in the diary activity descriptions. High data quality requires a coding index and procedures to support a uniform way of coding and to ensure identical work habits. A coding index is the key document through which activity descriptions are translated into the appropriate codes as defined by the survey activity classification. The coding index guides the coder by listing information—key words, for example—that can be found in the responses. The coding index indicates how different responses are allocated to the detailed or more aggregate classifications, depending on the nature of the information in the response. A coding index can also contain spelling variations. Coding tools have the functionality to apply filters, character or word replacement as well as fuzzy or exact matching. Statistics New Zealand has the functionality to develop, maintain and disseminate to a web coding service a coding index allowing for automated or manual coding.

Figure VI.1: Statistics New Zealand Concept and classification Management System

In the past, coding was one of the most expensive and time-consuming activities in time-use surveys. Data processing experts had to collaborate with subject matter analysts in formulating the coding rules and constructing the coding indexes and inserting them into into the processing procedures and system. Today, the Minimum Harmonized Instrument provides some wording that can be used as a starting point for a coding index for the minimum activity list, saving a great deal of time for statistical agencies embarking on their first survey or wanting to produce internationally-comparable data. The coding index should be adapted to the way people describe their activities in that setting. The index, instructions and procedures need to allow for updating—not only in future surveys, but in the field as the survey progresses. With digital tools, especially light diaries with limited activities in drop-down menus, on-the-fly coding can greatly simplify the process.

To correctly assign a code it is very important to accurately understand the context in which the activities take place, their sequences, their purposes, the place and time of the day, week or season in which they took place. The coding rules should reflect the survey objectives. For example, Japan's 2021 Survey on Time Use and Leisure Activities[39] is designed to provide information for formulating "policy aimed at promoting better work-life balance, maintaining a vital aging society, improving the childcare environment, facilitating gender equality, etc., taking the current social background (e.g., aging society with fewer children, and diversification of lifestyles) into account." (Statistics Bureau of Japan, 2022). They are therefore concerned not only with measuring paid and unpaid work, but also with accurately capturing participation in sports as well as cultural and other activities and with understanding time spent on travel and sleep.

The timing of codding training has to be as close as possible to be commencement of the actual survey processing and there needs to be refresher training as well as periodic coding meetings regarding modifications to the coding list, additional rules and examples, or problems that have arisen. For specific queries, it is best if the coders can receive prompt answers. Query resolution, however, often requires subject matter expertise and an immediate response may not always be possible. It is important to embed any determinations into the coding rules or index, and make them available to the entire team of coders, and data collectors if appropriate.

Decisions made about coding will influence international comparability. To improve comparability, the coding solutions should follow similar rules, and categories should be interpreted in the same way.

[39] Although the Survey on Time Use and Leisure Activities is conducted during the same period, the results are tabulated separately.

6. Coding rules

Coding most activities is relatively straightforward, but there are many situations in which the correct code is not obvious. Sometimes coding an activity as one thing or another will be of minor consequence. This is especially true when choosing between two three-digit codes: results are often reported at the major division or division level, and the three-digit activity codes would therefore be aggregated into the same category. At other times, the different choices could have implications for the survey objectives, such as for activities that may or may not be correctly classified as unpaid work.

Countries' experiences have shown several scenarios that have proven challenging to code. Broadly, these challenges can be described as:

1. *Activities that could be classified under more than one code:* The activity provided by the respondent could be classified under more than one ICATUS code. Background information and contextual variables might assist with determining the right code. Rules are needed to help ensure consistency in classifying the activity.
2. *Several activities that are reported as one activity:* The respondent is doing multiple things but reports them as one activity. The activities might be simultaneous (doing both at the same time, such as eating while watching TV) or consecutive (doing one thing and then another, possibly alternating, such as working at a paid job and taking a break, or spending time waiting and engaged in an activity).
3. *Other challenging scenarios:* A residual category which includes many activities related to technology use (such as virtual activities and developing digital content) and self-administered

surveys (where inconsistent or insufficiently detailed responses create the need to edit or impute data).

Members of the EG-TUS coding subcommittee identified key themes, issues or activities that can be difficult or ambiguous when assigning ICATUS 2016 codes. Along with standard coding rules, this section includes a set of coding rules and decisions to facilitate harmonized coding decisions for selected themes, issues or activities, chosen based on the following prioritization criteria:

- Importance for accomplishing survey objectives
- Relevance to multiple countries or contexts
- Relevance to countries that may not have existing coding tools or guidance to make decisions on this topic (i.e. that may be embarking on their first time-use survey)

Different local contexts present different challenges, so each country will need to develop its own coding guide.[40] The NSO can incorporate the rules and guidance presented here into a national coding guide, taking care to use language and examples appropriate to the context, that can be understood by survey staff and respondents.

In developing the Minimum Harmonized Instrument, the EG-TUS agreed on a set of background questions and contextual variables for ensuring international comparability in coding, as described in chapter I.D Background (covariate) information. These are described briefly below, as some of the coding rules presented here depend on these background and contextual questions.

With the guidance of its ILO members, the EG-TUS identified essential labour force characteristics necessary for the operationalization and coding of activities under ICATUS 2016

[40] Some examples include Statistics New Zealand Classifications, 2021 ATUS Coding Rules Manual (bls.gov) HETUS 2020 Guidelines, and INE Spain Methodological Guide.

major division 1 *Employment and related activities* and major division 2 *Production of goods for own final use*. As described in chapters II and III, characteristics such as the respondents' labour force status or the presence of dependent household members should be collected through a background questionnaire about the individual and household. Model questions and sequences to capture those characteristics are provided as illustrations in Annex 3: Questions capturing economic and labor characteristics of respondent. Countries are recommended to (a) use the approach already established at the national level to capture those characteristics in surveys, particularly Labour Force Surveys (LFS), provided that the details required for coding time-use activities are captured, or (b) adapt the national approach in line with the essential characteristics identified in the MHI, to be suitable for time-use surveys.

While labour force characteristics are collected at the respondent level, other contextual information will vary according to the activity episode and so should be collected in the time-use component to correctly code activities. The context variables recommended in the MHI are listed in chapter I.C Contextual information. The coding rules in this section will indicate how this additional information and/or less standardized probing can be combined with activity descriptions to correctly code activities, generally at the three-digit level.

a. General coding rules and challenging scenarios

This part of the document aims to guide on how to code possibly ambiguous activities collected in a time-use survey, especially those that could be classified under more than one code in different divisions.

Waiting

ICATUS 2016 does not contain categories for "waiting". If "waiting" time is reported, it should be coded under the associated activity. For example: Waiting at the doctor's office should be coded

as 942 *Receiving health/medical care from others*. The only exception is the time that someone is waiting while accompanying other household or family members, in which case the activity should be classified under division 44, using one of the relevant codes listed below.

442 Accompanying own children

443 Accompanying dependent adults

444 Accompanying non-dependent adult household and family members

Travel

Given the importance of gathering information on the purpose of travel and mode of transportation, every single Major Division contains codes for travel related to the activities under that major division.

There are several options for coding travel, depending on the type of instrument and how much detail is required.

In full diaries, travel may be coded **according to its purpose at the three-digit level.** Every major division contains codes for travel related to the activities under that major division. In this approach, travelling to bring children to and from school should be coded as 441 Travelling related to caregiving services for household and family members. Codes for other travel purposes are listed below.

181 Employment-related travel

182 Commuting

250 Travelling, moving, transporting or accompanying goods or persons related to own-use production of goods

380 Travelling, moving, transporting or accompanying goods or persons related to unpaid domestic services for household and family members

441 Travelling related to care-giving services for household and family members

540 Travelling time related to unpaid volunteer, trainee and other unpaid work

640 Travelling time related to learning

750 Travelling time related to socializing and communication, community participation and religious practice

860 Travelling time related to culture, leisure, mass-media and sports practices

950 Travelling time related to self-care and maintenance activities

Basic rules for travel

1. As described in ICATUS 2016 (p. 116), travel is coded based on the purpose. If the respondent specifies the purpose, this is used for coding.
2. If the purpose is not specified in the response, the purpose may be determined by the **destination** of the travel episode and the activity following the travel.

   Examples:

   - ✓ Drove to a different office/location related to my job (driving is not part of the job) → 181 *Employment-related travel*
   - ✓ Driving from home to work → 182 *Commuting*
   - ✓ Took the school bus → 640 *Travelling time related to learning*
   - ✓ Drove to concert → 860 *Travelling time related to culture, leisure, mass-media and sport practices*
   - ✓ Took taxi to pick up my son → 441 *Travelling related to care-giving services for household and family members*

- ✓ Travel home from school or work in the middle of the day for lunch→ 950 *Travelling time related to self-care and maintenance activities.* (Time spent eating is coded as 921 *Eating meals/snack*.)

3. If a respondent is travelling home and there is not enough information from the following activity to determine the purpose of the travel, the purpose is determined by the **starting point of the journey home**. The starting point is the location of the activity prior to the travel episode. For example going home back from the workplace at the end of the work day, should be coded as 182 *Commuting*

4. If the travel consists of several legs (with the same purpose), all legs should be coded according to the purpose of the travel. For example, if the respondent walks, waits for the bus, takes the bus and then walks to school, all legs should be coded as 640 *Travelling time related to learning*.

5. If a trip has multiple purposes, each episode should be coded according to its purpose. For example, drove to the supermarket (380 *Travelling, moving, transporting or accompanying goods or persons related to unpaid domestic services for household and family members*), then to school to pick up my son (441 *Travelling related to care-giving services for household and family members*) and then back home (441 *Travelling related to care-giving services for household and family members*).

6. If the respondent is receiving pay or profit for driving a vehicle, for example, the activity should be coded as 110 *Employment in corporations, government and non-profit institutions* or 134 *Transporting goods and passengers for pay or profit in households and household enterprises*, not as travel. It is important that in these cases the contextual variable location should be **workplace**, because the respondent is in the place they work, not travelling to a place of work.

It is important to note that respondents in some occupations, like the truck driver and train guard above, will spend all or almost all of their work time travelling. Respondents in other occupations, such as salesperson or provider of household services (electrician, plumber, cleaner), travel from one appointment to another and may spend much of their time at a means of transportation. In both cases, the purpose of the activity is employment and related activities, however, the location of the first case will **always** involve a mode of transportation, while for the second case location will **switch** from transport mode for travel activities to workplace for activities reported at a fixed location.

7. Waiting related to travel should be coded as part of the travel episode. For example, waiting for the bus or train to go to work should be coded as 182 *Commuting*.

8. Walking is considered travel if the intention is to get from one place to another. If the primary purpose is exercising, the activity should be coded as 832 *Exercising*. Walking the dog should be coded as 361 *Daily pet care*.

9. In self-completed instruments, the purpose will be determined by the respondent. It could be re-coded at processing if the reported travel is inconsistent with the type of activity.

Box VI.3: Challenges related to coding travel

Multiple travel episodes one after the other could be reported without a clear purpose for each travel episode. For example, leaving home to pick up an adult family member, then another travel episode going to a health clinic, later going to a restaurant, shopping, work, etc. In this case, picking someone up (first travel episode) does not have a clear purpose. In this example, the rule is to code the travel based on the purpose of the first activity that reports a clear purpose. In the example, group the first travel episode (picking someone up) with going to a health clinic,

and code both episodes of travel as 441 *Travelling related to caregiving services for household and family members*. Using the contextual information "with whom" would indicate the type of relationship between the respondent and the other person. This may help determine if the travel should be coded under 441 *Travel related to unpaid caregiving services to household or family members* if the person is a family member or under 540 *Travelling time related to unpaid volunteer, trainee and other unpaid work,* if the person being picked-up is not a family member.

Another challenge is the use of light instruments that display only one option for all activities related to travel. In this case, the activity description will not allow travel to be assigned to specific purposes. If this level of detail is needed, it may be possible to impute the purpose of the travel during the editing stage, based on the activity done before and after the travel episode.

Similarly, using self-administered surveys could lead to having less granular episodes: travel with multiple stops may be reported as a single activity. This is an inherent limitation of self-administered surveys and light diaries. Steps to review and possibly recode diaries that are missing travel segments are discussed under chapter VII.B Editing , below, but even these are more effective for imputing regular travel between two points, such as commuting, rather than short trips.

Use of ICT

If the respondent reports having used the computer, mobile phone or other ICT, the activity should be coded under the activity that the respondent was doing on the computer/phone or other ICT device or through a digital platform. For example, if the respondent mentioned using the computer for homework, the activity should be classified as 620 *Homework, being tutored, course review, research and activities* related to formal education.

The same applies to time spent on social media, which should be classified under the activity (or purpose) for which time is spent. For example, if a person is shopping via/through a social media platform, the activity should be classified as 371 *Shopping for/purchasing of goods and related activities* or 372 *Shopping for/availing of services and related activity*. Posting photos of a holiday on a social media platform should be classified as 713 *Reading and writing mail, including email.* Many people use social media to promote a business or respond to queries about a business. This should be classified under the corresponding group in major division 1 Employment and related activities.

Box VI.4: Challenges related to coding activities when ICT was used

People increasingly spend time doing activities virtually that were previously done in person. Some examples include shopping, attending meetings or seminars, watching live performances, attending funerals, attending school and online classes, employment-related activities, household management activities and volunteering. Information on the use of computer/ICT/social media are contextual variables but do not correspond to an activity themselves.

These activities vary in the degree of active engagement they require (listening to an online concert vs. teaching online). The level of engagement can help determine the right code for the activity. For example, attending virtual concerts or music performances, virtual theatre or dance performances, virtual art exhibitions and festivals, virtual museum tours etc. or watching online sports or esports as a spectator are all done **passively.** Therefore, they should be coded under mass media use (84) and/or watching/listening to television and videos (842). However, if the respondent is **actively engaged** in the activity, it should be coded according to the purpose of

the activity. For example, taking part in an online/virtual exercise class where the respondent is actively engaged should be coded under 832 *Exercising*. Playing organized, multiplayer video games (esports) should be coded as 823 *Playing games and other pastime activities.* Virtual community celebrations, virtual community rites (weddings, funerals, births, and similar rites of passage), virtual religious practices, should be coded according to their content under divisions 72–74.

Education has evolved with changes in technology and society since 2016, making distinctions between some codes falling under 61 *Formal education* more difficult.

ICATUS distinguishes between 611 *School/university attendance* and 614 *Self-study for distance education course work (video, audio, online).* 614 includes all activities related to watching videos or online resources, attending virtual classes or lectures, reviewing examples, notes, videos, taking examinations related to distance education and online formal education. It defines distance education as "the use of specific instructional techniques, resources and media to facilitate learning of people who are separated by **time or place** from the teacher" (ICATUS 2016 p.80). However, attending formal classes online is a more established and accepted mode of learning now. Classes may be synchronous (or live), with students and teachers interacting with one another on video or audio in real-time. They may have proctored examinations. Students may meet with instructors to get guidance on the course. Although these examples meet the definition of the students being separated by place from the teacher, they cannot be described as "self-study", which is generally understood to be independent, self-paced, without direct supervision. For this reason, the EG-TUS recommends that **live or synchronous sessions of remote learning with the potential for interacting with the instructor** be classified as 611 *School/university attendance.* Time when the student is watching pre-recorded lectures or other

materials for such a class can be coded as 620 *Homework, being tutored, course review, research and activities related to formal education.* Watching recorded materials for courses that are entirely remote and asynchronous and thus meet the definition for self-study should be coded as 614 *Self-study for distance education course work (video, audio, online).*

Coding some remote educational activities as 611 *School/university attendance* introduces another complication. Since the COVID-19 pandemic, there has been an increasing interest to distinguish educational activities that require in-person presence from those that are virtual. Distinguishing between **going to school** (as being physically present at school) and **virtual or home schooling** has implications for parents' responsibilities in assisting or supervising (if the students are young children), transportation, and instructional techniques, among others.

If the context variable "location" is collected, a location of "home" can be used to correctly classify these activities. (The context variable of ICT use cannot be used to distinguish between home and in-person schooling, as ICT is often used in classrooms.) If countries are not collecting context variables (for example, if they are using stylized questions or a light diary), or if data users have a need for detailed information on this topic, they may wish to add a virtual schooling code/question. It is important that any codes added should permit **aggregation into 611 *School/university attendance*.**

How to code **development of digital content** is an emerging area for which there is no consensus as yet. It is possible to develop content for paid work or an own business. Making video tutorials, writing blog posts or reviews, developing apps, writing Wikipedia entries are examples of activities that may be done for enjoyment, may benefit others without personal gain,

or may lead to employment or income generation in the long term, even if not directly. This is an area that requires further study before any recommendations can be made.

Major Division 1 *Employment and related activities*

This major division aims to capture activities to produce goods or provide services for pay or profit and to other activities directly related to employment, such as travelling and commuting for employment, breaks during working time, training and studies in relation to employment, seeking employment, and other related activities outside working time.

If the respondent indicates that the activity was done for pay or profit or for the market, it should be coded under 1 Employment and related activities. Additional information should be collected to be able to classify the correct division or group under 1 Employment and related activities (e.g. 11 Employment in corporations, government and non-profit institutions, 12 Employment in household enterprises to produce goods, etc.).

To correctly classify activities at two and three-digit levels, background questionnaires on economic characteristics of the respondents need to be included to the survey. For model questionnaires to please see Annex 3: Questions capturing economic and labor characteristics of respondent.

Breaks during working time within employment

As describd in ICATUS 2016, when simultaneous activities are recorded, each activity is to be recorded. If activities are prioritized as main, secondary, etc., the specific activity being performed during the break is to be treated as primary activity. The secondary activity is then 142 *Breaks*

during working time within employment. If simultaneous activities are not recoded, prioritization rule needs to be defined.

Lunch break

If the respondent reported that they had lunch during the employment-related time, then the activity should be coded as 921 *Eating meals/snack*.

If the respondent reported being in a working lunch, then the activity should be coded to the relevant code under 1 *Employment and related activities*.

Travel as part of the job

Time spent traveling during work for drivers, chauffeurs, and other workers for whom travel is part of the tasks and duties of their job or "direct hours" should be coded to the relevant code under 1 Employment and related activities. Possible codes are 110 *Employment in corporations, government and non-profit institutions* and 134 *Transporting goods and passengers for pay or profit in households and household enterprises*.

Reading for work

Reading for work should be coded to the relevant code under 1 *Employment and related activities*.

Training and studies as part of the job

If the respondent mentioned that the training/study is part of working time or official time and is directly related to their job, then the activity should be coded as 150 *Training and studies in relation to employment*. Otherwise, the activity should be coded to the relevant code under 6 *Learning*. If the activity involves physical or sports-related activities, it should be classified as 831 *Participating in sports* or 832 *Exercising*.

Trainee work

If the respondent mentioned that they are "working" without receiving any remuneration, it should not be coded under major division 1 if the intention is to acquire workplace experience or skills, then the activity should be classified as 530 *Unpaid trainee work and related activities*. If the respondent mentioned that they are volunteering, the activity should be coded to the relevant code under 51 *Unpaid direct volunteering for other households* or 52 *Unpaid community- and organization-based volunteering*. It may be necessary to probe to determine whether work without pay is to acquire workplace skills or to help family or non-family members.

Hobbies

If the respondent indicates that they expect pay or profit from the hobby, the activity should be coded to the relevant code under 1 *Employment and related activities*. If the activity/hobby is done purely for recreational purposes, then it should be coded under 8 *Culture, leisure, mass-media and sports practices*. Possible codes are: 821 *Visual, literary and performing arts (as hobby)*, 822 *Hobbies*, 823 *Playing games and other pastime activities*, and 829 *Other activities related to cultural participation, hobbies, games*.

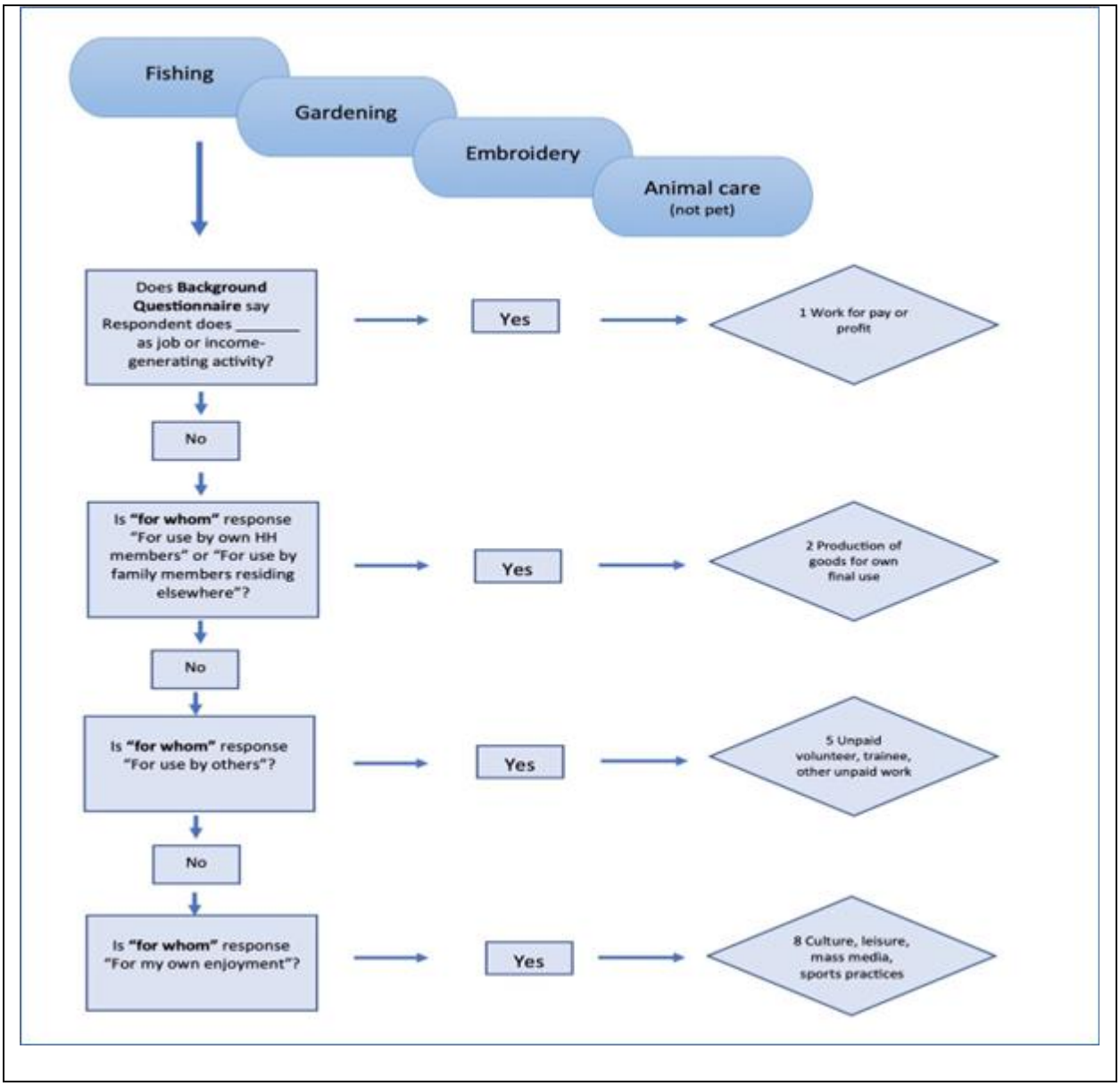
Box VI.5: Challenges distinguishing between paid work, unpaid work, and leisure activities

Sometimes a description of an activity is not enough information to determine which major division it falls under. Gardening, fishing, berry picking, caring for animals, doing needlework/textiles, preparing food, reading, and doing paperwork are examples of activities

where is not automatically clear whether they were done for pay or profit, for own-use production, to benefit others, or for leisure.

The contextual variable “for whom” provides information to assist with the classification. To reduce respondent burden, the questionnaire might be designed not to ask “for whom” about every activity, but only those that are clearly producing a good or service. A list of relevant activities can be programmed into CAPI or CAWI instruments, or enumerators can be trained to recognize them. An activity such as reading might or might not be producing a service. In cases where an activity might have more than one purpose leading to different coding, it is possible for an enumerator to informally probe, even if the question “for whom” is not automatically asked.

Diagram: Use of context variable “for whom” to classify activities



Major Division 2 ***Production of goods for own final use***

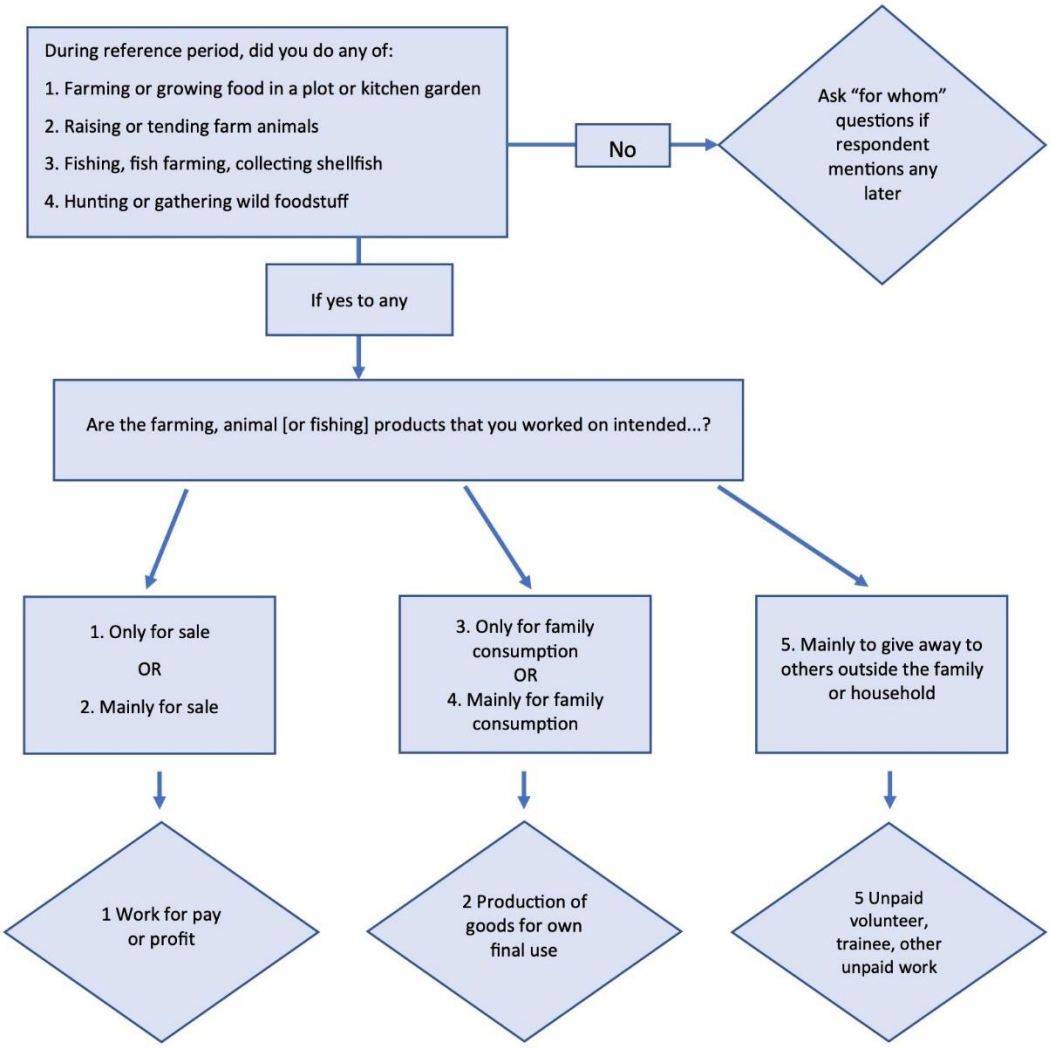
This major division aims to capture activities to produce goods for own final use where the intended destination of the output is mainly for final use by the producer in the form of capital formation, or final consumption by household members or by family members living in other households.

To correctly code activities for the production of goods for own final use, information from the background questionnaire on employment characteristics, the background information on own-

production of goods (optional questions recommended for countries with high levels of own-use production; see box below), and information from the diary (including contextual variables) or informal probing are used. Alternatively, the respondent can be asked the follow-up questions any time they mention doing the activity on the reference day.

Box VI.6: Applying background questions on own-use production

Ask: Last week, from (DAY) to (DAY), did you do any of the following activities on your own-account or help the family with..?



Major Division 3 ***Unpaid domestic services for household and family members***

This major division aims to capture domestic work, such as food preparation, cleaning of dwelling and surroundings, pet care, shopping, and repairs, among others.

Box VI.7: Challenges when the respondent report domestic or caregiving services for household and family members with exchange of money or goods

Domestic and caregiving services could be classified under paid or unpaid work. Sometimes a person does domestic or care work that is not paid employment but there is an exchange of money or goods involved, for example a teenager washes their parent's vehicle and is given money, or a person takes care of an elderly person and receives a cake as a thank you.

The 19th ICLS resolution states that " 'unpaid' is interpreted as the absence of remuneration in cash or in kind for work done or hours worked; nevertheless, volunteer workers may receive some small form of support or stipend in cash, when below one-third of local market wages (e.g. for out-of-pocket expenses or to cover living expenses incurred for the activity), or in kind (e.g. meals, transportation, symbolic gifts)." One key aspect to define this limit is the expectation of receiving payment (i.e. through a previous agreement). Therefore, the rule for these cases is to consider these activities as unpaid domestic or care work (major division 3, 4, or 5, depending on whether the care recipient is a household or family member) even if cash or in-kind gifts are exchanged if:

- There is no expectation of receiving payment, or
- The amount of money is significantly below market wage.

In the cake example, there is no expectation of receiving an exchange of goods for payment. In the car washing example, the payment works as an incentive for doing household work, and it should not be considered as employment, as the transaction was a small amount within the household (pocket money).

Preparing food

Preparing food for children should be coded under 311 *Preparing meals/snacks*.

If the respondent prepared food for other than their own household or family members, then the activity should be coded as volunteering under 511 *Unpaid volunteer household maintenance, management, construction, renovation and repair*. If the respondent prepared food for the community (or organization) without receiving a pay, it should be coded as 522 *Unpaid volunteer preparing/serving meals, cleaning up*.

Activities under 31 *Food and meals management and preparation* should be distinguished from 221 *Making, processing food products, beverages and tobacco for own final use*.[41]

Cleaning the kitchen

Cleaning the kitchen should be coded as 313 *Cleaning up after food preparation/meals/snacks*. If the activity was done for other than their own household or family members, then the activity should be coded as 511 *Unpaid volunteer household maintenance, management, construction, renovation and repair*. If the respondent prepared food for the community (or organization)

[41] ICATUS group 221 includes activities performed in relation to economic activities described under ISIC rev.4, Section C Divisions 10, 11 and 12. For a detailed description of group 221, see ICATUS p.47.

without receiving payment, it should be coded as 522 *Unpaid volunteer preparing/serving meals, cleaning up*.

Plants

Plant care (other than agriculture or gardening for produce that will be sold, consumed by the household or given away) is normally coded as 324 *Upkeep of indoor/outdoor plants, hedges, garden, grounds, landscape*. If coding at the three-digit level, it is possible to distinguish between taking care of the plant itself, such as by transplanting it into a new pot (specific activity group 324) and cleaning up the mess after knocking over a house plant (321 *Indoor cleaning*). At the division level both will be coded 32, cleaning and maintaining of own dwelling and surroundings. In the minimum harmonized instrument, both activities belong to activity 5 (cleaning the inside or outside of the dwelling; disposal of garbage or recycling, watering plants).

Pet care

Pet care should not be confused with activities whose intention is to produce goods, either for pay or profit or for own final use. These include:

- 122 Raising animals for the market in household enterprises
- 125 Aquaculture for the market in household enterprises
- 212 Farming of animals and production of animal products, for own final use
- 217 Aquaculture, for own final use

All pet care for the respondent's family or household pets should be coded under 36 Pet care. Pet care done for someone other than own household and family members as a favor should be coded

as 511 *Unpaid volunteer household maintenance, management, construction, renovation and repair*.

Pet care includes activities such as "cleaning". This has a sense of "washing" but could also be understood as cleaning up after. If cleaning is related to the health of the animal (such as scooping or picking up the animal's waste, or washing a muddy dog), this should be coded 361 *Daily pet care*. (In the minimum harmonized instrument, pet care corresponds to activity 9.)

If the animal ran into a table and broke a vase, this should be coded 321 *Indoor cleaning*. The dwelling is being cleaned, not the animal. (In the minimum harmonized instrument, it corresponds to activity 5, cleaning the inside or outside of the dwelling; disposal of garbage or recycling, watering plants.) As both codes 321 and 361 are found under the same major division and all activities under this major division are usually aggregated to produce the unpaid domestic work indicator, the impact of classifying the episode under one or the other is minimal.

Having a pet groomed by someone else should be coded as 362 *Using veterinary care or other pet care services (grooming, stabling, holiday or day care).*

Shopping

Shopping over the phone or Internet should be coded under 371 *Shopping for/purchasing of goods and related activities* or 372 *Shopping for/availing of services and related activity*.

Purchasing food for pets should be coded as 371 *Shopping for/purchasing of goods and related activities.*

If the respondent went shopping for other than their own household or family members, then the activity should be coded as volunteering as 512 *Unpaid volunteer shopping/purchasing goods and services*.

Paying for bills should be coded as 351 *Paying household bills*. This activity should not be confused with 229 *Acquiring supplies and disposing of products and other activities related to making and processing goods for own final use*.

Packing or unpacking

Packing or unpacking related to moving should be coded as 359 *Other activities related to household management*.

Paperwork

If paperwork is done for self, children, or other household or family members, it should be coded as 359 *Other activities related to household management*. If the respondent specified that it was done for another adult as help, it should be coded as 423 *Assisting dependent adults with forms, administration, accounts* (for household or family members) or as 514 *Unpaid volunteer care for adults* (for other than household or family members).

Major Division 4 *Unpaid caregiving services for household and family members*

This major division aims to capture activities related to caregiving services for own final use. It excludes unpaid domestic services for households and family members classified under major division 3.

Meetings and arrangements with care service providers

If the meetings and arrangements are for a child, then the activity should be coded as 417 *Meetings and arrangements with schools and childcare service providers*. If they are for a dependent adult, the activity should be coded as 426 *Meetings and arrangements with adult care service providers*.

Box VI.8: Challenges related to coding an activity done with a dependent person

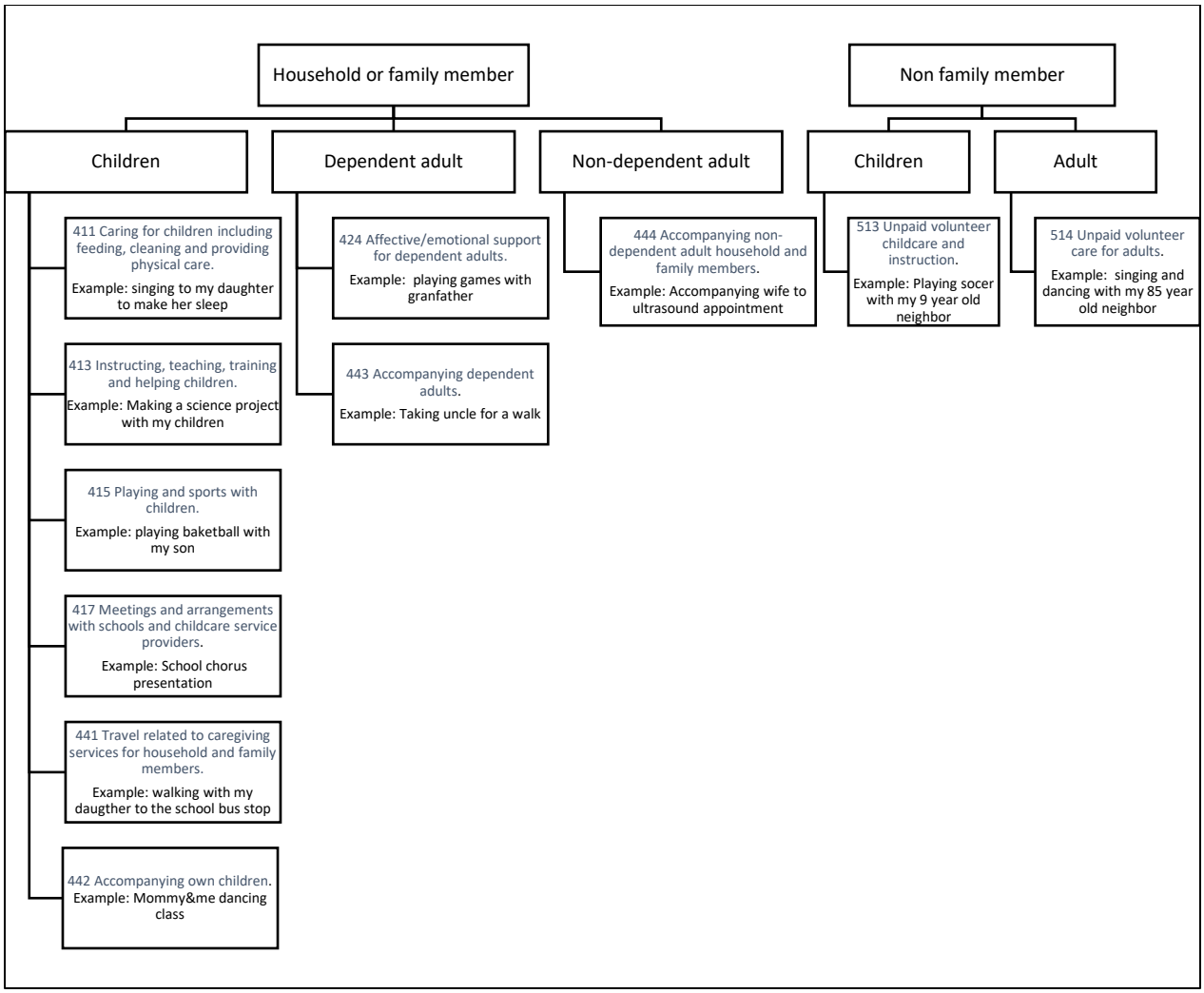
Respondent does a leisure activity, e.g. swimming, watching TV with a dependent person

1. Probe if the activity was for self-enjoyment (codes under major divisions 6,7,8,9) or for the benefit of others (codes under major divisions 4,5). For example:

- If a respondent takes a child to the hairdresser but also received a haircut the same time, then the activity should be coded as 941 *Receiving personal care from others*, however if the haircuts happened one after the other another, then this correspond to two sequential activities that should be coded as 442 *Accompanying own children* for the time where the child receive their hair cut and as 941 *Receiving personal care from others* for the time that the respondent receive their haircut. A similar situation happens if the respondent takes their parents shopping but also shop groceries for own household: then the activity should be coded as 371 *Shopping for/purchasing of goods and related activities*, if the shopping for both the respondent and their parents happens at the same time, or code as *444 accompanying non-dependent adult HH members of family* the portion of time that parents were shopping but the respondent was not.

- If a respondent goes swimming with children and actively participates in the activity, it should be coded 832 *exercising*. If the main activity was watching children swimming, it should be coded 416 *minding children*.

2. Ask "who was with you?" and code according to the response



Major Division 5 ***Unpaid volunteer, trainee and other unpaid work***

This major division aims to capture forms of work that were not captured in previous major divisions, such as volunteer work (unpaid activities done by the respondent for others, the community or institutions), trainee work (to obtain work experience) and other unpaid work (for example, compulsory work).

Any unpaid activity undertaken for others than the respondent's household or family members should be classified to the relevant code under 51 *Unpaid direct volunteering for other households*

or 52 *Unpaid community- and organization-based volunteering*. The distinction between 51 and 52 is how the volunteering was organized, not what the respondent was doing as volunteer work.

Major Division 6 *Learning*

This major division refers to activities related to learning, excluding work education/training/learning and trainee work.

Work-related training/education

Work-related training/education should be coded under 150 *Training and studies in relation to employment*.

Trainee work

If the respondent mentioned that they are "working" without receiving any remuneration, and the intention is to acquire workplace experience or skills, then the activity should be classified as 530 *Unpaid trainee work and related activities*.

Online learning

If a respondent reported activities related to watching videos or online resources, attending virtual classes or lectures (unless these are live or synchronous sessions with the possibility of interactivng with the instructor), reviewing examples, notes, videos, taking examinations **related to distance education and online formal education** as part of their learning activities, these need to be coded 614 *Self-study for distance education course work (video, audio, online)*. This includes formal courses (e.g. an online college degree), non-credit courses on platforms like Coursera, and academic tutorials (e.g. Khan Academy). Watching hobby-related tutorials (such as crafts) on video platforms such as Youtube or Tiktok should be coded as 822 *Hobbies.* Watching video

tutorials for decorating, maintaining or repairing the home or vehicle (e.g. how to repair a washing machine or change oil in a car) should be classified under the correct group within 33 *Do-it-yourself decoration, maintenance and repair*.

Reading for school

If the respondent reported reading for school, the activity should be coded as 620 *Homework, being tutored, course review, research and activities related to formal education*.

Extra-curricular activities

Includes activities such as speech and drama clubs, choir, computer or science clubs, and school publications and should be coded as 612 *Extracurricular activities*. Extra-curricular activities with physical activity or sports-related should be coded as 831 *Participating in sports* or 832 *Exercising*.

Attending school ceremonies including graduation

If the respondent reported attending to their graduation ceremony, the activity should be coded as 690 *Other activities related to learning*.

Hobby courses/lessons

All the courses related to hobbies (such as art or sewing lessons) should be classified as 630 *Additional study, non-formal education and courses*.

Sports and other physical activity courses/lessons

If the respondent reported taking sport lessons or other physical activity courses or lessons, the activity should be coded 831 *Participating in sports* or 832 *Exercising*.

Major Division 7 *Socializing and communication, community participation and religious practice*

Talking with household child (for example, son or daughter)

Talking with a household child should be coded as 414 *Talking with and reading to children*. This should not be coded under 711 *Talking, conversing, chatting*.

Talking to people while having lunch

Talking to people while having lunch should be coded as 711 *Talking, conversing, chatting* or 712 *Socializing, getting together and gathering activities*.

Talking to care service providers

Talking to care service providers should be coded as 417 *Meetings and arrangements with schools and childcare service providers*; or for a dependent adult as 426 *Meetings and arrangements with adult care service providers*; or for one self, *941 Receiving personal care from others* or 942 *Receiving health/medical care from others*.

Chatting on internet/WhatsApp, etc.

Chatting on internet/WhatsApp, etc. should be coded as 711 *Talking, conversing, chatting*. 711 includes face-to-face and virtual activities.

Phone calls

Phone calls should be coded according to the purpose of the call. Social phone calls should be coded as 711 *Talking, conversing, chatting*. If the phone call is related to employment, it should be coded under 1 *Employment and related activities*. If it is related to care, it should be coded under 41 *Childcare and instruction* or 42 *Care for dependent adults*.

Court-related activities

Court related activities, such as jury duty, should be coded as 730 *Involvement in civic and related responsibilities*.

Attending meetings

If the activity is for personal interest, attending meetings should be coded as 712 *Socializing, getting together and gathering activities*. If it is in relation to a volunteer activity, it should be coded to the respective activity under 5 *Unpaid volunteer, trainee and other unpaid work.*

Singing/karaoke/videoke singing

Singing should be coded as 821 *Visual, literary and performing arts (as hobby).*

Reading

Reading for leisure/personal purposes should be coded as 841 *Reading for leisure*.

Reading the bible or other sacred books should normally be coded as 841 *Reading for leisure*. If it is clear that the activity is part of a religious practice, then the activity should be coded as 741 *Private prayer, meditation and other spiritual activities* or 742 *Participating in collective religious practice*.

Listening to an audiobook

Listening to an audiobook or podcast should be coded as 843 *Listening to the radio and audio devices.*

Unpaid performance art activities

Unpaid performance art activities should be coded as 523 *Unpaid volunteer cultural activities, recreation and sports activities*.

Attending weddings

Attending the religious ceremony of a wedding should be coded as 742 *Participating in collective religious practice*. Attending a wedding reception should be coded as 712 *Socializing/getting together/gathering activities*.

Attending funerals and memorial services

Attending funerals and memorial services should be coded as 722 *Participating in community rites/events (non-religious) of weddings, funerals, births and similar rites of passage*.

Meditating

If respondent mentioned meditating, resting, reflecting, relaxing, it should be coded as 850 *Activities associated with reflecting, resting, relaxing*. Religious meditation should be coded under 741 *Private prayer, meditation and other spiritual activities*.

Attending religious lessons (for example, Bible study)

Attending religious lessons should be coded under 630 *Additional study, non-formal education and courses*.

Major Division 8 *Culture, leisure, mass-media and sports practices*

Attending a household or family child performance or event (including sports)

Attending a household or family child performance or event should be coded as 419 *Other activities related to childcare and instruction*.

Watching sports on TV

Watching sports on TV should be coded as 842 *Watching/listening to television and videos*.

Exercising for medical conditions/physical therapy

If exercising is done because of medical condition or physical therapy, it should be coded as 932 *Health/medical care for oneself* or 942 *Receiving health/medical care from others*.

Walking

Walking is considered travel if the intention is to get from one place to another. If the primary purpose is exercising, it should be coded as 832 *Exercising*. Walking the dog should be coded as 361 *Daily pet care*.

Camping

If the respondent reports camping, further information should be asked to obtain all the activities undertaken during camping.

Major Division 9 Self-care and maintenance

The activities under this major division are those required by the individual in relation to biological needs, such as sleeping, eating, etc., including performing own personal and health care and maintenance or receiving this type of care.

Receiving personal or health/medical care from others

If the respondent is the one receiving the personal or health/medical care from others, the activity should be classified under 941 *Receiving personal care from others* or 942 *Receiving health/medical care from others.*

Having a massage

If the respondent is having a massage, the activity should be coded as 941 *Receiving personal care from others.*

Insomnia

Insomnia should be coded under 913 *Sleeplessness*. If respondent mentions meditating, resting, reflecting, relaxing, it should be coded as 850 *Activities associated with reflecting, resting, relaxing*. Religious meditation should be coded under 741 *Private prayer, meditation and other spiritual activities*.

Resting

Resting should be coded as 850 *Activities associated with reflecting, resting, relaxing*. Resting because of illness: should be coded as 932 *Health/medical care to oneself.*

Box VI.9: Quality checklist – Enumeration procedures

- Set targets for the different measures of response (questionnaire response rate, diary return rate, household-level completion; see Box XI.1. Determining and reporting response rates), and monitor these throughout enumeration.
- Consider how to implement sample top-up and deselection to calibrate sample based on observed response rates in the field. This can be more difficult for time-use surveys, depending upon the survey design, for example if diary dates are constrained to a specific week in each month or quarter.
- Consider when enumeration can be discontinued to save costs (if targets met earlier than forecast in particular geographic regions or overall)
- Train interviewers for efficient and consistent collection of data.
- Train interviewers to maintain security and confidentiality.

- Offer different modes to allow preferred response style.
- Offer interviews at a wide range of times of day to suit respondents.
- Design questions to be easily understood and answered by a broad range of respondents. Avoid over-reliance on instructions to explain ambiguous questions or form completion.
- Undertake cognitive testing to identify any aspects of the diary that create particularly high cognitive load.
- Design questions to directly produce data items that meet specific data needs, rather than relying on interpretation during data entry and processing.
- Consider the data entry and processing requirements for the included content, and the impact on timely data dissemination.
- Understand implications of the timing of different aspects of the data collection process, such as the length of the enumeration period, the lag between completion of the questionnaire and the diary, whether and how to allow substitution of diary days for a selected household

VII. Processing of time-use survey data

Data processing begins after data are collected, but *how* it happens depends on earlier decisions, particularly on the data collection modes selected and type of instrument designed. With paper questionnaires, data processing consists of separate steps for coding, data capture, quality assurance, editing, and validation. All of these steps are at least partly incorporated into data collection when using digital tools. This is why digital tools reduce overall survey time, despite requiring a longer lead time.

The purpose of data processing is to turn completed questionnaires into data files to be used for core tabulations and analysis. The efficiency of data processing determines how quickly survey results are available for dissemination and impact on the timeliness of the data.

To develop an efficient data-processing system, NSOs embarking on a time-use survey should involve survey experts, subject-matter specialists, and information technology staff. Strategies for the processing phase need to be established early in survey planning. As a general recommendation, decisions on the processing methodology and technology to be adopted for the time-use survey should take into account the existing data-processing system of the statistical office. This means utilization of both regular processing staff and infrastructure—both hardware and software.

The principal aspects of developing a data-processing strategy for time-use surveys include the following:

Developing tabulation plans early. Tabulation plans specify the variables that need to be edited and coded, variables that must be derived, and logical relationships among these variables. This information is needed for editing and imputation specifications as well as for preparation of the

table formats. Assessing the consistency between the data specifications as they appear in the survey instruments and those required by the analytical tabulations is an important part of questionnaire design.

Determining the basic processing methodology. NSOs must decide how various processing steps will be carried out. They must decide how centralized or decentralized data-processing will be? They must decide whether data editing and coding be done by clerical staff (or manual processing), by computers or some combination. They must decide how detected errors will be handled. They must decide if missing items will be imputed and if so, how.

Developing necessary instructions, manuals and other tools for coding and editing, and other clerical operations. This should be done in parallel with instrument design.

Deciding what technology (hardware and software) will be utilized for processing, estimation and tabulation, and for subsequent data storage, preservation and sharing. This determines how data will be captured or transferred from questionnaires to create computer data files.

Issues related to the processing of household and personal background questionnaires in time-use surveys are similar to those for typical household surveys, and are expected to be resolved following current standards such as those prescribed in United Nations handbooks on surveys and censuses.[42] This *Guide* focuses on the processing of time-use survey questionnaires and diaries.

[42] See for example, United Nations (1984, chap. VI) and United Nations (2001b, chap. IV). For editing and processing common demographic and economic characteristics and coding of occupation and industry, see United Nations (2001a); and Hoffmann (2001).

A. After-coding

Attention to the quality of activity coding is essential for time-use studies. Coding (including developing a coding index and coding rules) is addressed in chapter VI, Enumeration. For paper diaries where data will be entered, or diaries that are after-coded, quality controls should occur before coding and during manual data entry or coding processes. Quality controls after the coding or for digital tools with on-the-fly coding are discussed under Editing.

If paper diaries are used, these need to be entered into the processing system. Decisions need to be made about whether these are checked and edited before data entry or after the data has been entered verbatim into the system. For interviewer-completed diaries, the expectation is that fewer corrections will be required since interviewers are trained to ensure they capture the main activity in sufficient detail and have no missing activities, or missing or illogical contextual responses. Free-text self-complete questionnaires are likely to be more variable in quality. The amount of editing must be balanced in accordance with the available time and staffing resources. The work of data entry staff should be checked to ensure they apply the coding rules as expected.

For more information about after-coding, see Guide to Producing Statistics on Time Use (UN, 2005), paragraphs 449-473.

B. Editing

1. General considerations in editing

Data editing is the application of checks that identify missing, invalid or inconsistent entries in the survey instruments, or that point to data records that are potentially in error. Some of these checks involve logical relationships that follow directly from the concepts and definitions. Others are more empirical in nature or are achieved through conducting statistical tests or procedures (for

example, outlier analysis techniques) or by external consistency checks from previous collections of the same survey or from other sources.

There are three main goals of editing: 1) to tidy up the data, 2) to provide information about the quality of the survey data, and 3) to provide the basis to improve future surveys. Traditionally, the focus of editing has been on cleaning the data and not on the much more useful aim of providing information about the survey process, either to serve as quality measures for the current survey or to suggest improvements for future surveys. In this role, editing can be invaluable in sharpening definitions, improving the activity classification and survey instruments, evaluating the quality of data, and identifying sources of non-sampling error. Control forms are needed for recording queries and for quality assurance later. One special concern in coding and editing of time-use data is documenting editing and coding problems and solutions tried. The information thus obtained is essential in further developing and improving the activity classification or instrument.

2. Edit checks

For electronic instruments, edits can be embedded in the collection instrument with error messages triggered if incorrect or missing information has been detected. Respondents should not be overburdened with too many error messages which may result in them abandoning the survey. Once the electronic diaries have been submitted, automated data checks can be run to ensure the data meets the quality thresholds such as minimum number of hours, activities etc.

a) Completeness

The first edit check is to assess whether the respondents provided sufficient information. Before editing begins, survey managers must decide on a minimum threshold to accept or reject the diary.

Total time. If the rerefernce period is one day, the total time for activities should cover 24 hours,

or 1,440 minutes. Twelve hours is sometimes used as a threshold but other levels are used.

Minimum number of activities. Respondents typically do many activities per day. A minimum number of activities, such as three, should be set. Even if someone is sick in bed all day, they will likely sleep, eat and talk.

A diary or questionnaire that fails to meet the minimum can only be rejected, not edited.

b) Diary-only checks

These edit checks are relevant only to diaries, not stylized questions.

(1) No entries in a particular time slot

Diaries should not contain gaps, or time intervals where there are no activities reported. This means that the ending time of a main activity should be the beginning time of the next main activity. A digital diary can automatically populate the field for start time with the end time of the previous activity to minimize this possibility, while allowing the respondent or interviewer to leave a gap if they actively choose to.

How to edit gaps: A blank time slot may be coded as missing (i.e. "no activity specified") or imputed. Many countries do little or no imputation of activities to avoid biasing the data.

(2) Overlaps

In an open-interval diary, there should be no overlaps in the beginning times of consecutive main activities. Overlapping beginning times of consecutive main activities need to be edited to eliminate the overlap.

How to edit overlaps: The ending time of the previous activity can be adjusted to the beginning time of the next activity.

(3) Omitted activities

Many activities are likely to be omitted from the diaries and thus underestimated. Among these are background activities such as passive childcare, smoking, drinking, eating, and travel.

There are some activities that should obviously have occurred but are not reflected in the diary. For example, it might reasonably be expected that everyone would have at least one episode of sleeping, of eating or of a personal care activity each day.

How to edit omitted activities: Editing omitted activities needs clear rules; it should not be left to the editor's interpretation. NSOs should have clearly-defined editing procedures and document the process. An editing procedure for not reporting night sleep used in the 1997 Time Use Survey of Australia is represented by box VII.1 below.

Box VII.1: Editing procedure for not reporting night sleep used in the 1997 Australian Time Use Survey

Are all times accounted for?

- *Yes: Do the activities in the diary seem reasonable (for example, studying all night for an exam) or is there an explanatory comment by the interviewer?*
    - *Yes: Accept the recorded activities.*
    - *No: Flag as missing (for resolution by supervisor).*
- *No: If there is any indication of going to bed, or getting up, then code a sleep episode.*

Source: Australian Bureau of Statistics, 1997a

In its 2022 survey, Australia did almost no imputation.

(4) Essential intermediate step missing

Respondents may report a sequence of activities for which there may be a logical gap because of a missing activity that should have followed or preceded another.

How to edit missing steps: Sometimes it is possible to impute based on other variables. For example, the respondent reports that she prepared a meal but does not report that she ate. Or a respondent may report "reading a book" and then "took medication" with a substantial gap in time until the next entry. In the past, it may have been assumed that the respondent continued to read after taking medication. If location changes between two subsequent activities, it is likely that a period of travel took place in between and travel may have been added. However, strict rules should be followed here. Adding time to activities based on assumptions can cause bias. NSO should avoid assumptions that might introduce bias. More recently, NSO will usually add a "not stated activity" rather than make assumptions.

(5) Multiple entries

Descriptions of activities reported by respondents may actually be not a single activity but several activities, especially when giving free text answers. Examples of such activities are travelling, socializing or entertainment that involves going to a venue, visiting or receiving visitors for more than a few hours. Sometimes respondent report as simultaneous activities that are sequential. With fixed-interval diaries, longer intervals may lead to more errors of this nature.

How to edit multiple activities: It is necessary to decide whether to code the activities as simultaneous or sequential.. Depending how time is allocated between simultaneous activities, this decision may make more or less difference: less if time is divided equally between simultaneous activities; more if one simultaneous activity is assigned as primary and the other as secondary.

This is a difficult scenario as it requires substantive expert knowledge to interpret. Would the activities be classified to different parts of ICATUS? The NSO should have clear rules on how to allocate time to multiple activities and if the decision is to treat this as simultaneous, on the criteria for selecting which one is primary.

(6) Contextual information

Episodes may be missing answers in the activity, location, or other contextual variables included in the diary.

How to edit missing contextual information: Sometimes it will be possible to impute some variables. Cooking is likely to occur at home, childcare is likely in the presence of own children, travel on a return trip may be the same as on the outward trip. Other times, the variable may be coded as missing.

(7) Simultaneous activities

A respondent may be engaged in an activity for a long interval of time but will not report this consistently in the diary. For example, childcare/child minding may take place throughout the whole day while the respondent is engaged in various other specific activities; the other activities might be reported as they occur, but childcare would only be reported sporadically in the diary. It is important to be careful with assumptions here as it depends on context. It is difficult or impossible to provide generic guidance. Chapter I.B Simultaneous activities discusses some considerations.

c) Stylized questions-only checks

These edit checks are relevant only to stylized questions, not diaries.

(1) Total time

When using a stylized questionnaire, interviewer checks or automated calculation should ensure the total number of hours reported does not go (much) over 24 daily hours or 168 weekly hours when excluding simultaneous activities such as supervisory care. In interview-administered surveys, interviewers should do their best to assist the respondent in reconstructing the day to get more accurate estimates of time, without creating an undue burden.

If activity categories are exhaustive, the total time should not be (much) less than 24 hours per day or 168 hours per week. If activity categories are not exhaustive, the total time accounted for may be less; survey managers should decide on an appropriate minimum amount of time.

How to edit total time that is too high or low: Rather than rejecting all questionnaires that are not exactly 24 or 168 hours, the survey should set a threshold, or a margin of time above or below that is acceptable. Chile is currently studying the idea of adopting a maximum of 48 hours per day, including simultaneous activities. See Table XI.2. Threshold for complete diary or stylized questionnaire for other country examples.

(2) Omitted activities

A questionnaire that fails to meet the minimum threshold of activites can only be rejected, not edited.

C. Imputation

Imputation is the process used to resolve the problem of missing or invalid information and inconsistent responses identified during editing. Imputation is then used to handle remaining edit

failures at the processing stage, since it is desirable to produce a complete and consistent file containing imputed data. The general principles for imputing missing or invalid survey data are outlined in the 2005 *Guide to Producing Time-use Statistics*.

In general, standard imputation specifications and quality indicators for evaluating missing, invalid and inconsistent time-use data need to be specified. Two important quality issues related to imputation are:

- Which variables should be imputed in the time-use survey?

Imputation should be used with caution to avoid introducing bias into the data. Australia used imputation more extensively in the past but have moved away from imputation. For their 2021 survey, they only imputed a very small number of variables like sleep. They made sure it was clear in survey outputs that results were based on what people reported. The American Time Use Survey imputes background demographic and labor force variables but does not impute missing time-diary data with the exception of minor editing of location codes. Missing time-diary data are coded as "Refused" or "Don't Know/Can't Remember". Interviews are dropped from the sample if too much time is uncoded. (See Table XI.2 in chapter I Ensuring quality of time-use data and surveys, for the thresholds the US and other countries use to determine whether a diary is sufficiently complete.)

- Is there enough information to use for imputing the missing information?

Choosing an appropriate imputation methodology is important, as some methods of imputation do not preserve the relationships between variables or can distort underlying distributions. For example, if location has changed and travel time was not included, to impute travel will require

decisions about how much travel to impute and which activity either side of the location change will have a decrease in time.

The imputation procedures may be automated or computerized, manual or a combination of both. Implementing automated imputation methods can improve accessibility and reduce processing costs. Regardless, imputation will add extra time to the data processing stage.

All imputations should be flagged.

D. Data preparation and management

1. Preparation of analysis files

    a) File formats for time data

Individual and household background information is organized into data files much as with any household survey. The household-level file contains all data items from the household questionnaire and the estimation weights corresponding to the household level. The person-level file contains the items from the individual questionnaire and the estimation weights. If there is only one individual per household, all background information may be in one file. If there are multiple individuals per household, there may be a single household file and multiple individual files.

Time data is organized into data files in different ways, depending on the format in which it was collected.

Stylized questions yield one set of values per person-day. These can be organized into a **person-day file**, where each row or record corresponds to a person-day, with a duration variable for each activity, and a person-day estimation weight. This kind of data file would have as many records as

person-days. If time data is collected for only one day per respondent, time and background data can go into the same record.

Fixed-interval diary data may also be organized into a person-day file, with variables for each time interval, and a diary-day weight. If the interval is 15 minutes, each row or record is a person-day with 96 main activity variables, 96 secondary activity variables, 96 location variables, etc. It is easy to sum across these variables to create a duration variable for each activity, much like the stylized question file. An alternative is to use start and end times to create an episode file.

Open-interval diary data is organized into an **episode file**, where each row or record corresponds to an episode. The episode record includes the start and end times of the episode and the items that delineate an episode—the main, secondary and other activities and context variables—as well as the diary day weights. This type of data file would have as many records as there are episodes, with a varying number of records for each diary day and for each respondent.

Table VII.1. Extract from list of episode file variables from GSS 2015 on Time Use and *Table VII.2. Extract from the episode file from the 2015 ESG PUMF on Time* Use show an example of variable names and definitions, and an extract from the episode file from Statistics Canada's 2015 General Social Survey on time use. In this survey, respondents were asked where they were, who they were with, if they were doing something else at the same time, and if they were using technology at the same time, for each activity of 10 minutes or longer. For two random episodes, respondents were also asked about their subjective well-being level during the activity. The reference day is the assigned day of the week.

Table VII.1. Extract from list of episode file variables from GSS 2015 on Time Use

Variables	Definition
TUI_01	Activity code of the episode
TUI_06A to TUI_06J	Indicates who the respondent was with during the activity mentioned at TUI_01 (up to 10 people)
TUI_03A and TUI_03B	First and second simultaneous activities (max of two)
TUI_07	Indicates whether or not technology was used during the activity mentioned at TUI_01
TUI_10	Level of subjective well-being at the activity mentioned in TUI_01 (asked for only two activities in the day)
DURATION	Duration, in minutes, of the episode (derived from the variables STARTIME, ENDTIME, STARTMIN and ENDMIN)
LOCATION	Location where the activity took place
DDAY	Diary- reference day
WGHT_EPI	Weight of episode mentioned at TUI_01
PUMFID	Record identification number (not related to the episode)

Table VII.2. Extract from the episode file from the 2015 ESG PUMF on Time Use

PUMFID	TUI_01	DURATION	LOCATION	TUI_06A	TUI_06B	TUI_06C	TUI_06D	TUI_06E	TUI_06F	TUI_06G	TUI_06H	TUI_06I	TUI_06J
10000	1	120	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	6	60	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	60	30	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	1	180	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	7	10	Travel - Car (Driver)	Yes	No	No	No	No	No	No	No	No	No
10000	7	80	Travel - Car (Driver)	Yes	No	No	No	No	No	No	No	No	No
10000	7	15	Travel - Car (Passenger)	No	No	No	No	No	No	No	Yes	No	No
10000	6	60	Restaurant, bar or club	No	No	No	No	No	No	No	Yes	No	No
10000	7	45	Travel - Car (Passenger)	No	No	No	No	No	No	No	Yes	No	No
10000	60	120	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	21	120	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	2	30	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	5	60	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	50	30	Outdoors	Yes	No	No	No	No	No	No	No	No	No
10000	60	150	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	50	20	Outdoors	Yes	No	No	No	No	No	No	No	No	No
10000	60	100	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	1	210	At home or on property	Yes	No	No	No	No	No	No	No	No	No

b) Analysis files

As with other hierarchical household surveys, data files with the individual and household background information will need to be merged with time data in order to conduct analyses by population subgroups. The type of analysis determines the type of data file needed.

For most analyses—such as calculating the average time or participation rate for activities for specific subpopulations (see Section IX. Survey Outputs)—the person-day is the unit of interest. Stylized questions and some diaries will already be organized into a person-day file. For other diaries, it may be necessary to derive variables from the episode file to merge into the person-day file. The Statistics Canada document "How to use data on Time Use in the General Social Survey" (Vézina, 2019) on the hub gives an example of how to derive variables for total duration and number of episode for an activity category from the episode file to merge into the "main" or person-day file. This creates variables summing the duration of each of the activities (DURXX) and counting the number of episodes of each activity (EPIXX), as showing in the extract below. The example includes SAS and Stata code.

Table VII.3. Extract from the main file from the 2015 GSS PUMF on Time Use

PUMFID	DUR01	DUR02	DUR05	DUR06	DUR07	DUR21	DUR50	DUR60
10000	510	30	60	120	150	120	50	400

PUMFID	EPI01	EPI02	EPI05	EPI06	EPI07	EPI21	EPI50	EPI60
10000	3	1	1	2	4	1	2	4

DUR01 is the duration of activity 1 and EPI01 is the number of episodes of activity 1. In this example, the respondent had 3 episodes of activity 1, for a combined total of 510 minutes. They had one episode totaling 30 minutes of activity 2, and 4 episodes totaling 400 minutes of activity 60.

In the person-day file, diary data is no more complex to analyse than data from stylized questions, but it provides the opportunity to analyze not just averages but also daily rhythm, and create interesting visualizations depicting sequence and timing, as described in chapters IX Preparation of survey outputs and X Dissemination of time-use data.

Many analyses can be done with either the person-day file or the episode file (after merging in person-level variables). Others—analysing a combination episode attributes, such as where the respondent was when they were working or what else they were doing while watching television—can be done only from an episode file.

Other file structures may be appropriate, depending on the goal of the analysis. Combining person-level characteristics with the episode file is necessary to compare, for example, who between men and women spent more time doing a specific activity in the presence of children, or whether men or women have more interruptions to do other things when working from home. If data is collected

from multiple household members with the aim of examining intra-household dynamics, it will be necessary to create a household-level analysis file.

One of the ultimate goals of data processing is the preparation of the planned tabulations for the survey. For this purpose, careful preparation of specifications is required for each proposed table. Among other things, the specifications must spell out the codes or values of each analysis variable and classification variable in the table, the data file to be processed, and the location of the information in the data file. A useful tool is the "table format" or a "dummy" table that spells out the specifications. The processing system should also be set up so that the statistical office is able to prepare special tabulations to meet emerging needs for data analysis.

Box VII.2: Quality checklist - Processing

- Create a clear set of rules and principles to be used when editing and cleaning diary data and ensure that the implications of these are understood. For example, determine to what extent the editing principles will prioritise completeness or internal consistency of a diary, versus maintaining the data as reported. When imputation is necessary, flag the data.
- Consider level of detail to be achieved in data entry and minimise this where possible.
- Consider different options for data entry and coding, the resources required for each, and the effect on data quality, (such as manual coding/amendments, at time of data entry or partially automated through statistical programming, pre-coded forms, machine learning).

- Consider cost of proposed data editing actions compared with the value added to the dataset.
- Consider whether there are statistically significant impacts of proposed data amendments.
- For any manual data entry, coding or editing, implement a quality assurance process.
- Ensure security and integrity of data integration and processing system, such as physical security of forms, and how to ensure data is not overwritten.
- Review data quality of responses and identify gaps in data collected to determine whether it will meet needs. For example, to what extent the data will be able to be used without editing or amendment, or whether certain diary fields have more missing data than others.
- Determine criteria for inclusion of diaries in the final dataset, based on required level of quality. For example, consider the number of activities reported per day, or the number of hours for which data is missing.
- Validate data through each processing step.
- Validate linkage between questionnaire and diary data.
- Plan processing tasks for efficiency, to minimise impact on data release timetable.
- Consider file structure and how to set up datasets that are as easy as possible to use (such as combining data items across different levels of the dataset).

VIII. Weighting and estimation for time-use surveys

A. Issues in weighting and estimating of time-use statistics

After the survey data are collected and edited, estimation weights are attached to respondent records to produce the estimates of the population. The estimation process accounts for sampling by creating weights that are the inverse of the probability of selection (base weights). In most household surveys, a base weight is a measure of the approximate number of people that the sampled person represents, because most household surveys have a sample population of persons. Time-use surveys sample person-days, not people. (See chapter V, Sample designs for time use surveys, for a discussion.) Since the unit sampled is a person-day, each person-day has its own base weight.

These base weights are then adjusted to account for sampled units that do not respond (non-response adjusted weights) and may be further adjusted to make the estimates consistent with known population totals, such as the number of persons in the country, by age and sex. For time-diary surveys, the weights should add up to the number of person-days and should be adjusted to ensure correct day-of-week representation. Incorporating weights to account for sampling over time is a unique feature of time-use surveys.

In the discussion that follows, it is assumed that a probability sample of households, and possibly persons within those households, has been selected using a multi-stage sample design. First the sample of households is selected. Within a household, either all eligible persons are included or a sample of household members is selected. The time use of the sampled persons is measured for a limited period of time, usually one or two days or a week during the year. How days are sampled will affect how weighting is done. If particular days of the week are over- or under-sampled, the weights will need to account for this.

For person-day analysis, such as is needed to produce estimates for accounts of household production, SNA or satellite accounts, the proportion of time spent on paid work, or the proportion of time spent by women on childcare, a single weight for each interview is all that is needed. For other units of analysis, multiple weights might be needed. For example, if multiple members of the same household were surveyed, separate weights would be developed for person-level and household-level analysis.

A major issue in the estimation scheme for a time-use survey is the treatment of the time dimension. Since every estimation procedure is heavily dependent on the sample design, the way the sample treats the time dimension should be reflected in the weighting scheme. For example, if the design calls for a sample of weekdays and a sample of weekend days, then the estimation scheme should account for this explicitly. If weights are properly designed, then weighting should be straightforward.

Weighting methods are best understood when the structure of the data file and terms (such as a respondent or a record in the file) are defined clearly. In time-use surveys in which a person is sampled for one time period, one data record suffices for both the person and the time period. The situation is more complex when persons are sampled for more than one time period. A person sampled and responding for two days would have two records on the data file. Each record would have one estimation weight, but the weights might not be the same. More than one weight may be necessary if statistics for more than one unit of analysis (for example, person-days, persons, households) are computed from the survey.

The ability to create weights that produce approximately unbiased estimates of population characteristics requires careful coordination between the survey's operations and analysis teams . For weighting, the probabilities of selection must be tracked for every record so that the data

needed may be properly captured and associated with the data records. Similarly, non-response adjustments require that data from the sampling frame or another source be linked to all the records. For post-stratification type of adjustments, care in the design of the data-collection instrument is essential so that the survey and the source of the data for the post-stratification are consistent. The link between the operations and the statistical methods is essential to making any survey successful.

B. Imputation versus non-response adjustments

As with other surveys, there are several types of non-response in time-use surveys. Weighting is the best method for adjusting for **unit or person non-response**, whereas imputation is the best method for adjusting for **item non-response**. (See C. Imputation, in chapter IX, Processing time-use data, above, for more about imputation.) The complexity for time-use surveys is when some but not all selected household members provide data, or the selected individuals provide data for some days and not others. **Weighting, not imputation,** should be used in these situations.

Imagine a case where two people in a selected household are asked to report on one weekend and one weekday. One person provides data for both days, but the other only for the weekday.

Weighting is the recommended approach for handling the **missing diary day**. Imputing the missing day by filling it in with the reported data from the same person may appear attractive, since the data "donor" and "recipient" certainly match on the key variables that would be used to define imputation classes. But this sort of imputation has two problems. First, it is equivalent to doubling the weight of the reported time period. More importantly, since the missing period is a weekend day and the reported period is a weekday, simply imputing the missing period will

provide very misleading information, likely including more paid work and less unpaid work or leisure. A better procedure might be to create weighting classes that distribute the weight for the missing time period more smoothly over a group of records that have the same characteristics.

The same issues arise when **multiple persons are sampled within a household and one does not respond**. The approach of imputing the missing data using donors from the same household is problematic, as their activities may be complementary. For example, if one parent spends a lot of time in caring for the children, it is likely that the other parents will spend less time providing care. Weighting is a better way of dealing with person non-response than imputing.

C. Weighting

1. Base weights

In time-use surveys, the base weight is a measure of the approximate number of person-days that the sampled person-day represents, The standard procedure for producing base weights in a household sample survey is to constitute the weight as the inverse of the probability of selection of the unit. In multi-stage samples, the weights are created at each stage and then multiplied to produce an overall weight for a sampled unit.

As an example, suppose that a sample of PSUs is selected, that within the sampled PSUs a sample of households is selected, and that within the sampled households a sample of persons is selected. The overall person weight is the product of three terms, with each term being the inverse of the probability of selection at the respective stage. The weight for a sampled person is

$$w_{(hi)j} = w_h \cdot w_{hi} \cdot w_{hij} \qquad (1)$$

where w_h is the inverse of the probability of selecting PSU *h*, w_{hi} is the inverse of the probability of selecting household *i* within PSU *h*, and w_{hij} is the probability of selecting person *j* from household *i* in PSU *h*.

For example, if PSU *h* is sampled with a probability proportional to size that is equal to 0.10, then its weight is $w_h = 10$. Suppose further that within PSU *h*, 50 households are listed and 4 are selected. The weight for any of these sampled households in the PSU, w_{hi}, is 12.5 (= 50 divided by 4). If every eligible person in the household is sampled, then $w_{hij} = 1$. In this case, the overall weight, $w_{(hi)j} = 125$ (=10 x 12.5 x 1). If, on the other hand, only one person is sampled per household, and household *i* has three persons, then $w_{hij} = 3$ for sampled person *j*. More generally, if every eligible person in the household has the same probability of selection, then w_{hij} is the number of eligible persons in the household divided by the number of persons sampled.

The weight given in equation (1) is the typical household survey weight, but it does not explicitly deal with the time dimension. In a time-use survey, this weight would be sufficient if data for the sampled person were collected for the entire time period of the survey. An additional weighting factor must be introduced to account for the sampling of time periods. In general, the time weighting factor, w_{hijk}, is the number of eligible time units in the period divided by the number of these units for which the person is sampled. The overall weight for estimating person/days (or any other unit of time) is

$$w_{(hij)k} = w_h \cdot w_{hi} \cdot w_{hij} \cdot w_{hijk} \qquad (2)$$

This formulation of the time-dimension weight allows time periods to be sampled using different selection criteria. For example, if one weekday and one weekend day are sampled for a person,

then the two periods have different weights. The appropriate weight, w_{hijk}, for a weekday would be the number of weekdays in the year, while the corresponding weight for the weekend day, w_{hijk}, would be the number of weekend days in the year. Each record on the person/day data file would have the single weight that is appropriate for that day.

This formulation also allows for variations in the number of sampled time periods for sampled individuals. For example, since w_{hijk} is specific to the sampled person, it accommodates designs in which some persons are sampled for one day, others for two days, and yet others for a full week.

The basic weight given in equation (2) is appropriate for producing person/day estimates. For household estimates, the same process could be followed, eliminating, however, the factor associated with sampling persons within a household.

2. Non-response adjustments

The weight given in equation (2) assumes that complete data are collected for every sampled unit at each stage. While this is clearly the ideal situation, unit non-response is almost always encountered in practice. For example, a sampled household is not contacted or refuses to participate in the survey and as a result no time-use data are collected for that particular household. A variety of adjustment methods exist to offset for the losses due to non-response[43] but only weighting class adjustments are discussed here. Weighting class adjustments are relatively easy to implement and are effective for handling unit non-response.

[43] There are many articles on adjusting for non-response in sample surveys. Elliot (1991) supplies a very readable introduction to the topic. Bailar, Bailey and Corby (1978), Chapman, Bailey, and Kasprzyk (1986), and Tremblay (1986) cover practical methods of non-response adjustment with emphasis on weighting class adjustment methods.

a) Weighting class adjustments

The first step in forming weighting class adjustments is forming groups or classes of sampled units that are expected to be similar with respect to their probability of responding to the survey or with respect to other key variables in the survey. To do this, the variables used to form the classes must be known for all sampled units, not just the responding ones. The second step is to divide the ratio of the sum of the weights of the sampled units by the sum of the weights of the responding units in each class. If all the units in the class have the same weight, the ratio is just the ratio of the number of sampled units to the number of responding units. The ratio is the non-response adjustment factor that is applied to all the responding units in the class. The non-responding units are either assigned a zero weight or simply dropped from the analysis file.

For example, suppose some households did not respond to the time-use survey and the non-response adjustment classes are regions of the country ($r = 1, 2, \ldots, R$). Equation (2) should be modified by multiplying w_{hi}, the weight of selecting household i within PSU h, by the appropriate regional non-response adjustment factor given by

$$NR_{hh,r} = \frac{\sum_{i \in r} w_{hi}}{\sum_{i \in r} w_{hi}\delta_i} \qquad (3)$$

where the sum is over all the sampled households in region r and δ_i is equal to one if the unit responds and to zero otherwise. The numerator of the adjustment factor is the sum of the weights for the records in a specific region (r). The denominator is the sum of the weights over the same set of records, but only the weights for respondents are included in the summation. The same procedure can be used at each stage of weighting to account for unit non-response at that stage. The base weight for that stage is replaced by the product of the base weight and the non-response

adjustment. The result is still an overall weight like equation (2), but the weights are the non-response adjusted weights at each stage and only the records for the respondents are included in the analysis file.

b) Issues in the development of non-response adjustments

In the development of non-response adjustments, several issues deserve special attention. One issue is the number of respondents in each class; the number should be large enough so that the adjustment factor is stable. A common choice is a minimum of 20 to 30 respondents in each class, although classes with more respondents are recommended. Another consideration is the size of the non-response adjustment. A useful rule of thumb is that the non-response adjustment for a class should not exceed two times the overall average adjustment. Classes may be combined or redefined to avoid these two situations. The choice of variable to be used in forming the classes is another key decision. Often, only a few variables are known for both respondents and non-respondents so the choice is very limited. For example, it may not be possible to go beyond classes that separate units into urban and rural cases. When many variables are available, more sophisticated methods such as search algorithms or logistic regression analysis might be used to identify the classes.[44]

The typical time-use survey design asks the sampled person to complete a basic questionnaire and to record time use for sampled time slots (often a full day) in a diary or some other data-collection instrument. Given this design, there is the risk that some persons may respond to the basic questionnaire but not complete the time-use diary. A weighting class adjustment of w_{hij} for the missing time-use data has the potential to substantially reduce non-response bias in this case.

[44] Brick, J. M., & Kalton, G. (1996). Handling missing data in survey research. *Statistical methods in medical research, 5*(3), 215-238 describe some of these options.

Substantial bias reduction is possible if data from the basic questionnaire has variables highly correlated with time use that can be used to form the weighting classes. When many variables are available, the investigation of the most important ones by use of a search algorithm or similar technique as outlined earlier may be profitable.

Non-response adjustment classes, designed to compensate for persons who are sampled for multiple time units (for example, days) but respond only for some of these days, are an important case. One option is to form weekday and weekend day classes so that the adjustments are separate for these classes. An extension of this option might be to form classes by day of the week and season of the year, if the sample sizes in each of the classes are sufficient. If substitute days are allowed in the survey, then these substitutes should be treated as if they were observed values in the weighting so as to avoid overadjustment for the missed periods.

D. Generating estimates of time use

In the present section, a simplified illustration of how the weighting and estimation procedures discussed above can be utilized in the analysis of time-use survey data is presented. In the discussion that follows, assume that the estimation methods outlined earlier have been implemented and an analysis file that contains the items collected in the survey, imputed as needed, along with the adjusted survey weights and the data needed for computing variances are included in the file. For purposes of estimating time use using data collected on reported time periods, the analysis file should be constructed so that each time period corresponds to a record on the file.[45]

[45] A detailed discussion of file structures is covered in chapter VII.D Data preparation and management.

1. Estimation at the person/day level

For ease of presentation, the fully adjusted weight for person *j* and time period *k* is written as w'_{jk}— the subscripts for PSU and household are suppressed. It is also assumed that each sample time period is of a fixed duration, say, one day, for illustration. With this structure, survey estimates can similarly be produced in most common sample designs.

Estimation of totals

Estimates of totals for the entire population or for subgroups of the population are easily produced from a file with the structure described above. For example, the total time spent by all eligible persons working for pay may be estimated as:

$$\hat{y} = \sum_{j,k} w'_{jk} y_{jk} \qquad (7)$$

where y_{jk} is equal to hours per day person *j* spent working for pay. The total (y-hat) is then equal to the total number of hours spent in the activity.

An estimate of a total for a subgroup, say the total time spent by all eligible persons working for pay in region *r* of the country, is:

$$\hat{y}_r = \sum_{j,k} w'_{jk} y_{jk} \delta_j \quad \text{(region = r)} \qquad (8)$$

where

$$\delta_j(\text{region} = r) = \begin{cases} 1, \text{if person } j \text{ lives in region } r \\ 0, \text{otherwise} \end{cases}$$

2. Estimation of means, proportions and ratios

Given the file structure described above, estimates of means, proportions and ratios can also be easily developed with a file of this structure. Continuing the previous example, an estimate of the mean time spent working for pay by eligible persons in region *r* is given by

$$\hat{\bar{y}} = \frac{\sum_{j,k} w'_{jk} y_{jk} \delta_j (region = r)}{\sum_{j,k} w'_{jk} \delta_j (region = r)} \qquad (9)$$

This statistic is also an estimate of the proportion of time spent working for pay by persons in region *r*. It is valuable to remember that a proportion is a special case of estimating a mean. In fact, a mean is a special case of estimating a more general ratio in most multi-stage samples. An example is the ratio of the mean time spent by men working for pay to the mean time spent by women working for pay in region *r*. An estimate of the ratio is given by

$$\hat{q}_r = \frac{\dfrac{\sum_{j,k} w'_{jk} y_{jk} \delta_j (region = r) \delta_j (male)}{\sum_{j,k} w'_{jk} \delta_j (region = r) \delta_j (male)}}{\dfrac{\sum_{j,k} w'_{jk} y_{jk} \delta_j (region = r) \delta_j (female)}{\sum_{j,k} w'_{jk} \delta_j (region = r) \delta_j (female)}} \qquad (10)$$

When estimating means, proportions and ratios, the effect of missing item responses is not as simple as with estimates of totals. For example, consider estimating the mean time spent working for pay by eligible persons in region *r* where y_{jk} is the proportion of all the *reported* time slot data. This estimate of the mean may be either an overestimate or an underestimate. If the missing time slot data are imputed with good predictors as the imputation class variables, then the

bias due to the item non-response may be smaller than if the data were left missing. The same issues arise with other estimates of proportions and ratios.

3. Estimation at the person and household levels

In time-use surveys with both a basic questionnaire and a diary, it is not uncommon to produce estimates of both persons and person/days. The description above relates to person/days but can easily be transformed to apply to estimates of characteristics of persons by using data from the basic questionnaire, and a *person* weight, rather than a person-day weight. The analysis file in this case should contain one record for each responding person with the adjusted person weight, irrespective of the number of time periods the person reports. The same procedure also applies for household-level estimates if a household-level file and weight are created.

For example, an estimate of the total number of persons who work for pay in region *r* of the country is

$$\hat{t}_r = \sum w_j'' \delta_j(region = r)\delta_j(\text{work for pay}) \quad (11)$$

where w_j'' is the adjusted weight for person *j* (not person-day) and

$$\delta_j(\text{work for pay}) = \begin{cases} 1, & \text{if person } j \text{ works for pay} \\ 0, & \text{otherwise} \end{cases}$$

Confusion occurs in some analyses when data are collected at multiple levels, such as household, person and time period. The problem occurs when analysts try to characterize an entire unit using data reported from a subset. For example, it is clearly incorrect to state that the household has no persons who are female because only the sampled person is male. The same problem occurs if estimates of the percentage of persons who engage in some category of time use are characterized

by virtue of an activity they performed on a specific day. In other words, it is incorrect to state that a sampled woman does not spend any time caring for children just because she did not report this activity for the sampled day. An appropriate analysis for this should be at the unit of analysis for which the data are collected. In this case, the statistic should be at the person/day level and the estimate is the percentage of time women spend in childcare.

To avoid this type of problem, it is suggested that only the weight that is appropriate at a certain level of analysis be included. Therefore, only a person/day weight would be included in the analysis file that contains the data for each sampled day. Another file with a person weight could be developed for estimating person-level characteristics. This suggestion also helps to eliminate the confusion that sometimes occurs when a data file has more than one weight.

Box VIII.1: Quality checklist - Weighting and estimation

- Design weighting strategy to most accurately create estimates based on time use data (in particular, to ensure the days of the week are weighted proportionally) and data requirements.
- Consider whether there are statistically significant impacts of proposed data amendments.
- If more than one collection mode has been used, check for mode effects (noting that detecting any statistically significant difference requires independent samples for each mode).
- If more than one collection mode has been used, consider if these will be treated separately during weighting.

IX. Preparation of survey outputs

A. Key survey outputs

Information collected from the time-use survey is organized and summarized in comprehensive statistical tables as the first survey outputs. These tables describe people's activities during the course of the 24 hours of a day or sometimes a week: which activities they participate in and for how long, disaggregated by a few basic variables such as sex, age and location. Typically, estimates are expressed as functions of population totals, for example: total number of hours spent on an activity; proportion of persons participating in an activity (participants); average number of hours spent on an activity by participants; proportion of time spent on an activity per day. While stylized questions permit reporting on total time and participation, data from diaries make it also possible to present information on timing and sequence of each episode of the activity as well as activity-related contextual variables. In addition to tables, visualizations help analysts to understand the data. Visualizations are discussed in chapter XI, Dissemination, as they are generally used to communicate results to others, but they can be helpful at an earlier stage to identify trends to explore further.

Specifications for the statistical tables can be described in terms of **analysis variables** (for example, activity, location, other context variables), **classification variables** (for example, sex, age) and **key statistics** (for example, total time spent by the population on an activity). The choice of variables and statistics as well as the level of detail depends on the analytical objectives of the survey. Such analysis may be at the household level, person level or person-day level.

This section discusses key statistics needed for most general types of analyses on how people spend their time, then suggests a basic tabulation plan for generating these statistics.

1. Key time-use statistics

The basic units of analysis of these time-use measures are the activity and the episode. Key indicators should be disaggregated by sex and age group at least, as well as location and any other variables considered important in the national context if the sample size permits (i.e. those domains considered important at the sampling stage). Indicators should specify the temporal unit. While they most often refer to an "average" day, they may also refer to an average weekday, average weekend day or average week. For some activities (for example related to agriculture), they may even refer to a season, quarter or a year.

All time-use surveys, whether using full or light diaries or stylized questions, should provide data to calculate the following key indicators on activities:

Participation rate is calculated as the percentage of the population who reported doing the activity**.** A participant in an activity is a person who has reported as least one occurrence of the activity on their reference period.

$$Participation\ rate = \frac{Number\ of\ persons\ who\ reported\ doing\ the\ activity}{Number\ of\ people\ in\ (sub)population}$$

Average time spent on activities by participants is obtained by dividing the estimated total time per reference period spent on the activity by the total number of persons who reported this activity.

$$Average\ time\ among\ participants = \frac{\sum time\ spent\ on\ activity\ by\ total\ (sub)population}{Number\ of\ persons\ who\ reported\ doing\ the\ activity}$$

Average time spent on activities by total (sub)population is computed by dividing the estimated total time per reference period spent on the activity by the total number of persons in a given (sub)population.

$$Average\ time\ = \frac{\sum time\ spent\ on\ activity\ by\ total\ (sub)population}{Number\ of\ people\ in\ (sub)population}$$

Differences among groups or over time may be due to a difference (or change) in the proportion of those participating in the specific activity or a difference (or change) in the amount of time spent by participants, or both.

In addition, diary-based surveys can report on episode characteristics and activity-related contextual variables. Key episode indicators are:

Average duration of an episode, calculated by dividing the the estimated total time per reference period spent on a specified activity by the total number of episodes of activity

$$Average\ duration\ of\ episode\ = \frac{\sum time\ spent\ on\ activity\ by\ total\ (sub)population}{Number\ of\ episodes\ of\ the\ activity}$$

Average number of episodes is computed by dividing the total number of episodes of a specified activity by the total number of persons in a given (sub)population.

$$Average\ number\ of\ episodes\ = \frac{\sum episodes\ of\ the\ activity}{Number\ of\ people\ in\ (sub)population}$$

Average number of episodes among participants is obtained by dividing the total number of episodes of a specified activity by the total number of persons who reported this activity.

$$Average\ number\ of\ episodes\ among\ participants = \frac{\sum episodes\ of\ the\ activity}{Number\ of\ persons\ who\ reported\ doing\ the\ activity}$$

These indicators are calculated using an episode datafile. The number and length of episodes provides information on time pressure and the extent to which time is fragmented. This is important from a gender perspective, as women typically have more fragmented time than men. Research the US and Belgium reports that fragmented leisure time can be perceived as lower quality (Mullens and Glorieux, 2020; Mattingly and Bianchi, 2003).

The above measures are essentially means or proportions taken over either the entire survey (sub)population, or over only a subset of the (sub)population who engaged in the specified activity (participants). The total number in the survey population remains constant while the total number of participants changes depending on the activity.

Table IX.1. Six key time-use measures highlights the differences in the resulting statistics by presenting the measures in terms of their numerators and denominators. Indicators should be calculated using the appropriate weights. See chapter VIII.C Weighting for more details.

Table IX.1. Six key time-use measures

Denominator	**Numerator**		
	Total duration of activity	Total number of episodes of activity	Total number of persons performing activity
Total number of persons (population)	**Average time** $\frac{\text{duration}}{\text{all persons}}$	**Average number of episodes** $\frac{\text{episodes}}{\text{all persons}}$	**Participation rate** $\frac{\text{doers}}{\text{all persons}}$
Total number of persons performing activity (participants)	**Average time among participants** $\frac{\text{duration}}{\text{doers}}$	**Average episodes among participants** $\frac{\text{episodes}}{\text{doers}}$	NA
Total number of episodes of activity	**Average duration of episode** $\frac{\text{duration}}{\text{episodes}}$	NA	NA

Source: Based on *Guide to Producing Statistics on Time Use* (UN, 2005)

Figure IX. from Statistics Belgium's 2013 time-use survey shows how these time-use measures may appear in an analysis table. In this figure, 14% of the population studied or went to school (the participation rate for education) on weekdays. Those who studied spent an average of 6 hours doing so (average time among participants), while the average among the whole population was only 50 minutes (average time). A table like this can be produced from a very light diary, or

aggregated from a diary with more categories. A more detailed summary table of the same data before it was aggregated can be downloaded as an Excel file at https://statbel.fgov.be/en/themes/households/time-use-survey#figures

Figure IX.1. Summary table from Statistics Belgium 2013 survey

Day of the week	Weekdays			Saturday			Sunday		
	Duration per respondent (h/day)	Duration per participant (h/day)	Participation rate	Duration per respondent (h/day)	Duration per participant (h/day)	Participation rate	Duration per respondent (h/day)	Duration per participant (h/day)	Participation rate
Paid work	02:44	07:21	37.2 %	00:47	06:06	12.8 %	00:25	04:53	8.5 %
Household work	02:29	02:53	86.0 %	03:01	03:25	88.3 %	02:18	02:42	85.1 %
Childcare and raising children	00:22	01:32	23.6 %	00:20	01:47	18.8 %	00:21	01:45	19.6 %
Personal care	02:23	02:23	100.0 %	02:38	02:38	100.0 %	02:35	02:35	100.0 %
Sleep and rest	08:48	08:48	100.0 %	09:14	09:14	100.0 %	10:08	10:08	100.0 %
Education	00:50	06:02	13.6 %	00:18	03:46	7.8 %	00:18	03:25	8.6 %
Social participation	01:15	01:47	69.4 %	02:02	02:38	77.1 %	01:53	02:24	78.8 %
Free time	03:46	03:58	94.9 %	04:21	04:37	94.3 %	04:59	05:09	96.9 %
Transportation	01:18	01:29	87.4 %	01:15	01:28	84.4 %	00:59	01:20	74.5 %
Other	00:05	00:39	12.4 %	00:05	00:45	11.2 %	00:05	00:39	12.0 %

Daily rhythm of the population can be presented in a table, with a column for each time increment. (See, for example, a table on Percent of the population engaging in selected activities by time of day from the American Time Use Survey 2021.) However, information on the daily rhythm of the population is usually presented in graphs. Some examples are in section C, Visualizations, below.

Internationally-agreed indicators

The international community has agreed on a set of indicators to monitor progress toward sustainable development and gender equality. Three internationally agreed indicators based on time use are described below.

SDG Indicator 5.4.1: Proportion of time spent on unpaid domestic and care work.

This indicator is defined as the proportion of time spent in a day on unpaid domestic and care work by men and women. Unpaid domestic and care work refers to activities related to the provision of services for own final use by household members, or by family members living in other households. These activities are listed in ICATUS 2016 under the major divisions "3. Unpaid domestic services for household and family members" and "4. Unpaid caregiving services for household and family members". The proportion of time spent on unpaid domestic and care work is calculated by dividing the daily average number of hours spent on unpaid domestic and care work by 24 hours.

$$SDG\ Indicator\ 5.4.1 = \frac{daily\ number\ of\ hours\ spent\ on\ unpaid\ domestic\ work\ +\ daily\ number\ of\ hours\ spent\ on\ unpaid\ care\ work}{24} * 100$$

where

$$daily\ number\ of\ hours\ spent\ on\ unpaid\ domestic\ work = \frac{Total\ number\ of\ daily\ hours\ spent\ by\ the\ population\ on\ activites\ under\ ICATUS\ 3}{Total\ population\ (regardless\ of\ whether\ they\ participated\ in\ the\ activity)}$$

$$daily\ number\ of\ hours\ spent\ on\ unpaid\ care\ work = \frac{Total\ number\ of\ daily\ hours\ spent\ by\ the\ population\ on\ activities\ under\ ICATUS\ 4}{Total\ population\ (regardless\ of\ whether\ they\ participated\ in\ the\ activity)}$$

If the reference period of the survey is a week, a daily average is obtained by dividing the weekly average by seven, without differentiating between weekdays and weekends.

SDG Indicator 5.4.1 includes unpaid work for household members and for family members who do not live in the household, as described in the metadata file. This would include, for example,

care for elderly parents living on their own. ICATUS major divisions 3 and 4 include both household and non-household family members. Some activity classifications, such as CAUTAL, do not include non-household family members in unpaid care work (under CAUTAL major division 3). If this is the case, SDG indicator 5.4.1 will be underestimated if unpaid care work performed for family members living in other households is not included. For this reason, it is recommended that countries not using ICATUS take care to include all unpaid care and domestic work for household and family members when computing SDG indicator 5.4.1.

For countries using the MHI, activities 4-12 are to be included in the computation of SDG indicator 5.4.1. To ensure international comparability and alignment with ICATUS, contextual variables as well as previous and next episode should be used to capture travel related to unpaid domestic and care work activities, and this time should be included in the estimate of SDG indicator 5.4.1.

Table IX. 2: Activities to be included in computation of SDG indicator 5.4.1

#	Activity	Type of work
4	Preparing and serving food and meals for own household	Unpaid domestic work
5	Cleaning own or family dwelling	
6	Maintaining and making small repairs in own or family dwelling	
7	Cleaning and care of clothing and footwear of own household or family members	
8	Managing own household	

9	Taking care of pet of own household or family	
10	Shopping for own household or family	
11	Taking care of own (household or family) child (use country definition of child)	Unpaid care work
12	Taking care of or helping adults (own household or family) (use country definition of adult)	
24	Travel	Use contextual variables as well as previous and next episode to capture travel related to unpaid domestic and care work activities

Complementary to indicator SDG 5.4.1, the **average number of hours spent on unpaid domestic and care work, by sex, age and location** is reported as part of the Minimum Set of Gender Indicators (Indicator I.1). This indicator is expressed in daily hours and calculated as

$$average\ number\ of\ hours\ spent\ on\ unpaid\ domestic\ and\ care\ work = \frac{Total\ number\ of\ daily\ hours\ spent\ by\ the\ population\ on\ unpaid\ domestic\ and\ care\ work\ activities}{Total\ population\ (regardless\ of\ whether\ they\ participated\ in\ the\ activity)}$$

For more information on the rationale for reporting this indicator, please see Metadata Page - Indicator I.1 | Gender Data Hub (arcgis.com)

Average number of hours spent on total work (paid and unpaid).

This indicator is defined as the time spent in a day on paid and unpaid work by women and men for the production of goods and services for own final use or for the use of others. It includes all activities inside the SNA general production boundary.

Paid work refers to employment and related activities classified under ICATUS divisions "11. Employment in corporations, government and non-profit institutions", "12. Employment in household enterprises to produce goods", "13. Employment in households and household enterprises to provide services", "14. Ancillary activities and breaks related to employment", "15. Training and studies in relation to employment", "17. Setting up a business" and employment-related travel. (Employment-related travel is travel that is part of doing work, such as making deliveries or driving a bus, but it excludes commuting to and from the place of employment.)

Unpaid work includes activities classified under ICATUS major divisions "2. Production of goods for own final use", "3. Unpaid domestic services for household and family members", "4. Unpaid caregiving services for household and family members" and "5. Unpaid volunteer, trainee and other unpaid work". See the Gender Data Hub for metadata information on Indicator I.2.

$$Total\ work$$

$$= \frac{\begin{array}{c} total\ hours\ \ spent\ on\ employment\ and\ related\ activities\ (ICATUS\ 11,12,13,14,15\ and\ 17) \\ +\ total\ hours\ \ spent\ on\ employment\ related\ travel\ (ICATUS\ 181) \\ +\ \ total\ hours\ \ spent\ on\ production\ of\ \ goods\ for\ own\ final\ use\ (ICATUS\ 2) \\ +\ total\ hours\ \ spent\ on\ unpaid\ domestic\ work\ (ICATUS\ 3) \\ +total\ hours\ \ spent\ on\ unpaid\ care\ work\ (ICATUS\ 4) \\ +total\ hours\ \ spent\ on\ unpaid\ volunteer, trainee\ and\ other\ unpaid\ work\ (ICATUS\ 5) \end{array}}{Total\ population\ (regardless\ of\ whether\ they\ participated\ in\ the\ activity)}$$

Data on the Minimum Set of Gender Indicators can be found on the UNSD Gender Data Hub

For concrete examples on how to compute time-use indicators, see the hub. Chapter 6 of Harnessing Time-Use Data for Evidence-based Policy (ESCAP, 2021) works through an example of calculating participation rates and average time on activities using Stata. The presentation slides "How to use data on Time Use in the GSS" (Vézina, 2019) in the hub work through an example of how these indicators can be calculated using SAS and Statistics Canada data.

Box IX.1: Indicators on supervisory care

Data on supervisory care can help inform a variety of gender transformative actions and policies. in particular, those targeting gender equality and women's economic empowerment; work-life balance policies, and regulatory frameworks and policies on care. Data on unpaid supervisory care can play an important role in improving the measurement of unpaid household service work for the production of extended accounts to the SNA. Shedding light on supervisory care constraints can complement evidence on labour underutilization of women's workers and inform policies and actions aimed at enabling women's workers to fully participate in employment. Data on supervisory care may support advocacy efforts on regulatory frameworks on parental leave. Furthermore, the implementation of policies and programs to provide care services (for children, older population, and people with disabilities) require a full understanding of supervisory care constraints.

The EG-TUS Sub-Committee on Supervisory Care recommends the generation of the following indicators to disseminate relevant data on supervisory care:

1. **Supervisory care participation rate**: proportion of individuals who spent any amount of time in a day on supervisory care over the total population, disaggregated by sex, age groups, location;
2. **Average time spent on supervisory care by total population** in a day, by sex, age groups and location.
3. **Average time spent on supervisory care by participant** population in a day disaggregated by sex, age groups and location. This indicator is expected to better illustrate gender gaps in the provision of supervisory care as the denominator for its computation is the number of

individuals who did provided supervisory care (in any amount of time) in the reference period (and does not include those who did not provide any supervisory care services).

As stressed in Box II.4, the computation of the above-mentioned indicators include only the time spent on activities under ICATUS Group 416 and Group 425 and do not include time spent on other activities falling under Major Division 4: Unpaid caregiving services for household and family members. It is also recommended to exclude the time when the respondent is engaged in activities falling under Division 91: Sleep and related activities.

Upon availability of resources and when feasible to present data on simultaneity, National Statistical Offices are also encouraged to disseminate data on supervisory care, disaggregated also by type of primary activity using ICATUS major Divisions (except for Major Division 4: *Unpaid caregiving services for household and family member*s).

2. Basic tabulation plan for analysing time-use data

a) Specifications for analysis and classification variables

Basic tables for analysis are specified in terms of: (a) analysis variables, (b) classification variables and (c) time-use measures.

The key analysis variable is, of course, the activity. Most standard statistical reports on time-use present tables on time spent in main activities. It is recommended that time-use surveys ask about simultaneous activities. How to present these in tables is addressed briefly below.

Context variables may be analyzed in combination with duration and activity (for example, leisure time spent using ICT, or work time spent in presence of children), or only with duration (time spent in the house).

Classification variables are used for defining the domains of study. These variables may be at the person level or at the household or family level. Relevant classification variables are those that define subgroups that are expected to differ substantially with regard to their use of time, and those that are highly relevant in the policy issues under study. As most time-use studies are designed to inform policies on gender inequalities on labour division, sex is an obvious classification variable. Age groupings s should constitute basic domains of study. Other classification variables should also be considered, as long as the sample size allows, especially to provide evidence of the situation of those that have historically been excluded from statistics. See the section on variance estimation, below, for guidance on when standard errors are considered too large for estimates to be considered reliable. Which characteristics to use as classification variables should be considered when deciding which background variables to collect. (See section IID, Background variables.)

The Minimum Harmonized Instrument recommends collecting the classification variables of age, sex, marital status, education level, current school attendance, current employment and labor force status of respondents, and residence (urban/rural), household composition and household income.

Time use is known to vary across the life cycle. Populations should be divided into age groups that make sense for the survey objectives, the country context and the variable in question. Five-year age groups may be appropriate, or broader age groups. Depending on the country context and sample size, tables might report broad groups such as youth (15-24), prime working years (25-64) and elderly (65+). However, for analyses concerned specifically with issues of ageing, this

grouping can be further subdivided into 60-69 (representing a relatively active and self-sufficient period) and 70+ (representing the onset of disability, greater ill health and smaller incomes).

b) Table specifications

It is useful to distinguish three types of tables: working tables, simultaneous activity tables and thematic tables.

Working tables

Working tables are the core tabulations from which various analytical tables may be derived. These tables report the duration or proportion of time spent in each category of a comprehensive list of activities. Duration can be expressed in terms of total time or average time.

Figure IX. from the 2021 American Time Use Survey illustrates the format of a core working table with main activity as the analysis variable. Working tables should utilize the most detailed level of the activity classification. The tables should show both the time-use measure and the number of persons in the population (for population-based tables) or the number of participants (for participant-based tables). Published tables of aggregate statistics may be derived by aggregating time-use measures in terms of higher levels of the activity classification.

Figure IX.2. Extract from Table A-1. Time spent in detailed primary activities and percent of the civilian population engaging in each activity, averages per day by sex, 2021 annual averages

Table A-1. Time spent in detailed primary activities and percent of the civilian population engaging in each activity, averages per day by sex, 2021 annual averages

Activity	Average hours per day, civilian population			Average percent engaged in the activity per day			Average hours per day for persons who engaged in the activity		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total, all activities	24.00	24.00	24.00	100.0	100.0	100.0	–	–	–
Personal care activities	9.70	9.51	9.88	99.9	99.9	100.0	9.71	9.52	9.88
Sleeping[1]	8.95	8.86	9.04	99.9	99.9	99.9	8.96	8.87	9.04
Grooming	0.65	0.56	0.74	78.1	75.3	80.7	0.83	0.74	0.92
Health-related self care	0.08	0.06	0.09	7.1	6.3	7.8	1.06	1.03	1.09
Personal activities	0.01	0.01	–[2]	0.3	0.3	0.3	2.78	4.01	1.48
Travel related to personal care	0.01	0.02	0.01	1.8	1.9	1.7	0.76	0.81	0.70
Eating and drinking	1.19	1.20	1.17	97.0	96.9	97.1	1.22	1.24	1.20
Eating and drinking	1.11	1.12	1.09	97.0	96.9	97.1	1.14	1.16	1.12
Travel related to eating and drinking	0.08	0.08	0.08	14.1	15.0	13.2	0.55	0.52	0.58
Household activities	1.95	1.54	2.33	78.9	71.1	86.2	2.47	2.16	2.70
Housework	0.58	0.30	0.84	35.6	21.4	49.1	1.62	1.38	1.71
Interior cleaning	0.35	0.20	0.49	23.8	14.0	33.0	1.48	1.46	1.48
Laundry	0.17	0.08	0.27	15.5	6.6	23.9	1.12	1.15	1.11
Storing interior household items, including food	0.02	0.01	0.03	6.5	4.7	8.3	0.34	0.31	0.35
Food preparation and cleanup	0.64	0.42	0.86	61.9	50.8	72.4	1.04	0.82	1.19
Food and drink preparation	0.50	0.34	0.65	58.4	47.8	68.3	0.85	0.71	0.95
Kitchen and food cleanup	0.14	0.07	0.20	23.9	14.3	33.0	0.59	0.52	0.62
Lawn and garden care	0.20	0.27	0.14	10.1	11.3	9.0	2.02	2.38	1.60
Household management	0.14	0.11	0.17	17.9	15.1	20.6	0.79	0.74	0.83
Financial management	0.03	0.03	0.04	2.9	2.7	3.2	1.10	1.01	1.18
Household and personal organization and planning	0.11	0.08	0.13	15.1	12.1	17.9	0.71	0.68	0.74
Interior maintenance, repair, and decoration	0.07	0.09	0.05	3.1	3.4	2.8	2.27	2.77	1.70
Exterior maintenance, repair, and decoration	0.05	0.08	0.03	2.6	3.5	1.8	1.98	2.26	1.48
Animals and pets	0.15	0.13	0.17	19.7	16.4	22.8	0.77	0.82	0.74
Care for animals and pets, not veterinary care	0.07	0.06	0.08	14.2	11.2	17.0	0.52	0.55	0.49
Walking, exercising, and playing with animals	0.08	0.07	0.08	9.2	8.4	9.9	0.85	0.85	0.85
Vehicles	0.04	0.07	0.01	2.3	3.6	1.0	1.65	1.91	0.82
Appliances, tools, and toys	0.02	0.02	0.01	1.4	1.8	1.1	1.12	1.34	0.80
Travel related to household activities	0.05	0.04	0.05	7.8	6.8	8.6	0.60	0.60	0.59
Purchasing goods and services	0.68	0.57	0.78	40.5	37.1	43.7	1.68	1.55	1.79
Consumer goods purchases	0.32	0.25	0.38	36.6	33.7	39.4	0.87	0.75	0.96
Grocery shopping	0.10	0.08	0.12	12.5	10.6	14.2	0.80	0.74	0.84
Professional and personal care services	0.09	0.06	0.11	7.5	5.9	8.9	1.16	1.07	1.22
Financial services and banking	0.01	–[2]	0.01	1.7	1.5	1.9	0.31	0.29	0.33
Medical and care services	0.06	0.05	0.07	4.2	3.1	5.3	1.37	1.50	1.30

See footnotes at end of table.

1

[1]Includes naps and spells of sleeplessness.

2 Estimate is approximately zero.

3 Estimate is suppressed because it does not meet the American Time Use Survey publication standards.

- Not applicable.

Source: American Time Use Survey, Bureau of Labor Statistics (available at https://www.bls.gov/tus/tables.htm)

A series of tabulations with this basic format can be generated for various classification variables, both person and household, including demographic and employment characteristics. Working tables using other analysis variables (for example, context variables) can also be produced using

this basic format. In such tables, categories of the context or other analysis variables replace the activity list.

Simultaneous activities

Countries traditionally create a set of tables for primary activities and then a separate set of tables for secondary activities. Primary activities should add up to 24 hours and secondary activities to something less, though there is no expected value. Including only primary activities in the main tables ensures that a day does not exceed 24 hours but neglects activities that are often considered secondary, such as unpaid care. It may be preferable to present tables of total time that encompass both primary and secondary activities, but time needs to be allocated to the activities in some way to prevent a day from exceeding 24 hours. There is no clear best practice on how to allocate time between simultaneous activities that fits all situations (United Nations, 2022a, Annex 5). Therefore, this guide presents the most common alternatives. Diary data is discussed first, followed by stylized questions.

One option is to **assign a single activity as primary**. It is possible for interviewers to ask respondents to clarify which they consider their primary activity, but for self-administered diaries, researchers can only assume that the first listed activity is the primary one for the respondent. Choosing to present only time spent on the primary activity leads to underestimating activities that are usually done in conjunction with others like the time spent on unpaid work, particularly supervisory care. Stylized questions can specify whether they refer to time spent as a main activity or a secondary activity, but need to make sure respondents understand.

Alternatively, analysts can develop their own system for assigning priority. It is necessary to develop clear, explicit rules and apply them consistently. This introduces potential bias into the

analysis, as what the NSO deems more important may not be what the respondent considers more important or is spending more energy on.

Another option is to **divide the time equally** between activities. This is computationally simple and reduces the effect of leaving out all secondary activities, but it still biases time spent on secondary activities downward, artificially diminishing gender gaps in unpaid work.

It is possible to **create compound activities**, such as "cooking while caring for children". Besides potentially creating many new categories, this approach may be problematic if the activities cross major division boundaries.

Table IX.3. Most common combination of two simultaneous activities, South Africa

1st activity	2nd activity	Number of 30-minute time slots	% of 2 simultaneous activities
Watch TV	Socialise with family	9,327	16.0
Eat and drink	Watch TV	7,427	12.8
Eat and drink	Socialise with friends	2,904	5.0
Eat and drink	Socialise with family	2,576	4.4
Cooking	Eat and drink	1,988	3.4
Watch TV	Socialise with friends	1,882	3.2
Cooking	Watch TV	1,807	3.1
Cleaning	Listen to radio	1,350	2.3
Cooking	Listen to radio	1,257	2.2
Socialise with family	Listen to radio	1,159	2.0
Socialise with friends	Listen to radio	1,090	1.9
Cooking	Socialise with family	1,085	1.9
Eat and drink	Listen to radio	1,015	1.7

Source: Statistics South Africa (2013). A Survey of Time Use, 2010

A final possibility that is not often used is to **assign a weight** to the time spent on each activity. Box 7 on page 146 of the 2005 *Guide to Producing Time-use Statistics* provides an example of how to weight according to the amount of time spent in those activities as sole (not simultaneous) activities.

As each approach has its limitations, it is important to consider which will best meet the objectives of a particular analysis. For example, an analysis focused on education might consider "studying" to be the primary activity, even if it occurred while commuting to work on the train. An analysis of the same data for transportation policies might prioritize commuting. A study of care would consider care activities primary. Although this approach is fine for certain analyses, it is not appropriate for describing the full array of activities a population engages in. To describe the full array of activities, NSOs may wish to create tables with compound activities. Tables and all dissemination materials should clearly state what composite indicators consist of and explain all methodological choices so that users are aware of the limitations.

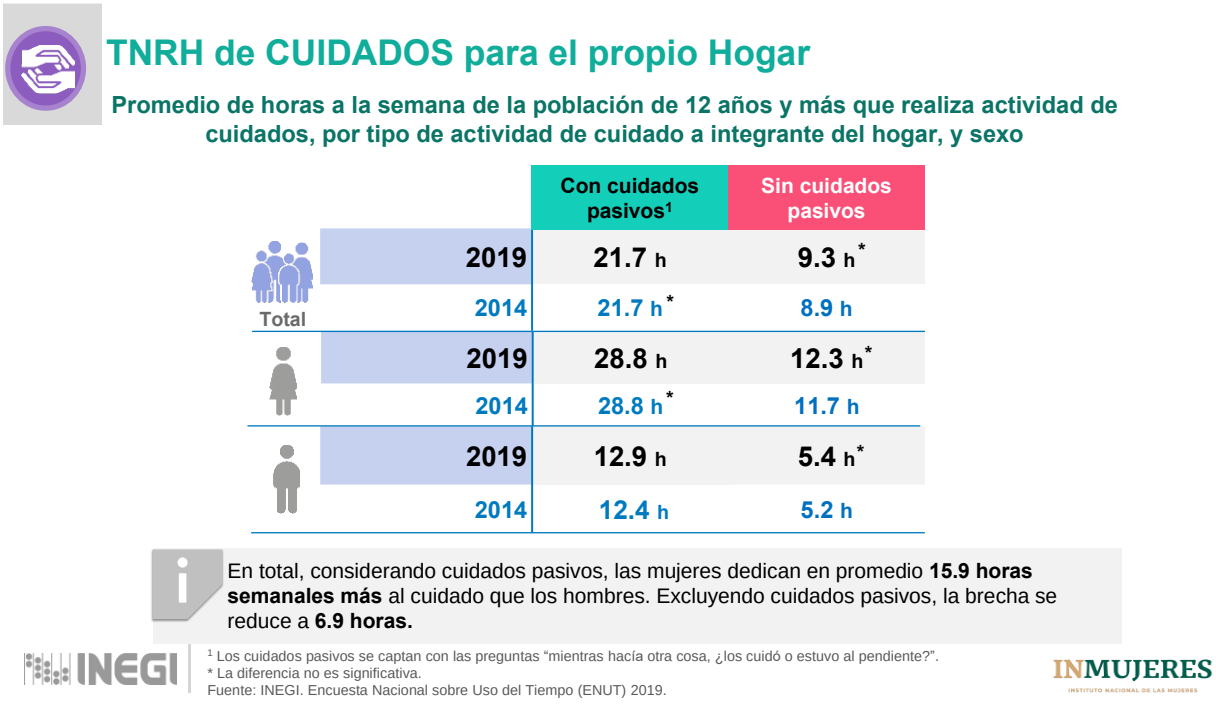
Stylized questions can ask about time spent on activity X "while you were doing something else", but unless they ask about specific pairings of activities, it is not possible to know what the other activity was. One option is to present tables reporting primary activities and also a couple of relevant activities (i.e. relevant for the objective of the study) that were done at the same time as the primary activity.

Survey results disseminated should always clearly state methodological choices so users are aware of the limitations.

Thematic tables

Thematic tables focus on specific activities of interest such as SNA work, unpaid housework, childcare, travelling, waiting time etc. A thematic table on childcare would sum time spent in childcare activities by adding time spent doing childcare as a sole activity as well as time spent doing childcare in combination with any other activities. Figure IX., below, shows a thematic table for care. It displays the amount of unpaid care work considering only the primary activity (red column on the right) and also including supervisory care (green column on the left). Data shows that women spent 16.5 hours per week doing on supervisory care. Showing only the figure on the right would greatly diminish the amount of childcare Mexican women provide.

Figure IX.3 Average hours per week population 12 years and older provide care, by type of care activity, by sex, in Mexico



Source: [Encuesta Nacional sobre el Uso del Tiempo (ENUT) 2019. Presentación de resultados](inegi.org.mx) (inegi.org.mx)

B. Computation of sampling variances

Whether estimates are computed for a sample, it is also important to estimate the precision or variance of the estimates. Time-use surveys are very similar to most other national household surveys with respect to variance estimation. The literature on variance estimation for these types of surveys is considerable, and each NSO will already have preferred methods for estimating sampling variances.

Sampling error is a measure of how much the estimate from a sample may deviate from the population quantity. It is the square root of the variance of the estimate and is used to form confidence intervals that provide practical bounds for the likely range within which the population characteristic is likely to fall. In simple random samples, the sampling error of a mean or total decreases with the square root of the sample size. With the more complex designs and estimates, this simple relationship between size of the sample and the sampling error does not hold. Sample design features such as deviations from equal probabilities of selection and clustering typically cause the sampling errors to be larger than they would be in simple random samples. Time-use surveys differ from most household surveys in that their sampling approach is even more complex that most multi-stage sampling designs, as discussed in chapter V Sample designs for time-use surveys. The complexity of time-use sample designs also makes it more difficult to compute sampling errors analytically and increases the need for generalized variance estimation techniques as well as the use of specialized variance estimation software. The 2005 Guide covers variance estimation methods of linearization and replication, as well as generalized variances (modelling design effects and rel-variances).

C. Statistical estimation software

NSOs use several different statistical estimation software packages. The most common are R, SAS, Stata and SPSS. Some offices use one package for processing data and merging files, such as SAS, and then conduct analysis in another package, such as R or Stata.

Of these packages, R is the only one that is open source. Using open-source software can reduce costs and free the NSO from having to maintain expensive licenses in the future. It can also facilitate sharing code and promote replication. However, it is important to use the software that NSO analysts are proficient in and have access to. When used correctly, all of these packages can produce the necessary estimates and the variance of the estimates.

Time-use surveys have complex sampling designs in order to balance days of the week as well as account for selection of individuals at the household level, as discussed in chapter V Sample designs for time-use surveys. All software for variance estimation requires that key data about the sample design are included in the analysis file. Otherwise, variance estimates will not be reliable.

An issue to keep in mind when working with imputed data is that the variance of the estimates derived from these packages will treat the imputed data as if they were real observations. The effect is to underestimate the variance of the estimate. The bias tends to be larger when more data are imputed. This is another reason to ensure that the data collected are as complete as possible.

Box IX.2: Quality checklist – Survey outputs

- Undertake relevant analysis to meet key data needs.
- Develop dissemination products with key data needs in mind. For example, how users can most easily derive common requirements such as average time spent on each activity.
- Consider design of outputs for ease of use (e.g. using appropriate units of measure)
- Validate data using comparable data sources (e.g. previous time-use survey, other time-use surveys internationally, other survey or administrative data sources).
- If more than one collection mode has been used, check for mode effects (noting that detecting any statistically significant difference requires independent samples for each mode).
- Include description of methodology as part of outputs.
- If comparisons with previous iterations are planned, make sure all aspects are comparable and where they are not. Report these in outputs.

Part Four. Review and dissemination of time-use data

X. Dissemination of time-use data

While dissemination occurs at the end of the time-use statistics production cycle, it should be planned for from the beginning. Dissemination should be linked to the survey objectives and users' needs. For time-use statistics to feed into evidence-based policies, they must be disseminated at the right point in the policy cycle. Even the best data will not be used if they are not available at the right time. This is particularly important to consider if a time-use survey is only conducted every five to ten years.

Another reason to plan for dissemination early is to ensure that all necessary variables are collected, and that the sampling approach allows the resulting data to meet users' needs. It is not possible to go back at the end to add an important variable—to disaggregate results, or to ensure an adequate sample of a particular sub-population. When the design team is determining the scope and coverage of the survey (covered in chapter II Scope and coverage of time-use data), they should be considering who will use the results and how. This analysis should inform how the results will be disseminated.

As part of planning for its 2017 National Time Use Survey, Costa Rica's National Institute of Statistics and Censuses (INEC) convened three separate groups of stakeholders to discuss their needs. The technical group consisted of representatives of INEC, the National Institute of Women, and the Central Bank of Costa Rica (the agency responsible for calculating satellite accounts for unpaid domestic and care work). The institutional group included members from government ministries such as Labor, Health, and Planning, as well as international organizations such as UNDP. The research group included members from universities and regional and international statistical agencies. The technical group worked together to plan and carry out the survey, but the

institutional and research groups were also key users of the data. By including them in the planning stage of the survey, INEC was able to ensure that the survey would meet their needs. These needs led to INEC including more extensive disaggregation (by planning region and vulnerable populations) than in previous surveys, questions on remote education and telework, attempting to measure time poverty, and maintaining a consistent design to enable comparison to previous surveys.

A. Dissemination products

Users and their information needs should determine the most appropriate modes, format and content for dissemination. A basic set of tables, a user guide summarizing methodology, and a comprehensive report covering the methodology and all variables are standard and can serve as a long-term reference. But they are not enough to ensure that time-use statistics collected will be utilized to their fullest and will feed into policy. Communications specialists can help segment users and guide an audience analysis to determine what each segment needs to know and how best to communicate it. Some key questions that should be considered in an audience analysis are presented in Box X.1.

Box X.1. Audience analysis and targeted dissemination

1. Who is your target audience?

   Divide your audience into segments. Be as specific as possible in describing each segment so you can tailor what and how you communicate. “Policymakers”, “researchers”, and “the general public” are very broad categories. For example, what

kind of policies do your policymakers make: Care? Family leave? Education? Urban development? At what level?

2. What do they want to know? What do they care most about?

   The best way to find out what users care about is to engage them in dialogue from an early stage in the research process. This helps ensure that necessary data is collected and that it is communicated in time to support decision-making.

3. What is their level of expertise?

   - What do they already know about the topic? The audience's level of knowledge and awareness of the topic should guide how simple or technical your communication can be. Gender specialists may already understand the implications of time spent on unpaid work, whereas economists in the Ministry of Finance might need you the pathways explained.

   - How well do they understand time-use statistics? To help those who are less familiar, express findings in a meaningful way, such as how much unpaid work men and women do on an average day. When describing differences, be careful not to perpetuate gender or other stereotypes.

4. How do they like to receive information?

   Policymakers will want to receive main results and their implications for specific policies written in clear, concise language. Academic researchers specializing in time use will want to do their own analysis, often using microdata. They will want detailed methodological information, metadata and other information. Researchers in other

disciplines (e.g. economics, sociology, gender studies) who don't specialize in time use might find data in tables sufficient, but will still want a user guide or methodological information. Visualizations, infographics and human interest stories can be effective ways to communicate to the public, who may be interested in the topic more superficially and only want to spend a short time on it.

5. In what order do they need the information?

   In general, concentrate on communicating the 2-4 most important points. For most audiences, use an "inverted pyramid" style with most important results first. This is the opposite of how researchers and analysts typically communicate.

6. Why will they read what you write?

   Early engagement with potential users followed by targeted dissemination means that statistical products respond to the specific demands of different audiences. Decisionmakers will have greater trust in information from an NSO known for producing quality statistics in a timely manner. The general public responds to engaging headlines and compelling stories but must this is also subjected to the level of trust and credibility in official statistics in the country.

7. How will you make them aware that you have data to share?

   Just putting a report or microdata on the website, or issuing a press release, is not enough. NSOs increasingly use social media as well as traditional media to share stories and generate interest in data. Existing relationships and regular

communication with users and with the media facilitates sharing of dissemination products.

The structure of this box is adapted from University of North Carolina at Chapel Hill Writing Center Tools and Tips: Audience. More detailed guidance on dissemination of gender statistics can be found at Gender Statistics Training Curriculum (UN Women and the Statistical Institute for Asia and the Pacific, 2020) and Making Data Meaningful (UNECE, 2009) available in English, Chinese, Croation, Italian, Russian and Spanish.

Policymakers working on issues related to unpaid work need information in a different format than statisticians and researchers. Voluntary National Reviews (VNR) for the SDGs might contain a few specific time-use indicators. In Latin America and the Caribbean, government policymakers and advocates use time-use statistics as part of the project documents to promote care systems. Colombia released an annex containing tables of care indicators from the 2016-17 and 2020-21 surveys separately from their basic indicators for this purpose[46]. Government policymakers and advocates using the findings for this purpose will want the most relevant data analyzed and presented clearly, beginning with the most important results, whereas academic researchers exploring intra-household tradeoffs in care might prefer to access the microdata and conduct their own analysis.

[46] The indicators can also be downloaded in Excel format under "Anexo especial: Indicadores sobre el cuidado" at https://www.dane.gov.co/index.php/estadisticas-por-tema/pobreza-y-condiciones-de-vida/encuesta-nacional-del-uso-del-tiempo-enut

Box X.2. Example of targeted dissemination products - Morocco

Morocco's dissemination strategy encompasses a range of products and activities designed to reach specific audiences. Most of the products are available on their gender data platform

For specialists and researchers

- Data: tables, graphs
- Analytical reports: reports, notes, executive summaries, in-depth analysis
- Methodological materials : questionnaires, diaries, classifications, glossaries, etc..
- Anonymized microdata

For public users

- Interactive data simulators
- Infographics (see below)

Other products or activities

- Events: seminars or webinars, radio/TV debates and interviews
- Thematic notes timed to coincide with gender-thematic days or special events (e.g. Ramadan, International/African/National women's days.)
- Statistical one-stop-shop (guichet statistic) of the HCP

1. Basic outputs

As a first step in dissemination, survey results should be shared in the form of **basic tables,** a **methodological summary** that includes information on the quality review, and a **narrative summary** that highlights a limited set of key findings, using clear, non-technical language and

graphs. This will enable timely release of the results and allow the NSO to call attention to the most important findings. Later a full report and a user guide describing the methodology in detail should be prepared, but these can take time. Dissemination does not need to wait for these.

As described in chapter IX Preparation of survey outputs, key survey outputs include a set of tables for the time-use variables (activities, contextual variables) and the composite indicators, disaggregated at least by sex and age group. Tables are typically shared as downloadable files in a spreadsheet format (either Excel or a csv file) but may also be shared as a pdf file. Summaries may be described in a news item or blog post but should also be available for users to download.

2. Specialized reports

While a general report, summary and set of tables are useful references, analyses focusing on a single topic in a bit more depth can be more effective for communicating results to the most relevant audiences. People working in the environmental or agriculture sector might be interested in own-account production, time use by people in areas with differing levels of infrastructure, or time spent on different types of travel, for example. Time spent on exercise, social and cultural activities, and with other people could be especially relevant to those working on health and well-being. National samples generally do not enable small area estimates, but geographic comparisons can be compelling and informative.

For data to be most useful to policy formulation and monitoring, dissemination products should link the time-use statistics to specific policies or proposals, clearly spelling out conclusions and implications while remaining objective. The Dominican Republic's *Unpaid work in the Dominican*

Republic: An Analysis of Time Use Module in the ENHOGAR 2016 Survey[47] (National Statistical Office and Ministry of Women, 2017) is an example of a specialized report on care. In addition to presenting the survey findings, it describes the state's response to the unequal distribution of unpaid labor, giving examples of existing policies and making recommendations for others.

Liaising with data users directly can help communications staff better understand the policy issues and the data needs, supporting data "storytelling"[48]. Data should be presented in a way that makes sense to non-experts—for example, describing an average weekday or weekend day, or the time people spend per week on an activity. If an average number of minutes per day is low because people don't do the activity every day, it might be more instructive to convert it to time per week or month. Even policy analysts that are accustomed to interpreting statistics may be less proficient with time-use statistics than other types, so they may not be able to just look at tables and understand what they mean; they need results explained to them.

With their narrower focus, these sorts of analyses are suitable for short publications such as research briefs or blog posts, as well as presentations, interviews or press releases.

While this guide prioritizes gender differences in unpaid work, specialized analyses can highlight the potential for time-use statistics to inform policies and decision making related to other groups and topics. One example is health, wellbeing and socioeconomic issues for indigenous groups, such as the Māori in New Zealand. While the same information may be relevant to policymakers,

[47] Trabajo no remunerado en República Dominicana: un análisis a partir de los datos del Módulo de Uso del Tiempo de la ENHOGAR 2016 [available online at: https://www.one.gob.do/media/40dbgimq/investigacióntrabajonoremuneradoenrepdomanálisismódulodelusodetiempoenhogar2016nov2018.pdf]

[48] "Making Data Meaningful Part 1: A guide to writing stories about numbers" (UNECE, 2009) describes statistical storytelling and gives examples from NSOs in Europe and North America.

service providers, and the community, it might be communicated most successfully by packaging it in different ways for each audience.

3. Visualizations

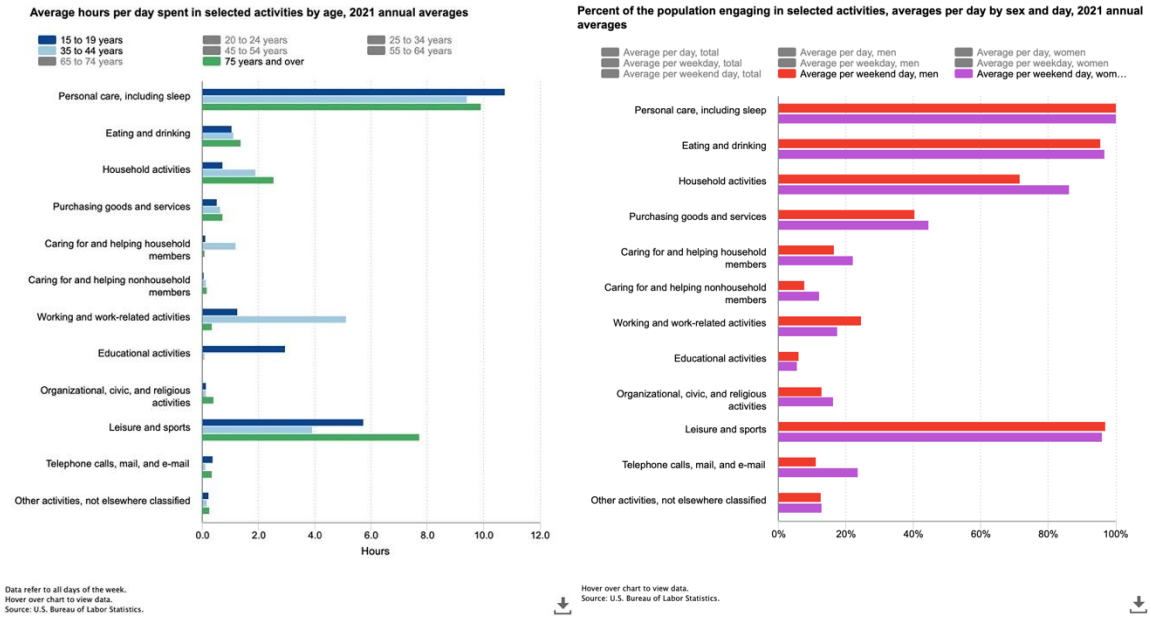
Visualizations are an important tool for disseminating time-use statistics. They are especially useful for communicating statistics simply and for highlighting comparisons and contrasts. Infographics are combinations of data visualizations, images and text to communicate more information than can be expressed in a single graph[49].

a) Graphs

Standard bar graphs are widely used for showing average time and participation rates. They are easily understood and can summarize a large amount of data and clearly show differences between groups or change over time. The graphs below show average time and participation for the main activity categories in the 2021 American Time Use Survey. The website allows the user to choose which bars to display by selecting groups at the top, but these are static images showing breakdowns by age and by sex.

[49] t is important to emphasize that visualizations should avoid representations that induce gender biases

Figure X.1. Bar graphs from American Time Use Survey

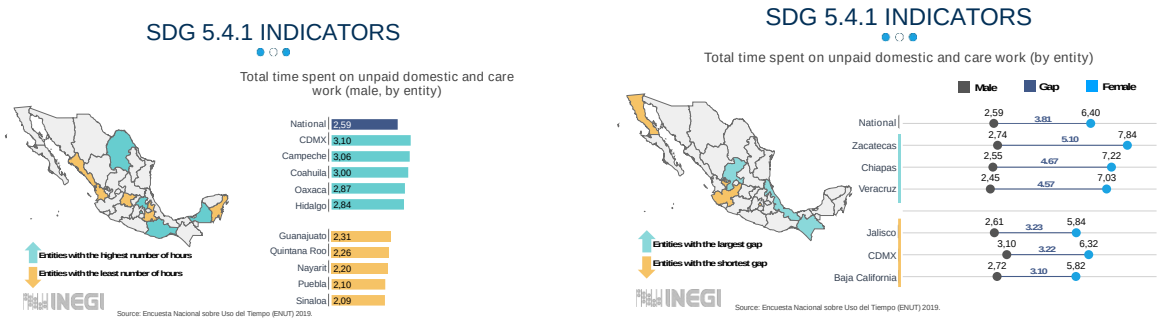


Source: Bureau of Labor Statistics https://www.bls.gov/charts/american-time-use/civ-pop-by-sex-and-day.htm

As with written publications, narrowing the scope of visualizations can help to communicate a more targeted message. The graphs below highlight the Mexican states with the highest and lowest values of indicators related to SDG target 5.4, based on the 2019 time-use survey. These figures could facilitate a discussion of policies or other factors that might contribute to the geographic differences. Maps showing differences by administrative area can make a compelling case for the need to design and implement local policies.

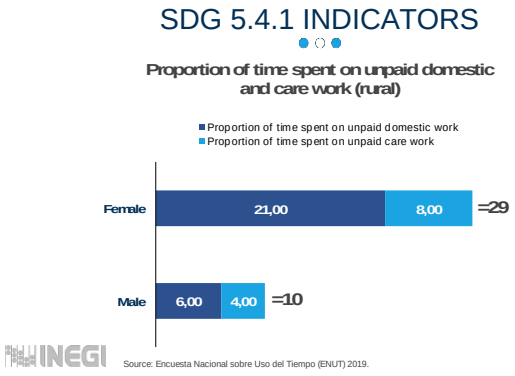
Figure X.2 on the left shows time men spent on domestic and care work and on the right shows the gender gap in hours of unpaid work. The bar graphs on the left are clear, but the connected dot plot on the right conveys the gender gap concisely, highlighting the difference as well as the absolute value for each group.

Figure X.2. Total time spent on unpaid domestic and care work



Stacked bar graphs can present differences in broader categories at the same time as the component parts, as shown in Figure X.. This graph shows that in rural areas, women spent 29% of their time on unpaid domestic and care work, compared to only 10% among men. It also shows that while women spent twice as much of their time as men on unpaid care, they spent 3.5 times as much on unpaid domestic work.

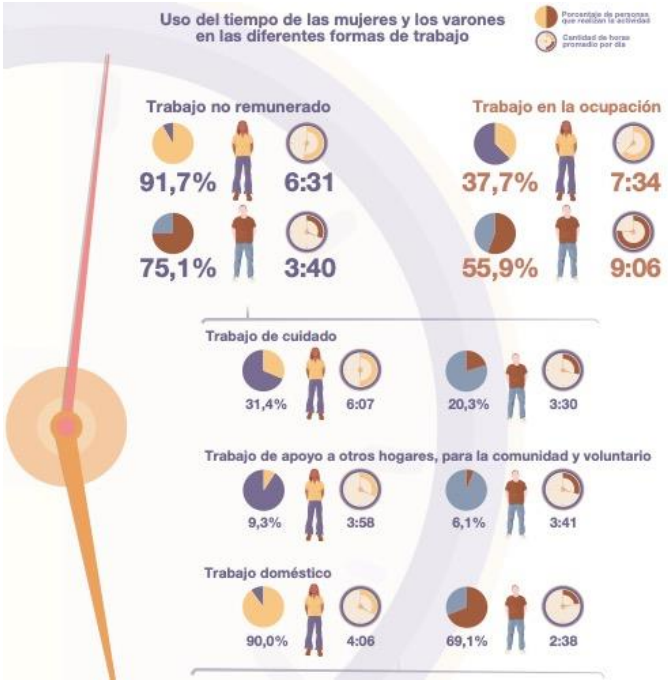
Figure X.3. Proportion of time spent on unpaid domestic and care work (rural)



Pie or donut charts are common ways of expressing proportions. Pie charts can be useful for demonstrating the approximate relationship of a proportion to the whole, but they are less good at

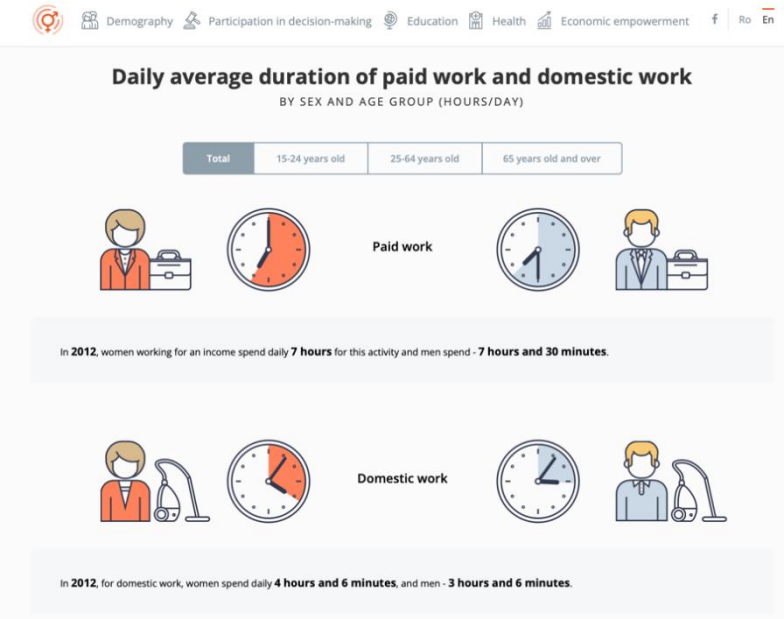
expressing precise values. Many people find these graphs harder to absorb and compare than bars or lines, especially when multiple categories are used. While axes are often marked and labeled in line and bar graphs, areas other than precisely ½ or ¼ can be difficult to gauge on a circle. But circles have a unique advantage when used for to depict hours. Incorporating the clock face as in Figure X. and Figure X.5 makes it easier to conceptualize the numbers as passing time, as shown in the examples from Argentina and Moldova below, because people who can read a clock have an intuitive idea of the scale. These graphs cannot show figures greater than 12 hours, however. With all graphs, the scale should be considered carefully so that data are not misrepresented.

Figure X.4. Time use by women and men in different forms of work



Source: Instituto Nactional de Estadistica y Censos (INDEC). (2022). [available online at: https://www.argentina.gob.ar/sites/default/files/2022/04/enut_2021.pdf]

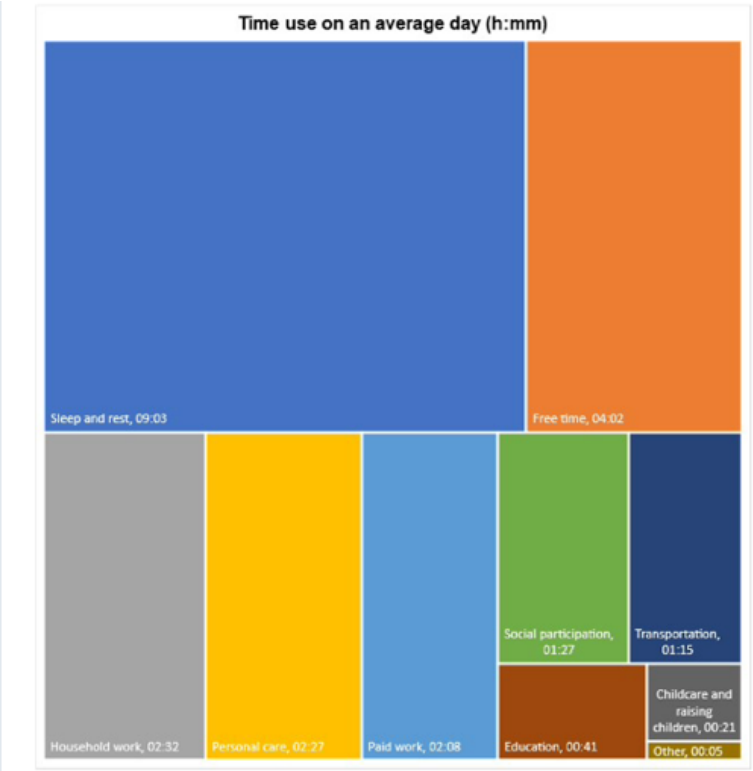
Figure X.5. Daily average duration of paid work and domestic work



Source: Moldova National Bureau of Statistics, GenderPulse Application https://genderpulse.md/en/economic-empowerment/paid-work-and-domestic-work/daily-average-duration-of-paid-work-and-domestic-work

Another alternative to a pie graph, this time for expressing many values adding up to 100%, is a proportional area graph. This can be used to present data from a diary or stylized questions using an exhaustive activity list. Figure X. shows such a graph presenting overall average time use in Belgium's 2013 time-use survey. Such a graph is eye-catching compared to a set of bars, and the rectangular shapes and right angles make comparing relative sizes easier than wedges on a circle. There is also more space for labels directly on the segments, rather than in a legend.

Figure X.6. Average time spent on activity categories in Belgium, 2013

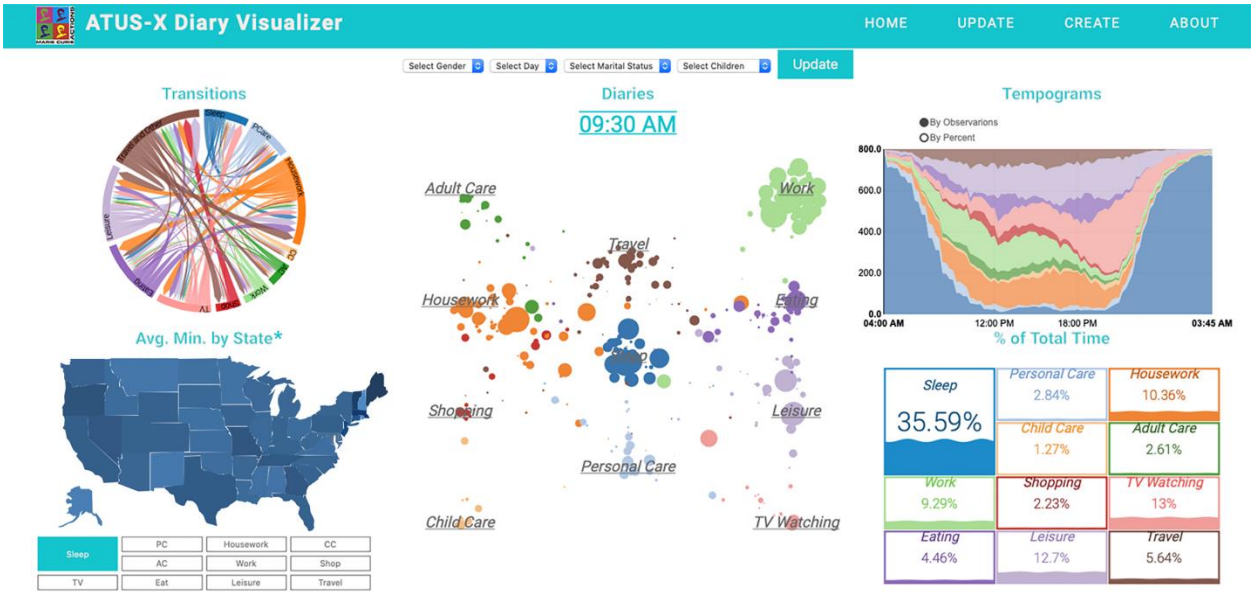


Source: Statistics Belgium 2013 Time Use Survey

The above figures can be created with data from diaries or stylized questions, but the sequence and timing data in diaries makes additional visualizations possible. Figure X.7. Types of figures generated by ATUS-X Diary Visualizer online tool shows several examples that can be generated using the ATUS-X Diary Visualizer online tool (Kolpashnikova et al., 2021) and so are feasible for other diary data.[50]

[50] R packages to construct these visualizations with ATUS data are available at https://github.com/Kolpashnikova/package_R_timeuse. These R packages will work with other diary data with the same file structure as ATUS-X data extracts, or can be adapted.

Figure X.7. Types of figures generated by ATUS-X Diary Visualizer online tool



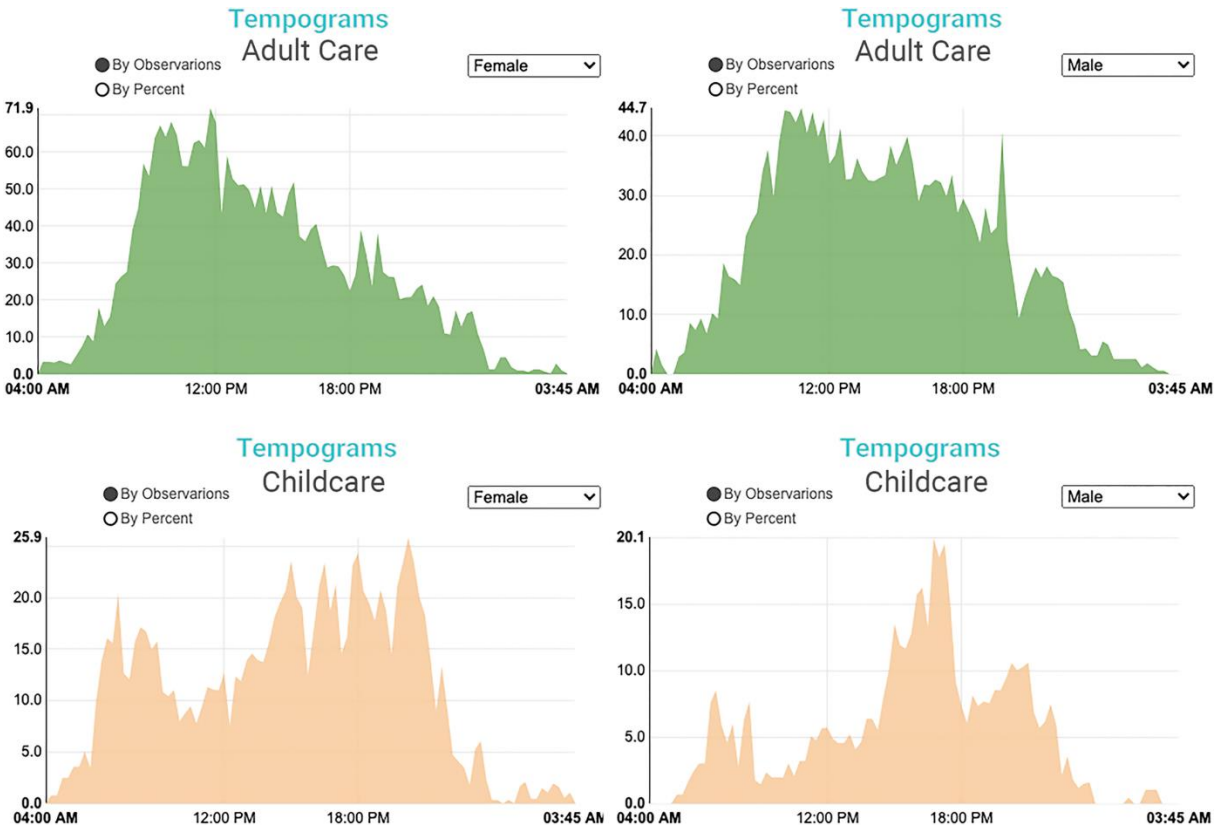
*The US map was created by tracing a USGS snapshot and is not identical to the original image and is, therefore, for illustrative purposes only. Source: IPUMS ATUS Extractor: Sample of self-identified family caregivers from 2011–2019.

Tempograms are a type of area graph that summarizes the daily rhythm of a population. The x-axis shows time—usually 24 hours—in fixed increments. The y-axis shows the proportion of respondents. A tempogram allows users to compare overall time spent (the total area below the line) as well as the temporal location, or time of day. In essence, a tempogram is a set of bar graphs, with very thin bars that have no space between. If a 10-minute interval is used, a 24-hour tempogram of one variable would have 144 data points.

The tempograms in Figure X.8 below show the number of women (left) and men (right) providing care for adults (top) and for children (bottom) throughout the day. They are based on a sample of family caregivers from 2011- 2019 (Kolpashnikova et al., 2021). The graphs on the top show that the timing of care for adults is similar for men and women, although more women were providing care (note the big differences in the scales on the y-axes.) Childcare shows a gendered pattern: female carers provide care throughout the day, with a lull in late morning, whereas male carers

provide most of their childcare in the morning or evening. The comparison in the bottom graphs is much more compelling than simply comparing average time, as it expresses various dimensions of time use. Tempograms contextualize data and tell stories that people can relate to.

Figure X.8. Tempograms of adult care time based on American Time Use Survey data



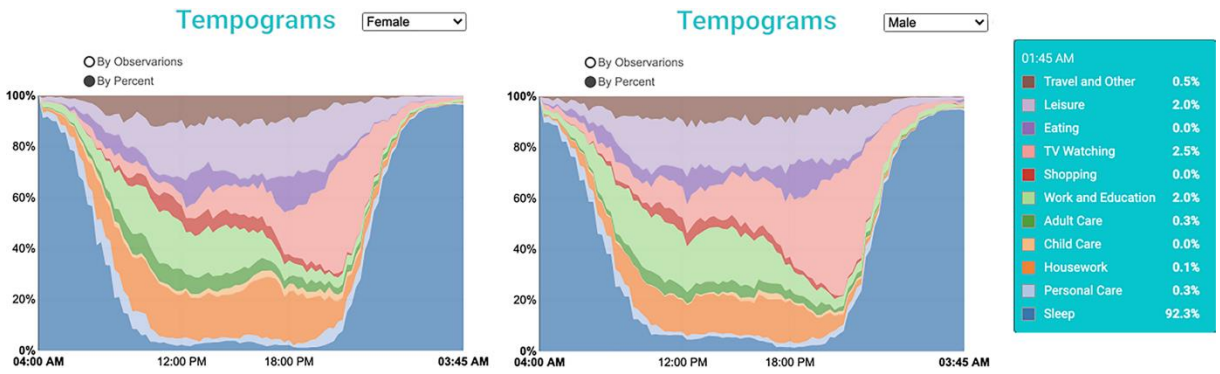
Notes:Adult care time use tempograms for women (top left) and men (top right) and child care for women (bottom left) and men (bottom right). Source: IPUMS ATUS Extractor: Sample of self-identified family caregivers from 2011–2019.

The above tempograms are based on one activity. Another type of tempogram shows all of the activities that a sample is doing. The underlying statistics for these are cumulative percentages. For example, for a particular time of the day, the percentage of the population recorded as eating is added to percentage sleeping and so on until all activities that are recorded for that particular

time are accounted for. In the analogy of a tempogram as a set of skinny bars, these tempograms are sets of skinny stacked bars.

To compare two tempograms, the number of categories should be limited. The tempograms in Figure X. below, also from the article by Kolpashnikova and colleagues (2021) on visualizations using the IPUMS ATUS Extractor tool, show eleven categories and give a complete view of what the population is doing throughout the day. Fewer categories—no more than five or six—make it easier to compare patterns for individual categories between two graphs, whereas many categories can provide a comprehensive view of how a population uses time.

Figure X.9. Tempograms of comprehensive time use by women and men caregivers

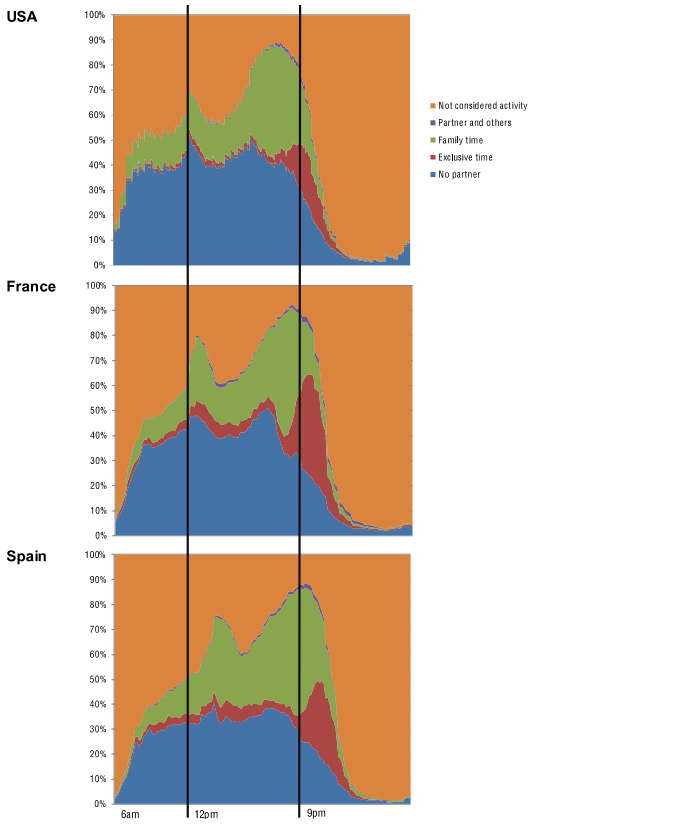


Source: IPUMS ATUS Extractor: Sample of self-identified family caregivers from 2011–2019.

Tempograms can graph contextual variables as well as activities: for example, showing co-presence of different people. The tempograms in Figure X.3 below are from Garcia-Román, Flood and Gedanek's 2017 paper on time parents spend with and without their partner. They show the proportion of respondents with different people from 6am to 6am in the US, France and Spain. Orange includes time spent on paid work and personal care, including sleeping, which was considered "not eligible" as partnered time. Blue is time that the respondent could be with their partner but is not, red is with partner only (no children), and green is with partner and children.

These graphs show that the three countries have broadly similar patterns, with many families together at midday and evening mealtimes, and couples together without children in the evenings.

Figure X.3. Tempograms of time shared with respondent's partner, by country



Source: Own calculation, using American Time Use Survey 2010, Enquête Emploi du Temps et Décisions dans les Couples 2009–2010, and La Encuesta de Uso del Tiempo 2009–2010

Source: Garcia, Flood & Gedanek, 2017.

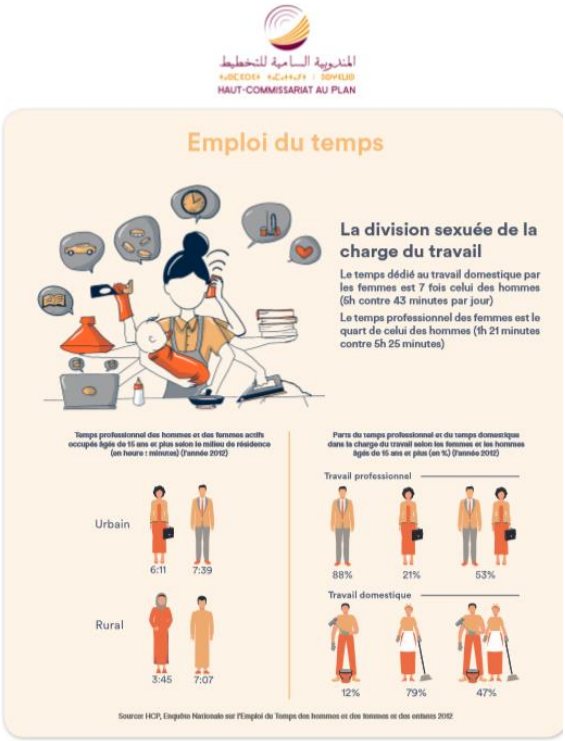
Kamila Kolpashnikova has published Stata (2020) and R (2022) code for creating tempograms using ATUS data that can be adapted for other diary data.

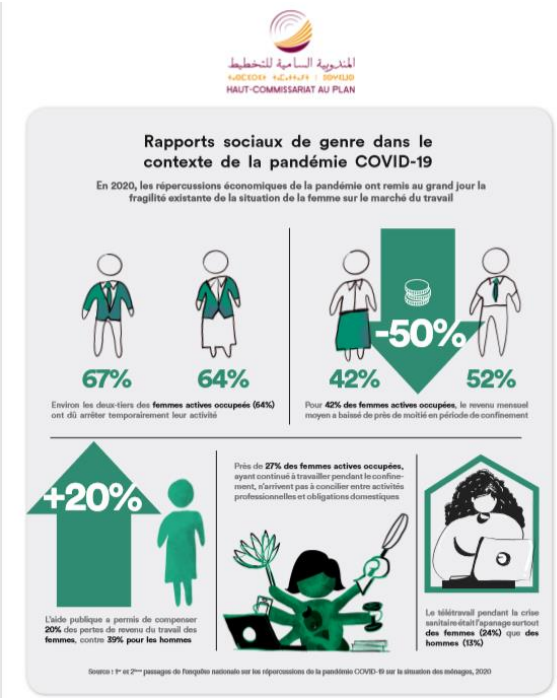
b) Infographics

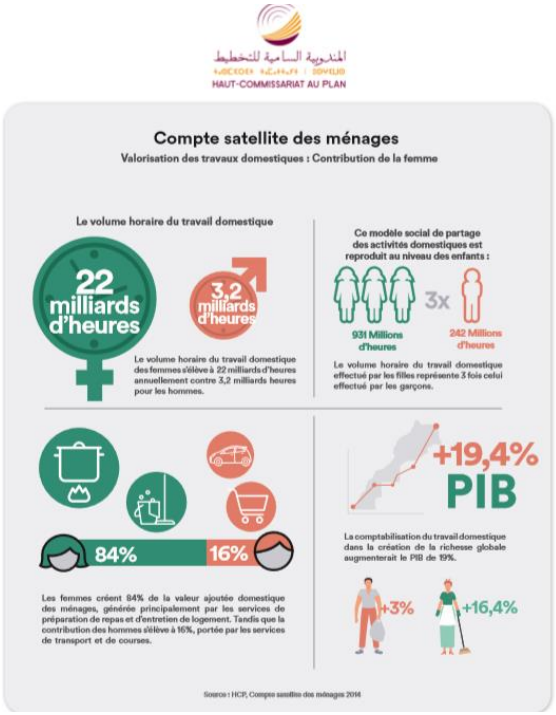
Multiple visualizations can be combined into infographics. Infographics are increasingly used to communicate data to the public as they are visually appealing, can convey data to people with low data literacy (when designed well), and can tell a story.

The infographics below from Morocco's High Commission for Planning describe a) gender differences in time use in 2012, b) and c) gender relations in the context of the COVID-19 pandemic, and d) satellite accounts for domestic work. The infographics can also be viewed online as a set of slides.

Figure X.4. Infographics of time use in Morroco







There are many software packages and guidelines for producing effective infographics[51].

4. Interactive and mixed-media

One of the advantages of electronic formats for dissemination is the possibility of including interactive or mixed media products. This section will describe some interactive or mixed-media products and provide links. (More can be found on the hub.) Due to their interactive nature, the products are best viewed on the websites.

Thailand's National Statistics Office provides dynamic statistical tables and bar graphs. The user can choose whether to view municipal (urban), non-municipal (rural), or total population, for the 2009 or 2014 survey. While some of the website is only available in Thai, these tables are also available in English.

[51] One good resource is *The 7 Graphic Principles of Public Health Infographic Design* (Stones and Gent, 2015)

Hungary's Central Statistical Office displays data showing the daily rhythm in this https://www.ksh.hu/interaktiv/idomerleg/animacio.html -?lang=en&colors=act&dataset=FULL_POPULATION&utm_source=kshhu&utm_medium=banner&utm_campaign=theme-time-use animated path graph. This type of graph shows how people move between activity categories throughout the day, which allows the viewer to see what the population is doing at a given point, as well as their transitions from one activity to another. The graph allows the user to select population subgroups (men, women, retired or economically active), or to view the entire population, choosing to distinguish between population group or activity by color. Kamila Kolpashnikova's time use path graph R package can create a similar type of graph.

Morocco's High Commission for Planning created a dynamic visualization targeting the general public called "Simulate your time budget". The user can input their age and sex and their own time use for different categories, and see how their time use compares to the general population and to others from their demographic group.

National Division of Administrative Statistics (DANE) of Colombia's simulator of unpaid domestic and care work at home and in the community first asks the user to put in their own weekly time budget for seven categories of unpaid domestic and care work. It then computes how much time this adds up to per year, as well as how much money that work would earn per week if it were compensated at minimum wage. Finally, it shows graphs of how the user's time compares to men and women from different regions and age groups. INEGI of Mexico has a similar simulator of the economic value of domestic and care work, without the regional and age breakdowns.

Unlike creating standard graphs, developing interactive products often requires collaboration with an interdisciplinary team. Morocco created a multidisciplinary team composed of time-use survey and gender statisticians, computer scientists, sociologists and graphic designers from the gender,

coordination/visibility and IT teams. They developed a gender data platform in collaboration with the EU's MEDSTAT-IV programme. The overall goal of this visualization data platform is to ensure better dissemination of the time-use statistics produced. Presenting the statistics in an attractive way and making them more available and accessible to the general public is expected to expand their use.

B. Data

1. Open data by default

The information in this section applies to other types of data that NSOs collect and process, not only time-use statistics. It is presented here in brief, to assist NSOs that are using time-use statistics as part of a process of modernization. This section draws on work by Open Data Watch, including *Open Data Resource Guide* (2022) and *Maximizing Access to Public Data* (2019), as well as a number of their partner organizations such as Data 2x[52] and the World Wide Web Foundation[53]. As laws and technology relating to data change rapidly, NSOs are encouraged to refer to these or other resources for more up-to-date information.

The first principle of the U.N. Fundamental Principles of Statistics states that,

> *Official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honour citizens' entitlement to public information. (UNSD, 2014)*

This is increasingly understood to mean not just statistical tables but also microdata. As of 2021, 132 countries had access to information laws requiring governments to proactively disclose

[52] See e.g. Data 2x and Open Data Watch (2022). *Transforming the Data Landscape: Solutions to Close Gender Data Gaps.* https://data2x.org/resource-center/transforming-the-data-landscape-solutions-to-close-gender-data-gaps/
[53] See e.g. Brandusescu, A. and Nwakanma, N. (2018). *Is open data working for women in Africa?* World Wide Web Foundation. https://webfoundation.org/research/datawomen/ (available in French and English)

information (UNESCO, 2021). Following these laws and principles, data should be **open by default** and indeed, the 53rd Session of the United Nations Statistical Commission endorsed the the principle of "open data by default" in the Report of the Working Group on Open Data.[54] The Report states:

> *The open by default principle serves as the foundation for a set of policies that make a Government's or an organization's data publicly available and in accordance with open data guidelines,[55] with only a limited number of specific exceptions (for reasons of security, for example, or privacy protection). Under the principle, it is recognized that government data, produced with public resources, are valuable and have many different users and uses and should therefore be expected to be available to the public (that is, by default).[56]* (paragraph 7)

Open Data Watch's framework of the benefits of open public data (see Figure X.5) depicts how responsible sharing of data can increase its value. The advantages it outlines are:

[54] https://unstats.un.org/unsd/statcom/53rd-session/documents/2022-27-OpenData-E.pdf
[55] See, for example, "A review of open data practice in official statistics and their correspondence to the Fundamental Principles of Official Statistics" (background document prepared by the Statistics Division for the Statistical Commission at its fiftieth session and available at https://unstats.un.org/unsd/statcom/50th-session/documents/BG-Item3c-Open-Data-guidance- and-mapping-to-FPOS-E.pdf), which makes reference to operationalization by Open Data Watch of the open data definition in terms of (a) machine readability; (b) use of non-proprietary formats; (c) availability of multiple download options; (d) availability of metadata p roviding sufficient context to enable understanding of the data; and (e) open licensing. See also the background document entitled "Guidance on the implementation of open data in national statistical offices", prepared by the Working Group on Open Data for the Statistical Commission at its fifty-first session, available at https://unstats.un.org/unsd/statcom/51st-session/documents/ BG-Item3v-Guidance_OD-E.pdf.
[56] See the principles of the International Open Data Charter, available at https://opendatacharter.net/principles/.

Figure X.5. Benefits of open public data

Source: Open Data Watch (2019)

Data that is open by default should have certain characteristics.

- Timely and Comprehensive: Data should be published as soon as possible after being collected, on a regular basis. It should include sufficient background information to allow people to use it responsibly.
- Accessible and Usable: It should be stored somewhere people can find it and access it. It should be available in a machine-readable but in an open (non-proprietary) format—for example, a csv file rather than (or in addition to) an SPSS or Stata data file.
- Comparable and Interoperable: Data should use consistent classifications and definitions to allow it to be compared to and linked to other datasets. The Collaborative on SDG Data

Interoperability's *Data Interoperability: A Practitioner's Guide to Joining Up Data in the Development Sector* (2018)[57] provides background and resources for NSOs wanting to learn more about why and how to increase interoperability of data. It states:

> *Interoperability is the ability to join-up and merge data without losing meaning (JUDS 2016[58]). In practice, data is said to be interoperable when it can be easily re-used and processed in different applications, allowing different information systems to work together. Interoperability is a key enabler for the development sector to become more data-driven.* (p.9)

- Attributable and sharable: Metadata should include a source or author for users to cite. Users should also be able to share the data, but should be required to share it on the same terms (that is, on an open license, free of charge).
- Responsive to user's needs. NSOs should engage with potential data users and provide feedback mechanisms to ensure that data meets their needs.

2. Data protection

a) Planning for data protection

Data collection, storage, processing, and dissemination must respect the data protection laws, regulations and rules as described in national law, such as New Zealand's data protection within its 2020 Privacy Act[59] and Data and Statistics Act 2022[60], or Mexico's LSNIEG[61]. EU countries

[57] González Morales, L. G., & Orrell, T. (2018). *Data interoperability: A practitioner's guide to joining up data in the development sector.* https://unstats.un.org/wiki/display/InteropGuide/Home
[58] Joined-Up Data Standards project (2016). *The frontiers of data interoperability for sustainable development.* http://devinit.org/wp-content/uploads/2018/02/The-frontiers-of-data- interoperability-for-sustainable-development.pdf
[59] Privacy Act 2020 No 31 (as of 28 October 2021), Public Act Contents – New Zealand Legislation
[60] https://www.legislation.govt.nz/act/public/2022/0039/latest/LMS418574.html
[61] https://www.snieg.mx/scn-marco-juridico/

must adhere to the General Data Protection Regulation (GDPR), and African Union countries to the Convention on Cyber Security and Personal Data Protection (also called the Malabo Convention). The African Union and the Internet Society jointly developed a set of guidelines to help in the implementation of the Malabo convention, *Privacy and Personal Data Protection Guidelines for Africa*[62] (2018) that outlines the roles of different stakeholders including government agencies.

Data protection laws require a Data Protection Plan (DPP) to be completed to assess proposed measures that pose particular risks relating to how personal data is used. These may include a full Data Protection Impact Assessment (DPIA).

Even the GDPR does not define which method has to be used to perform a DPIA, but the European Data Protection Supervisor (2018) points to the Bieker et al. (2016) method as a reference. Hoorn & Montager (2018) uses the Bieker et al. method as a starting point because it gives a parsimonious model with privacy and security protection goals (confidentiality, integrity, availability, unlink ability, intervenability and transparency). These protection goals are aligned with the data protection principles defined in article five of the GDPR. Those principles are lawfulness, fairness and transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity, confidentiality, and accountability. Hoorn & Montager (2018) added data minimisation as an additional protection goal. Table X.1. Sample data protection goals and measures, taken from Hoorn & Montager (2018), outlines protection goals and some generic measures for the implementation of these goals. This table could be used as a starting point to further discuss issues on data protection and privacy related to the digitalization of time-use studies.

[62] https://www.internetsociety.org/wp-content/uploads/2018/05/AUCPrivacyGuidelines_2018508_EN.pdf

Table X.1. Sample data protection goals and measures

PROTECTION GOALS	GENERIC MEASURES FOR THE IMPLEMENTATION OF THE PROTECTION GOALS
Data minimization is the requirement to collect, process and use only personal data than are necessary for the achievement of the purpose of the processing.	• Reduction of collected attributes of the data subject. • Preference for automated processing operations (not decision-making processes), which make the use of processed data unnecessary and limit the possibility of interference, compared to dialogue-controlled processes. • Procedures for pseudonymisation and anonymisation.
Availability is the requirement that personal data must be available and can be used properly in the intended process. Thus, the data must be accessible to authorised parties and the methods intended for their processing must be applied.	• Preparation of data backups, process states, configurations, data structures. • Protection against external influences. • Implementation of repair strategies and alternative processes.
Integrity refers, (i) to the requirement that information	• Restriction of writing and modification permissions.

technology processes and systems continuously comply with the specifications that have been determined for the execution of their intended functions. (ii) the data to be processed remain intact, complete, and up to date.	• Documented assignment of rights and roles. • Specification of the nominal behaviour of workflow or processes and regular testing of the detectability respective determination of the current state of processes.
Confidentiality refers to the requirement that no person be allowed to access personal data without authorisation. It ensures the protection against unauthorized and unlawful processing.	• Definition of a rights and role concept according to the principle of necessity based on identity management by the controller. • Implementation of a secure authentication process. • Limitation of authorized personnel to those who are verifiably responsible. • Specification and control of organisational procedures (obligation to data secrecy, confidentiality agreements, etc.). • Encryption of stored or transferred data.
Unlink ability refers to the requirement that data shall be processed and analysed only for the purpose for which they were collected.	• Restriction of processing, utilization and transfer rights. • Separation in organisational / departmental boundaries.

	• Approval of user-controlled identity management by the data processor. • Using purpose specific pseudonyms, anonymisation services, anonymous credentials, processing of pseudonymous or anonymous data.
Transparency is necessary for the monitoring and control of data, processes, and systems from their origin to their erasure and is a prerequisite for lawful data processing. Transparency of the entire data processing operation and of the parties involved can help ensure that data subjects and supervisory authorities can identify deficiencies and, if necessary, demand appropriate procedural changes.	• Documentation of procedures, in particular including the business processes, data stocks, data flows and the IT systems used, operating procedures, description of procedure, interaction with other procedures. • Documentation of the contracts with external service providers and third parties, from which data are collected or transferred to. • Documentation of consents and objections.
Intervenability refers to the requirement that data subjects are effectively granted their rights to notification, information, rectification, blocking and erasure at	• Differentiated options for consent, withdrawal, and objection. • Creating necessary data fields, e.g., for blocking indicators, notifications, consents, objections, right of reply.

any time, and that the controller is obliged to implement the appropriate measures.	• Disabling options for individual functionalities without affecting the entire system. • Traceability of the activities of the controller for granting the data subject's rights. • Establishing a Single Point of Contact (SPoC) for data subjects. • Operational possibilities to compile, consistently correct, block, and erase all data stored regarding any one person.

Source: Hoorn & Montager (2018)

b) De-identifying microdata

Along with the benefits, there are challenges to sharing data. One important challenge is that there are legitimate reasons for some data not to be made public. The most important legitimate exemption to disclosing time-use data is the obligation to protect personal identifiable and sensitive personal information.[63] Data can be made open without sharing personal identifiable information or sensitive personal information through a process called de-identification. This involves removing or obscuring the information so that it cannot be linked to individuals and harm them, even when combined with other datasets. De-identification reduces the risk but it can rarely completely eliminate the possibility of people being identified and harmed. Re-identification

[63] Additional exemptions relate to national security and confidential commercial information, but these are less relevant to time-use statistics than to some other types of statistics.

becomes more of a concern with higher-dimension datasets (including with multiple linked datasets), with small samples and with outliers or unique values.

Most time-use data is likely to be less sensitive than some other types of data NSOs handle, such as health or income data, but the same techniques are used for de-identification. Broadly, data is deidentified through suppression, reducing precision, masking or replacing some data values, or a combination of these techniques.

Suppression is when specified fields or values are removed from the dataset. The drawback of suppression is that if used extensively, it may limit the usefulness of the data. Direct identifiers such as address or national ID number should always be suppressed or transformed.

Abstraction reduces precision by grouping values into categories, such as five-year age groups or geographic region. **Aggregation** is similar to abstraction but instead of assigning a category or range, it replaces the value with a descriptive statistic, such as the average of those in the category. Abstraction and aggregation are both useful for hiding outliers, such as top-coding income.

Perturbation masks data by randomly replacing specific values with other specific values while maintaining the key statistical properties of the dataset. This can consist of replacing a value with another actual value (for example, from within a specified category or range), or by adding random noise to all points. Perturbation may be called **jittering** when applied to geographic data. Geolocation data in time-use surveys is personal identifiable information as it is possible to see where the respondent sleeps and spends their days. Even with jittering or perturbation, re-identification may be possible. The greater the perturbation, the lower the risk, but also the less meaningful any analysis will be. NSOs should carefully consider whether and how to make geolocation data open.

Pseudonoymization, or assigning a unique identifier, is a way to de-identify data but still allow it to be linked to other datasets that use the same unique identifier. For example, if a time-use survey uses the same sample as another household survey, those variables could be linked to the time-use information. All personal identifiable information must first be removed from the dataset through one of the previous techniques—both direct identifiers and indirect identifiers that will allow re-identification once the datasets are linked.

NSOs should adhere to the current best practice in de-identification techniques.

3. Microdata

Public-use microdata files substantially enhance the analytical value of the data, particularly time-use diary data. Much of the analysis of contextual variables is done by researchers outside NSOs. NSOs may lack the time and resources to conduct all the analyses they wish to, or the resources to commission analysis. Making data available to researchers means survey data will be more fully explored.

There are different systems for providing access to microdata. These include public use files, where datafiles are distributed to users, or through remote access. In remote access, users send statistical code to the NSO. The NSO runs the code and provides the results to the user, rather than providing the data itself. The main reason to use remote access is to protect privacy and confidentiality, especially if time-use data are linked to other survey microdata which might be more sensitive or restricted. Protecting confidentiality of responses is a major consideration for the dissemination of data. Issues and measures for dealing with them are discussed in the next section.

Increasingly there are programs that allow limited online tabulation, creating tables of time-use variables disaggregated by background variables. The Multinational Time Use Study and the

Harmonised European Time Use Survey, described below, as well as the American Time Use Survey (https://www.atusdata.org/atus/) have online tabulation on their websites.

The UNSD Gender Data Hub https://gender-data-hub-2-undesa.hub.arcgis.com/pages/time-use tracks SDG indicator 5.4.1 as part of the Minimum Set of Gender Indicators. The data hub has information on unpaid domestic and care work by sex, age and location.

Two projects provide harmonized time-use microdata for multiple countries: the Multinational Time Use Study (MTUS) and the Harmonised European Time Use Survey (HETUS).

MTUS is a collaborative project containing diary samples collected over six decades from 30 countries. Most surveys come from Western Europe, North America or Australia, but there are a few others such as Peru and South Korea. People and agencies responsible for collecting national sample time-use surveys or other large-scale time-use studies are invited to deposit data with MTUS. The dataset includes harmonised variables on background, activity, location, mode of transport and co-presence. The sample includes 1.5 million diary days from over 100 randomly sampled national-scale surveys. MTUS is managed by the Centre for Time Use Research (CTUR), University College London. Users can apply to MTUS for data access at https://www.timeuse.org/index.php/mtus, or use the data extract builder MTUS-X at https://www.mtusdata.org/mtus/. MTUS-X is a collaborative project between MTUS, Maryland Population Research Center, Minnesota Population Center and IPUMS dedicated to making it easy for researchers to use data from Multinational Time Use Study.

The Harmonised European Time Use Surveys (HETUS) are national surveys conducted in European countries using standardised survey designs and statistical classifications as far as possible. Data from two rounds are available so far: HETUS 2000 (1998-2006; 15 European countries) and HETUS 2010 (2008-2015; 18 European countries). There is also a 2020 round but

many countries that planned to participate in this round postponed their surveys due to the COVID-19 pandemic. Some surveys took place or are scheduled and others are not yet. Microdata are available at https://ec.europa.eu/eurostat/web/microdata/harmonised-european-time-use-surveys but tables can be accessed at https://ec.europa.eu/eurostat/web/time-use-surveys /database

4. Metadata

Procedures regarding metadata for time-use surveys should follow those for other household surveys. NSOs should provide comprehensive metadata along with any data released in any format. Basic recommendations on the management and provision of metadata can be found in the United Nations National Quality Assurance Frameworks Manual for Official Statistics (2019), including the use of data transmission standards and tools, such as Statistical Data and Metadata eXchange (SDMX). Principle 19 on managing metadata states that metadata should:

> *provide information covering the underlying concepts and definitions of the data collected and statistics produced, the variables and classifications used, the methodology of data collection and processing, and indications of the quality of the statistical information—in general, sufficient information to enable the user to understand all of the attributes of the statistics, including their limitations (p.27).*

A user guide for microdata should additionally contain detailed information on variable and value definitions, naming conventions, weights, and values that were imputed.

Box X.3: Quality checklist -Dissemination

- Develop dissemination products with key data needs in mind. For example, how users can most easily derive common requirements such as average time spent on each activity.
- Develop detailed documentation to describe dataset and facilitate use (user guide). Include a description of the editing practices and rules used, which may help data users interpret the results.
- Time use datasets can be complicated to use – consider training high-level users or other method to ensure they can produce valid output from microdata.
- Publish classifications. If classification has changed between survey iterations, consider whether a concordance should be published.
- Publish dataset documentation to facilitate comparison with other datasets.
- Consider appropriate balance between publication and microdata to best address known data needs.
- Plan processing tasks for efficiency, to minimise impact on data release timetable.
- Consider staged release to allow early dissemination of key statistics.
- Consider file structure and how to set up datasets that are as easy as possible to use (such as combining data items across different levels of the dataset).
- Consider design of tables for ease of use (e.g. using appropriate units of measure)
- Incorporate some international comparison into survey evaluation.
- Publish evaluation or share with peer organisations.

XI. Ensuring quality of time-use data and surveys

A. Unique quality considerations for time-use surveys – a checklist

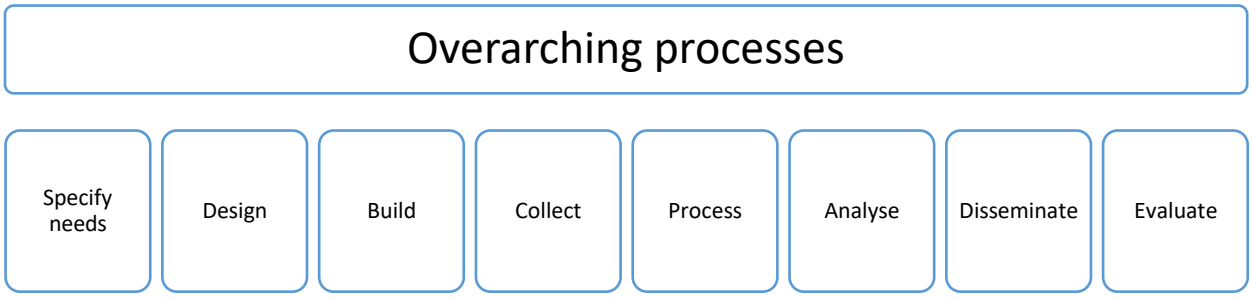
1. Aim

The purpose of this checklist is to present quality considerations that should be considered when undertaking time-use surveys. Not all of these will be relevant to every time-use survey, but taken together they form a suite of considerations that will assist organisations to build quality into their surveys from development through to dissemination. This chapter consolidates the Quality Checklists presented at the end of each chapter into a coherent quality assurance framework.

2. How to use this checklist

This checklist should be read together with the Generic Statistical Business Process Model (GSBPM) and the United Nations National Quality Assurance Frameworks Manual for Official Statistics (UN NQAF Manual). This chapter assumes that organisations are aware of and implementing good quality survey practices in general, and so is focused only on considerations that are of special or unique relevance to time use subject matter and methods.

Figure XI.1 Generic Statistical Business Process Model (GSBPM)[64]



[64] See GSBPM (version 5.1, January 2019) - https://statswiki.unece.org/display/GSBPM/GSBPM+v5.1

The Generic Statistical Business Process Model (GSBPM) describes and defines the set of business processes needed to produce official statistics. It comprises eight phases of the survey process, each with associated sub-processes. Although the presentation of the GSBPM follows the logical sequence of steps in most statistical business processes, the elements of the model may occur in different orders in different circumstances. Also, some sub-processes will be revisited, forming *iterative loops*[65].

In this section, quality considerations are arranged according to the GSBPM phase. As a general principle, repetition has been avoided between phases, with each consideration being listed where the related decision or action mostly takes place. In some cases, closely related considerations appear in separate phases. For example, one might determine a linking method in the Design phase, and then test its accuracy in the Process phase.

The quality considerations for each GSBPM phase are classified according to these dimensions of process and product quality, derived from the United Nations National Quality Assurance Frameworks Manual for Official Statistics (UN NQAF Manual)[66].

Quality principles for:

Process quality

1. Methodological soundness
2. Cost-effectiveness
3. Appropriate statistical procedures
4. Managing respondent burden

[65] See GSBPM (version 5.1, January 2019) - https://statswiki.unece.org/display/GSBPM/II.+The+Model
[66] See UN NQAF Manual (of 2019) - https://unstats.un.org/unsd/methodology/dataquality/un-nqaf-manual/

Product quality

1. Relevance
2. Accuracy and reliability
3. Timeliness and punctuality
4. Accessibility and clarity
5. Coherence and comparability

While there is another set of quality dimensions relating to the institutional environment of the survey organisation, they are chiefly beyond the scope of a time-use survey specifically, so have not been discussed in this chapter.

Table XI.1. Key quality considerations for time-use surveys, by business process

Specify need	
Quality dimension	**Key considerations**
Relevance	Consider whether key users have been identified and included in consultation In gathering requirements: • Identify the data need to the highest possible level of specificity • Document the proposed use of the required data • Identify any conflicts between requirements • Ensure data requirements are prioritised

Accuracy and reliability	Consider whether data needs can be accurately delivered on the proposed survey vehicle

Design	
Quality dimension	**Key considerations**
Relevance	Consider the extent to which content addresses the identified data needs. Ensure that the highest priority needs are addressed. Consider level of detail required in activity classification to meet data needs, but balance this against how easily responses can be coded to that level. Especially where collection is new or substantially redeveloped, consider keeping activity classification flexible enough to be iterated in response to issues encountered when coding diary entries (e.g. removing a category if very few responses are coded to it).
Accuracy and reliability	Undertake cognitive testing to determine whether questions accurately measure the intended concepts. Consider mode of collection: self-administered diary, interviewer-administered recall diary, stylized questions.

	Consider length of diary time periods (commonly 10, 15 or 30 minutes), balancing respondent burden against the desired level of precision in measurement. Consider the number of reference days collected from each respondent, balancing respondent burden against any improvements in accuracy. Consider providing completed diary examples to increase respondent understanding of the expected responses and level of detail. Consider retention and use of personal details for the purpose of validating match between background questionnaire and diary records. Determine whether and how this can be done within applicable legislative and privacy frameworks.
Timeliness and punctuality	Consider the data entry and processing requirements for the included content, and the impact on timely data dissemination.
Accessibility and clarity	Consider activity classification from the perspective of data users to determine whether category groupings make instinctive sense.
Coherence and comparability	Consider coherence of content with other data sources available. Ensure coherence of data collection modes (e.g. paper diary vs electronic diary). Design method for reliably matching background questionnaire records with time-use records.

	Consider comparability with previous iterations of this survey, and with international time-use surveys.
Methodological soundness	Consider representativeness of enumeration periods across the year (seasons, holidays, school terms). Understand implications of the timing of different aspects of the data collection process, such as the length of the enumeration period, the lag between completion of the questionnaire and the time-use component, whether and how to allow substitution of reference days for a selected household. Consider implications of diary design on data cleaning tasks. For example, for self-administered diary whether respondents could enter more than one activity for a given time-period, and how you plan to treat that in processing to preserve fidelity, consistency, and quality. For retrospective instruments, consider for how many days respondent will recall, how much information is collected. Consider population required to meet data needs (only one or every adult in the household), are children included, what age a respondent is treated as an adult. If a new collection mode is being introduced, consider selecting independent samples to offer each mode, so that statistically valid tests can determine whether there is a mode effect.

Cost-effectiveness	Consider implementing electronic collection methods to improve accessibility and reduce collection costs.
Appropriate statistical procedures	Design questions to be easily understood and answered by a broad range of respondents. Avoid over-reliance on instructions to explain ambiguous questions or form completion. Design questions to directly produce data items that meet specific data needs, rather than relying on interpretation during data entry and processing.
Managing respondent burden	Consider whether any content included in previous collections can be removed. Undertake cognitive testing to identify any aspects of the diary that create particularly high cognitive load. Consider placement of time use collection in a stand-alone or combined survey vehicle to maximise participation and reduce respondent burden. Consider usability and respondent experience associated with time-use instruments. Make use of visual features and layout to alleviate cognitive load and meet respondents' natural ways of thinking about how they spend their time.

Build	
Quality dimension	**Key considerations**

Cost-effectiveness	Consider the cost of building and testing different collection instruments, particularly an electronic instruments, weighed against any saving created in reduced data collection effort.
Appropriate statistical procedures	Ensure appropriate security and privacy provisions in both electronic and paper collection.
Managing respondent burden	Reduce complexity of user interface and form completion process, to reduce cognitive load and respondent burden. Plan to build iteratively, to allow time for usability testing and resulting improvements.
Collect	
Quality dimension	**Key considerations**
Methodological soundness	Set targets for the different measures of response (questionnaire response rate, diary return rate, household-level completion), and monitor these throughout enumeration. Consider how to implement sample top-up and deselection to calibrate sample based on observed response rates in the field. This can be more difficult for time-use surveys, depending upon the survey design, for example if diary dates are constrained to a specific week in each month or quarter.

Cost-effectiveness	Consider when enumeration can be discontinued to save costs (if targets met earlier than forecast in particular geographic regions or overall)
Appropriate statistical procedures	Train interviewers for efficient and consistent data collection. Train interviewers to maintain security and confidentiality.
Managing respondent burden	Offer different modes to allow preferred response stye[67] Offer interviews at a wide range of times of day to suit respondents.

Process	
Quality dimension	**Key considerations**
Relevance	Review data quality of responses and identify gaps in data collected to determine whether it will meet needs. For example, to what extent the data can be used without editing or amendment, or whether certain diary fields have more missing data than others.
Accuracy and reliability	Determine criteria for inclusion of diaries or stylized questionnaires in the final dataset, based on required level of quality. For example, consider the number of activities reported per day, or the number of hours for which data is missing. Validate data through each processing step.

[67] But keep in mind the mode effect in comparability across respondents

	Validate linkage between background questionnaire and time data.
Timeliness and punctuality	Plan processing tasks for efficiency, to minimise impact on data release timetable. Consider staged release to allow early dissemination of key statistics.
Accessibility and clarity	Consider file structure and how to set up datasets that are as easy as possible to use (such as combining data items across different levels of the dataset).
Methodological soundness	Design weighting strategy to most accurately create estimates based on time use data (in particular, to ensure the days of the week are weighted proportionally). Create a clear set of rules and principles to be used when editing and cleaning diary data and ensure that the implications of these are understood. For example, determine to what extent the editing principles will prioritise completeness or internal consistency of a diary, versus maintaining the data as reported.
Cost-effectiveness	Consider level of detail to be achieved in data entry and minimise this where possible. Consider different options for data entry and coding (such as manual coding/amendments, at time of data entry or partially automated through statistical programming, pre-coded forms, machine learning), the resources required for each, and the effect on data quality.

	Consider cost of proposed data editing actions compared with the value added to the dataset. Consider whether there are statistically significant impacts of proposed data amendments.
Appropriate statistical procedures	For any manual data entry, coding or editing, implement a quality assurance process. Ensure security and integrity of data integration and processing system, such as physical security of forms, and how to ensure data is not overwritten.

Analyse	
Quality dimension	**Key considerations**
Relevance	Undertake relevant analysis to meet key data needs.
Accessibility and clarity	Consider design of tables for ease of use (e.g. using appropriate units of measure)
Coherence and comparability	Validate data using comparable data sources (e.g. previous time-use survey, other time-use surveys internationally, other survey or administrative data sources). If more than one collection mode has been used, check for mode effects (noting that detecting any statistically significant difference requires independent samples for each mode).

Methodological soundness	Use a method of measuring and reporting response rate that is transparent and consistent with previous surveys. Provide enough information on response to permit international comparison. This could include questionnaire response rate, diary return rate, proportion of selected households where all questionnaires and diaries were completed, proportion of collected diaries that were sufficiently complete to retain in the final output dataset.

Disseminate	
Quality dimension	**Key considerations**
Relevance	Develop dissemination products for different type of users (policy makers, researchers, general public, press). Develop dissemination products with key data needs in mind. For example, how users can most easily derive common requirements such as average time spent on each activity.
Accessibility and clarity	Develop detailed documentation to describe dataset and facilitate use (user guide). Include a description of the editing practices and rules used, which may help data users interpret the results. Time use datasets can be complicated to use – consider training high-level users or other method to ensure they can produce valid output from microdata.

Coherence and comparability	Publish classifications. If classification has changed between survey iterations, consider whether a concordance should be published. Publish dataset documentation to facilitate comparison with other datasets.
Cost-effectiveness	Consider appropriate balance between publication and microdata to best address known data needs.
Evaluate	
Quality dimension	**Key considerations**
Coherence and comparability	Incorporate some international comparison into survey evaluation. Publish evaluation or share with peer organisations.

B. Assurance of data quality of time-use survey results

1. Planning for a quality review

The review process to assess data quality involves evaluating the final survey product in terms of the accuracy, reliability and general usability of the data, in light of the objectives of the survey. The desired result is a balanced and informative discussion on specific sources of error and bias. Data quality statements are important to allow users to make more informed interpretations of the survey results, including understanding the limitations, and to help the NSO improve future surveys. Issuing statements relating to the quality of data produced should be standard statistical practice.

It is essential to plan the quality review as part of the overall survey planning process, not as an afterthought, because much of the information needed to evaluate data quality must be collected while the survey is being implemented. Data users should be involved at the planning stage as well. Most users are not able to assess data quality themselves so will rely on the quality review needs to understand the degree to which errors limit their use of the data.

The quality review cannot cover all potential sources of error and bias. It should focus on the most important sources, providing quantitative measures where it is possible and qualitative measures where it is not. To determine the appropriate level and intensity of evaluation, survey managers should consider:

- the uses and users of the data;
- the potential error and its impact on the use of the data;
- the variation in quality over time;
- the cost of the evaluation relative to the overall cost of the survey;
- the potential for improvement of quality, efficiency or productivity of statistical operations;
- the utility of data quality measures to users and their ease of interpretation; and
- the possibility of repeating the survey.

2. Data quality issues

As in any survey, sources of error in a time-use survey are described in terms of the components of total survey error—sampling and non-sampling errors. There is an extensive technical literature on survey errors and this guide does not go into a detailed discussion of the topic in general. Rather, it highlights quality issues specific to time-use data.

a) Sampling error

Sampling error (or sampling variability) occurs when the results of the data collection are based on a sample of the population rather than the entire population. Statistics from time-use surveys may differ from population characteristics because only a sample of all the persons **and time periods** are surveyed. Factors that affect the magnitude of sampling error include the sample design, sample size, variability of population and type of days.

Standard error and relative standard error are useful measures of sampling error. The relative standard error (RSE) expresses the standard error (SE) as a percentage of the estimate:

$$RSE\% = \frac{SE}{estimate} * 100$$

The Australian Bureau of Statistics uses 25% as the upper limit for estimates to be considered reliable for most purposes. It still reports estimates with RSEs between 25% and 50% but flags them to indicate that they should be used with caution. It does not report estimates with RSE of 50% or higher (Australian Bureau of Statistics 2022). Canada used a lower threshold: RSEs over 33.3% are considered too high, estimates with RSE between 16.7% and 33% should be interpreted with caution, and those with RSE below 16.7% are considered reliable.

b) Non-sampling errors

The major sources of non-sampling error are: (a) *missing data* due to coverage errors and both unit and item non-response; and (b) *measurement errors* derived from response errors and processing (coding and data entry) errors. It is often difficult to detect and to quantify the extent of these errors.

Coverage errors

Generally, coverage errors come from a sampling frame not reflecting the target population. The sample of a time-use survey includes people **and time periods** (see chapters II Scope and coverage of time-use data and chapter V), with the target population of days often including all days of the year. A sample that does not reflect target time can also lead to coverage errors. For practical reasons such as difficulty accessing the population, some days might be excluded, such as holidays or the rainy season. Other surveys are conducted in only one short time span, rather than throughout the year. Since coverage errors affect every estimate produced from the survey, they are one of the most important types of error. These errors may lead to either a positive or negative bias in the data, and the effect can vary for different subgroups of the population.

When the number of units excluded from the population is small, the biases introduced in the estimates will generally also be small in magnitude. However, when responses to some of the survey questions are highly correlated with characteristics of the groups or times excluded, the magnitude of the biases may be more significant. For example, single parents or people with two jobs may be too busy to respond to questionnaires. Their time use will be systematically different from those who have time to respond.

Coverage ratios obtained by comparing survey estimates of population subgroups (e.g. defined by age, race or sex) with population estimates from an independent source (for example, census or post-enumeration surveys) provide indicators of the extent of non-coverage. If a survey objective is to provide information on a specific sub-population, such as working parents, it can be useful to calculate coverage ratios for those population groups. But studies that measure only the level of non-coverage provide no information on the bias for individual survey estimates. Adjusting estimates by post-stratification or calibration aims to reduce non-coverage bias but does not

eliminate it. Studies of subsamples can provide evidence of non-coverage bias but their sizes are generally too small to use for estimation (Kalton, 2000).

Non-response error

Most time-use surveys randomly select households and reference days, and within households, randomly select respondents.

Unit non-response can be a household failing to respond, or an individual failing to respond at all or failing to respond on the assigned day. Response rates should be reported at the levels of household, individual and diary (or stylized questionnaire) day. Box XI.1. Determining and reporting response rates suggests an approach for calculating response rates in a way that is internationally comparable. This approach should be used when reporting on SDG Indicator 5.4.1, even if the NSO has other ways of reporting response rates for national publications.

Box XI.1. Determining and reporting response rates

Concepts

Discussions on response rates are not simply a matter of formulas but also specifications of concepts.

Higher response rates are often considered an indication of higher quality. Before making that assumption, however, it is important to consider how the sample was selected and how different inputs into the calculation are reported.

In reporting the response rates, researchers should be clear and transparent on the following issues:

Sample

Is the responding sample representative of the target population? How was the initial sample drawn?

- A random sample from the population register or any other list of persons, addresses, telephone numbers …? (If yes, which list?) What is the quality of the sampling frame?
- An existing panel? (If yes, how was the panel composed and selected?)
- Or was the sample selected some other way (e.g. self-selection of respondents who respond to advertisements)?

With quota samples, for example, interviewers might keep calling telephone numbers until they reach their survey quota. These surveys might report a 100 per cent response rate because everyone contacted completed the survey; however, the numbers that did not answer or were not valid were not included in the calculation.

Replacement

Is non-response handled by means of substitution? If yes, according to which procedure? How is substitution included in calculating non-response?

Any contact that does not lead to an acceptable result should be counted as a non-response, even if it is successfully replaced (for example, by someone else with similar characteristics, someone from the same street, someone from the same household.)

Eligible persons, sample loss

A clear definition of who is eligible to take part to the survey should be available. Persons who do not meet these criteria (e.g. outside the age range) are not considered as part of the sample, therefore are not considered as non-response[68].

There should also be a clear definition of what is considered as sample loss. Sample loss refers to that part of the sample that cannot be enumerated. For example, in a telephone list-based sample it would be the telephone numbers on the list that are no longer in use and therefore it would be impossible to elicit a response from that number.

Eligible diaries/questionnaires, acceptable diaries/questionnaires

A clear definition should be available of what is considered as an eligible diary or questionnaire for stylized questions. What criteria are used (e.g. minimum number of activities, amount of unspecified time, etc.)? What are the acceptable thresholds? See Table XI.2. Threshold for complete diary or stylized questionnaire for some countries' definitions.

Placed diaries/questionnaires

It should be clear what is expected from the respondents. If two diary days are asked for and only one day meets the acceptable thresholds, the diary response rate for this respondent is 50%.

Calculating response rates

Response rates for probability samples are calculated as the total number of completed interviews divided by the total number of eligible sampled units. Depending on the survey design, the following are different response rates that can be reported for time-use survey:

Sample response rate = completed sample / (approached sample minus sample loss)

[68] With prior estimates of non-response or from similar surveys, oversampling can be attempted..

Person response rate = number of persons completed the survey / persons eligible for the survey

Diary/stylized questionnaire response rate = number of acceptable returned diaries / placed diaries

Diary/stylized questionnaire days = number of days that met the acceptable thresholds / total eligible diary days

If children are included in the survey, a separate child-level response rate can also be calculated with the denominator representing the eligible number of placed child diaries and the numerator, representing the actual number of diaries from children included in the data file.

The American Time-Use Survey (BLS, 2022) calculates response rates as

$$\frac{Complete}{(Complete + Refusal + Noncontact + Other + Unknown\ Eligibility)}$$

Complete: complete or sufficient partial interview[69]

Refusal: contacted, declined to participate

Noncontact: uncompleted callbacks; never contacted

Other: respondent absent, ill, or hospitalized; language barrier, etc.

Unknown eligibility: phone number incorrect for household, unconfirmed number, etc.

Item non-response occurs when a sufficiently accurate response is obtained for only some of the data items required for a respondent. For time-use surveys, it is necessary to define a "completed

[69] The ATUS considers a diary with a minimum of 21 hours and 5 activities as complete.

interview"—that is, how much of the diary or questionnaire needs to be completed for it to be used for analysis. This may be expressed in hours of completed activities, or as the number of activities entered. Where the reference period is more than one day, consideration should be given to the treatment of diaries containing only one complete day. A balance needs to be achieved between setting the acceptance threshold too high–and not having enough diaries to complete the analysis, or too low–and impacting data quality. Table XI.2 provides thresholds used by some countries.

Table XI.2. Threshold for complete diary or stylized questionnaire

Country	Threshold for being complete
Australia	24-hour period had a minimum of 14 hours of information and minimum of three activities At least one day was completed of the two days
Canada	Diary has at least 3 activities in a 24-hour period
Chile	A proposal that is currently being studied for the 2023 time use survey is: • At least 80% of core questionnaire answered (questions on whether participated in activity and amount of time). • At least 85% of questions related to work activities answered (questions on whether participated in activity, amount of time and, for care work, also the identification of the care recipient); • Have at least 4 activities including eating and/or sleeping reported with the amount off time.

	• Total time reported minimum of 11 and maximum of-48 hours per day (including simultaneous activities)
China	At least 3 consecutive activities
Finland	At least 12 hours. Also consider specific activities.
Italy	At least 7 episodes and 17 hours of activity
Japan	At least 4 activities and at least 18 hours in a 24-hour period Both designated days
Mexico	All stylized questions answered
USA	At least 21 hours and 5 activities

As with all surveys, differences between respondents and non-respondents can bias survey results. There are, in general, two methods of compensating for non-response: sampling weight adjustment and imputation (Kalton and Kasprzyk, 1986). Weighting adjustments aim to reduce non-response bias but do not eliminate the bias. When weighting is used to adjust for non-response, estimates of the variances of survey estimates should incorporate their effects.

Imputation may reduce non-response bias but cannot eliminate it. Imputation effects should be incorporated into variance estimation. (See chapter 0

Processing of time-use survey data for additional discussion on weighting adjustments and imputation.)

Measurement error

Two types of measurement errors are response errors and processing errors. **Response errors** occur when the response received differs from the "true" value. These errors may be caused by the respondent, the interviewer, the questionnaire, or the mode of data collection. **Processing errors** may occur at the stages of data capture, coding, editing, imputation and tabulation. Measurement errors may be random in nature, or they may introduce a systematic bias into the results.

Digital tools have the potential to reduce processing errors by having the respondent or interviewer enter the data directly (skipping separate coding or data entry steps by other people), with automatic validation checks flagging out of range responses. However, range checks cannot guarantee that values entered are correct, only that they are not implausible. Self-report tools can also increase the likelihood of response errors. Respondents are more likely than well-trained interviewers to:

- Misclassify activities (especially if lists are long)
- Report sequential activities as simultaneous
- Omit activities, especially those that are done throughout the day while doing other activities, such as supervisory care.

The main way to measure response error is by conducting validity and reliability studies, for example by re-interviewing a sub-sample of respondents.[70] It is best to minimize error to begin with by carefully designing survey tools and procedures and investing adequate time on thoroughly piloting them.

3. Some quality review procedures

In addition to standard measures of quality such as coverage ratios, response rates, edit and imputation rates, and measures of sampling error, some **indicators of quality** specific to time-use survey data include:

- Number of activities or episodes/events reported (episodes for diaries only)
- Variety of activities reported
- Number of simultaneous activities reported (diary only)
- Number of time intervals accounted for (diary only)
- Number of starting times that are rounded up (open-interval diary only)

More detail is usually an indicator of better reporting. Survey quality is assessed by taking the averages over all diaries and comparing them with known results from similar surveys. Broader activity categories will lead to fewer episodes being recorded because separate activities falling into the same broad category will be coded in the same way as a single activity. For number of simultaneous activities, the focus should be on typically omitted or pervasive activities.

[70] NSOs need to plan and budget for these in the design phase, considering whether and how personal details can be retained for the purpose of validating match between questionnaire and diary records, within applicable legislative and privacy frameworks.

The number of time intervals accounted for is an indicator of accuracy in reporting. It is possible to compare these values across sub-populations, but important to consider the extent to which differences reflect differences in reporting or differences in actual behavior. For example, people who earn low wages may have to work longer hours, which would lead to fewer non-work activity episodes. This is a difference in behavior, not an indication of poorer-quality reporting.

As with all surveys, it is important to check internal consistency and validity across tables produced. The total time should add up to 1,440 minutes per day or 168 hours per week (including missing or "no activity recorded"). An external consistency check is to compare results to previous studies, or to those from similar populations. Mean duration of time allocated to major activity groups over the population, mean duration for participants, and participation rates are three measures that could be compared, (disaggregated by sex, age groups, day of the week, and other relevant analysis variables). In making comparisons, it is important to account for differences in methodology, coverage, concepts and definitions, and classifications between surveys.

Sometimes it is too expensive, time-consuming or not technically feasible to conduct intensive data quality evaluations or generate quantitative measures of errors. In that case, the statistical office and time-use experts can work together to attempt a subjective analysis or data quality rating based on expert judgement.

4. Using results of data quality review

Quantitative measures and qualitative assessments from the review of data quality can be used to adjust survey estimates, to guide users in the analysis and interpretation of survey data, and to improve the quality of succeeding surveys.

The question often arises whether adjustments should be made in survey results to correct obvious deficiencies. As discussed above and in chapter VIII.C, Weighting, it may be possible to a limited extent to reduce bias due to coverage and non-response errors by adjusting estimates using appropriate adjustment factors. For example, adjustment factors for non-response bias can sometimes be developed from re-interview studies or record checks. These factors can theoretically be applied to the original survey results to reduce evident biases.

Another procedure is to allow the unadjusted survey estimates to stand but to provide as much information as possible in the technical appendices of publications on the estimated magnitudes of various kinds of errors based on results of data review studies. An alternative to applying adjustment factors to survey estimates that are considered unreliable is to suppress the information with an explanation as to why it is being withheld.

Information on item errors can affect various publication decisions. If the errors are especially numerous in a given item, for example, that item can be suppressed in the publication (that is to say, not shown), with a note explaining the reason for suppression. In their statement on the methodology of their 2020-21 time-use survey, Australia Bureau of Statistics (2022; p. 4) reports:

> *The following items were collected in the diaries and have not been published due to data quality concerns:*
>
> - *Whether a smartphone, table or computer was used to do the activity*
> - *Who was present during the activity*

Where imputation is used, the extent of imputation can also be specified through explanatory notes in statistical tables.

Quality reviews are also important for informing the next cycle of the survey. The review or

evaluation should address all aspects of the survey from survey design through to data dissemination. In Australia, an evaluation report is prepared for every survey. This is a document for internal use only that covers the entire survey cycle process and includes recommendations for improvements in the next cycle.

Box XI.2. Quality checklist

- Set targets for the different measures of response (questionnaire response rate, diary return rate, household-level completion), and monitor these throughout enumeration.
- Train interviewers for efficient and consistent collection of data.
- Train interviewers to maintain security and confidentiality.
- Review data quality of responses and identify gaps in data collected to determine whether it will meet needs. For example, to what extent the data will be able to be used without editing or amendment, or whether certain diary fields have more missing data than others.
- Determine criteria for inclusion of diaries in the final dataset, based on required level of quality. For example, consider the number of activities reported per day, or the number of hours for which data is missing.
- Validate data through each processing step.
- Validate linkage between questionnaire and diary data.

- Validate data using comparable data sources (e.g. previous time-use survey, other time-use surveys internationally, other survey or administrative data sources).
- Check for mode effects, if more than one collection mode has been used.
- Use a method of measuring and reporting response rate that is transparent and consistent with previous surveys. Provide enough information on response to permit international comparison. This could include questionnaire response rate, diary return rate, proportion of selected households where all questionnaires and diaries were completed, proportion of collected diaries that were sufficiently complete to retain in the final output dataset.
- Incorporate some international comparison into survey evaluation.
- Publish evaluation or share with peer organisations.

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Annexes

Annex 1: Minimum Harmonized Instrument - Model Diary

The model diary and wording presented here are intended for use in a digital mode of data collection implemented as a computer-based web application or as a smartphone application. Any digitized mode should offer a low-tech option such as telephone interview to accommodate respondents who lack digital communication technology. The minimum activity list presented in Annex 1 should be offered in colloquial language, as shown below, in drop down menus as required. Note that the order of presentation of the activity list may differ depending on the application used. The order of presentation is not the MHI activity number.

Table. Minimum Harmonized Instrument Activity Categories

1	working for pay or doing activities to generate an income for yourself or your family
2	unpaid activities done to produce goods for use by your household or family
3	helping neighbours, friends, or others without receiving payment
4	cooking, preparing or heating meals, setting up or clearing the table or washing the dishes
5	cleaning the inside or outside of the dwelling; disposal of garbage or recycling, watering plants
6	making minor repairs to the dwelling, repairing or maintaining furniture, appliances, or household vehicles
7	washing, ironing, hanging clothes to dry, mending clothes or cleaning footwear
8	budgeting, paying bills, organizing or planning household-related activities or completing administrative forms such as passports, contracts, applications, or collecting social program benefits

9	taking care of a family pet, feeding, bathing, taking them for walks, cleaning their space or using veterinary or pet services
10	buying household supplies, food, or clothing for family members, when done in person or online
11	taking care of children in your household or family by feeding, dressing, putting to bed, talking, playing, assisting or supervising homework or school activity, accompanying to appointments, providing healthcare
12	taking care of adults in your household or family by feeding, bathing, dressing, putting to bed, talking, listening, providing or planning for health care services or helping with personal business management
13	education, attending classes or courses onsite or online, or education-related assignments, homework
14	getting together with others for social purposes, talking, chatting, writing or reading personal emails or texts
15	joining in community festivities or events, attending civil obligations, or participating in religious celebrations or practices
16	attending cultural, entertainment or sports events
17	participating hobbies such as painting, music, or photography, playing games, or relaxing
18	participating in a sport or exercise
19	reading for leisure (e.g. newspapers, books, e-books, social media, magazines)
20	watching TV, listening to radio or streaming
21	sleeping
22	eating or drinking

23	own personal hygiene such as showering, getting dressed, getting a haircut or personal health care like resting, being sick or visiting doctors or specialists
24	traveling to and from places
25	other (activities not listed or unknown)

The model assumes the diary is based on open format episodes with exact start and end times. Statistical organizations may use fixed intervals (for example 10, 15 or 20 minute blocks) for timing activities but this option is not examined here.

Examples of simplified categories for answers to the contextual questions: *where?,who with?, for whom?* and *use of ICT?* are also provided. These should be customized for local applications. Alternative categories used in current programs will be supplied by members of the Expert Group on request.

Model open-timed diary questionnaire

In an open-timed diary, respondents report daily activity from a start time, often 4:00 am, and their best estimates of ending times. In the model, *Q_Act1* refers to the question about the first activity episode. *Act1* refers to the answer, and similarly for the contextual questions. The cycle of questions is repeated from 1 to the number of the final episode reported. Thus *Q_Where12* is the question regarding location of the twelfth activity, if applicable. The second and following start times are computed as the summation of the sequence of duration times. Alternatively, the duration question can ask for the ending time and the duration is then calculated as the difference between start and end.

There are alternatives to attaching the context questions directly to the episodes, namely asking a series of supplementary questions about the context or secondary activity at the end of the

questionnaire. This implies either using an interview mode or programming the supplementary questions into the software. This would require a fairly high level of methodological capacity.

The episode reports begin with the question:

Q_Act1. What were you doing at 4:00am?

Act1. *answer is selected from the drop-down menu of 25 activities*

Drop down list for primary activity (25 MHI activities)

Q_ Duration1. How long did this activity last?

Duration1. *HOURS; MINUTES*

Q_Where1. Where were you?

Where1. *answer selected from drop-down list. If Act1 is travel, this list shows transport modes rather than locations.*

Drop down list for *Where were you?*
1 At home 2 At place of work or school 3 At another residence 4 Outdoors (away from home) 5 At store or place of service 6 Other (non-travel)

If traveling to or from places is selected, the “Where were you?” question should be “Which mode of transportation did you use?” The answers shown are specific to mode of transportation such as:
7 Car, van, truck as a driver 8 Car, van, truck as a passenger 9 Public transportation such as bus, tramway, subway, light train, ferry 10 Bicycle 11 Walking 12Taxi, limousine service 13 Plane 14 Other transport 99 Refusal, no answer

Q_Who1. Who was with you?

Who1. *Respondent selects all persons from drop-down list. This creates a field of variables, one for each possible person type.*

Drop-down list for Who was with you?
1 Alone 2 Spouse or partner 3 Household children 4 Other household or family

5 Friends 6 Workmates, colleagues, classmates 7 Other

Q_ForWhom1. For whom did you mainly do/undertake this activity?

For_Whom1. *answer selected from drop-down list* (answer set depends on activity reported in the episode)

Drop-down list for MHI activity 1, 2, 4, 5, 6, 7, 8, 9, 10, 25
1 For paid job or own or family business 2 For use by household members or yourself 3 For use by family members residing elsewhere 4 For use by others

Drop-down list for activity MHI 11, or MHI 12
1 For use by household members 2 For use by family members residing elsewhere 3 For use by unrelated persons living in your household

Drop-down list for activity MHI 3 (helping and volunteering)
1 Friends 2 Neighbours 3 Colleagues from work, school or community organization 4 Acquaintances 5 Other

Q_Use of ICT1. Were you using any type of technology for this activity?

Use_ICT1. *answer yes or no*

Q_Secondary_act1. Please indicate if you were doing any of these activities at the same time.

Secondary_act1. *answer is selected from abridged list or complete MHI list of 25 activities* (see also section 6.4)

Drop-down list for secondary activities (abridged)

Unpaid domestic and care work activity

- Housework (such as dishwashing, table cleaning, taking away garbage, laundry, etc.)
- Child-care (such as supervising homework, watching child swimming, minding)
- Adult care (such as supervising someone else's medication consumption/ or treatment)
- Organizing, planning or paying bills
- Pet care

Additional activities:

- Eating or drinking
- Socializing or communicating - in person > Talking, conversing
- Socializing or communicating - using any type of technology > Phone, email, social media, video call, text messaging
- Reading
- Watching TV or videos
- Listening to music or radio
- General computer use
- Hobbies

Examples of probing questions for secondary activity

Intro Many of our daily activities help persons living inside or outside our household. The following question is asked to determine how much informal support people provide to one another.

##Q1 Among the activities you reported in the diary, which one(s) did you do to help another person? (please select all that apply) programmer: bring full list of activities from the diary with check boxes. For each identified activity have a loop of Q2 to Q6

##Q2 Did (this activity) help a person inside your household, outside of your household or an organization?

<1> Person from household..... Go to ##Q3

<2> Person outside from household..... Go to ##Q3

<2> Organization Go to ##Q6

<3> No (Go to next episode)

<x> Don't know (Go to next episode)

<r> Refused (Go to next episode)

##Q3 Was the person helped 65 years or older? (If more than one, principal person helped.)

<1> Yes

<3> No

<x> Don't know

<r> Refused

##Q4 Does the person you helped have a long-term health or physical limitation?

(Any conditions lasting or expected to last more than 6 months and which can be either chronic or permanent)

<1> Yes

<3> No

<r> Refused

##Q5 What is this person's relationship to you?

<1> husband/wife/partner

<2> child less than 5 years

<3> child 5 to 13 years

<4> Child over 13 years

<5> Parent(s) or parent (s) in-law

<6> Children of respondent living outside the household

<7> Other member(s) of the family outside the household.

<8> Friend(s)

<9> Neighbour(s)

<10> Co-worker(s)

<11> Others

<x> Don't know

<r> Refused

[Go to next episode]

##Q6 Was this organization mostly concerned with seniors, children, persons with disabilities or other?

<1> Seniors

<2> Children

<3> Persons with disabilities

<4> Other

<x> Don't know

<r> Refused

(go to next selected activity)

End of diary instrument

From all the activities you did on (Diary Day), were any performed to help the following persons?

Children 14 and under leaving in your household Yes No

Adult 65+ leaving in your household Yes No

Children 14 and under not leaving in your household Yes No

Adult 65+ not leaving in your household	Yes	No
Friends, acquaintances	Yes	No

Annex 2: Minimum Harmonized Stylized Questionnaire Instrument

Annex 2 provides an illustration of the use of sets of stylized questions for collection of time-use data for the minimum set of 25 harmonized activities.

The instrument is administered using eight sections or modules tailored to specific groups of activities within the minimum set of 25. The groupings are:

- self-care and learning
- employment and production of goods for own final use
- unpaid domestic work activities for own household
- unpaid care activities for own household
- unpaid domestic and care activities for non-household persons
- volunteering
- socializing and leisure
- other activities

Captions for a better understanding of the instrument are explained below:

- The wording in *italics* are aids (for example, interviewer should not read aloud)
- Words, questions, and sections marked in grey are optional, so each country can decide whether to include them or not.

SECTION A: SELF-CARE AND LEARNING ACTIVITIES

Now I am going to ask you about the time you dedicate to personal activities

NOTES	***For persons N+ (countries need to define age of respondents)***	
	Reference period: day	**Reference period: week**
Essential ICATUS 91	A1. (Yesterday/Assigned day/Last week) how much time did you sleep? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 93 and 94	A2. (Yesterday/Assigned day/Last week) how much time did you spend on personal hygiene *(taking showers, getting dressed, getting a haircut)* or personal health care *(resting sick, visiting doctors)*? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 92	A3. (Yesterday/Assigned day/Last week) how much time did you spend eating or drinking? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ]

		Saturday and Sunday [ ] and [ ]
Essential ICATUS 6	A4.a. (Yesterday/Assigned day/Last week) did you attend any education classes, participate in an online course or work on education-related assignments? 1.Yes→A4.b 2. No→A5.a	
	A4.b How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	A5.a. (Yesterday/Assigned day/Last week) did you commute to and from school, college, or university? 1. Yes→A5.b 2. No→B1	
	A5.b How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION B: EMPLOYMENT AND PRODUCTION OF GOODS FOR OWN FINAL USE

Now I am going to ask you about the time you dedicate to working for pay or to doing activities to generate an income for yourself or your family

NOTES	***Only for persons employed in reference week***	
	Reference period: day	**Reference period: week**
Essential ICATUS Division 11, 12, 13	B1. How many hours did you work in your (main/other) job on [specify the day (yesterday/assigned day)]? (*Repeat this question for each job reported)* [ ] hours and [ ] minutes	B1. What days and how many hours did you work last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	For all persons aged N+	

<table>
<tr><td rowspan="3">Essential
ICATUS
Division 11,
12,13</td><td colspan="2">B2.a Aside from what you told me already, [Yesterday/ Last 7 days//Assigned day/Reference week] did you do any (other) activity to generate income, even for a short period. (to be asked to respondents identified as not employed in the background questionnaire)
1.Yes→B2.b
2. No→B3.a</td></tr>
<tr><td>B2.b How much time did you spend on it?</td><td></td></tr>
<tr><td>[ ] hours and [ ] minutes</td><td>Hours and minutes
Monday [ ] and [ ]
Tuesday [ ] and [ ]
Wednesday [ ] and [ ]
Thursday [ ] and [ ]
Friday [ ] and [ ]
Saturday [ ] and [ ]
Sunday [ ] and [ ]</td></tr>
<tr><td>Essential
ICATUS</td><td colspan="2">B3.a [Yesterday/assigned day/Last week] did you spend any time travelling to and from your (main/other job(s))?
1.Yes→B3.b
2. No→B4.a</td></tr>
</table>

<table>
<tr><td>Division 18</td><td>B3.b How much time did you spend on it?

[ ] hours and [ ] minutes

Hours and minutes
Monday [ ] and [ ]
Tuesday [ ] and [ ]
Wednesday [ ] and [ ]
Thursday [ ] and [ ]
Friday [ ] and [ ]
Saturday [ ] and [ ]
Sunday [ ] and [ ]</td></tr>
<tr><td>NOTES</td><td>For all persons aged N+</td></tr>
<tr><td>Essential

ICATUS

Division 16</td><td>B4.a [Yesterday/assigned day/Last week] did you do anything to find a paid job or to start a business?

1.Yes→B4.b

2. No→B5.a</td></tr>
<tr><td></td><td>B3.b Including commuting and waiting times, how much time did you spend searching for a job or starting a business?

[ ] hours and [ ] minutes

Hours and minutes
Monday [ ] and [ ]
Tuesday [ ] and [ ]</td></tr>
</table>

		Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
Essential ICATUS Major Division 2	B5.a [Yesterday/assigned day/Last week] did you grow produce, raise animals or fish, preserve food, make textiles, work on construction for own household or family use or manufacture household items? 1.Yes→B5.b 2. No→C1.a	
	B5.b How much time did you spend on it? [ ] hours and [ ] minutes	B5.b On which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ]

		Saturday [ ] and [ ] Sunday [ ] and [ ]

SECTION C: UNPAID DOMESTIC WORK ACTIVITIES FOR OWN HOUSEHOLD AND FAMILY MEMBERS[71]

Now I am going to ask you about the time you dedicate to domestic work activities for your household and/or for family members not living with you for which you did not receive a payment. Where relevant include travel and waiting times.

NOTES	***For persons N+ (countries need to define age of respondents)***	
	Reference period: day	**Reference period: week**
Essential ICATUS31	C1.a. (Yesterday/Assigned day/Last week) did you cook, prepare, or heat meals, set up or clear the table or wash the dishes? 1.Yes→C1.b 2. No→C2.a	
	C1.b How much time did you spend on it? [ ] hours and [ ] minutes	Hours and minutes

[71] If section C is limited to domestic work activities for household members, section E needs to be added and wording marked in grey needs to be deleted.

		Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS32	C2.a. (Yesterday/Assigned day/Last week) did you clean the inside or outside of the dwelling; dispose of, separate, or recycle the garbage; or water plants in your garden? 1.Yes→C2.b 2. No→C3.a	
	C2.b How much time did you spend on it? Please include commuting and waiting times for waste recycling, if applicable.	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS36	C3.a. (Yesterday/Assigned day/Last week) did you take care of a family pet *(feeding, bathing, taking them for walks, or cleaning their space)* or use veterinary or pet services? 1.Yes→C3.b 2. No→C4.a	
	C3.b Including commuting and waiting times, how much time did you spend on it?	

	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS34	C4.a. (Yesterday/Assigned day/Last week) did you wash, iron, hang or dry or mend clothes or clean footwear? 1.Yes→C4.b 2. No→C5.a	
	C4.b Including commuting and waiting times, how much time did you spend doing these tasks? Please exclude the time the washing machine was running while you were engaged in other activities.	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS33	C5.a. (Yesterday/Assigned day/Last week) did you make minor repairs to your dwelling, repair or maintain furniture, appliances, or household vehicles? 1.Yes→C5.b 2. No→C6.a	
	C5.b Including commuting and waiting times, how much time did you spend on these tasks?	

	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS35	C6.a. (Yesterday/Assigned day/Last week) did you budget, organize or plan household-related activities; pay household bills *(utilities, mortgages, loans, rent)* or carry out administrative or legal procedures *(passports, contract or cancel services, collection of social program benefits)*? Include activities performed online. 1.Yes→C6.b 2. No→C7.a	
	C6.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS37	C7.a. (Yesterday/Assigned day/Last week) did you buy household supplies, food, or clothing for family members in person or online? 1.Yes→C7.b 2. No→D1.a	

	C7.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION D: UNPAID CARE ACTIVITIES FOR OWN HOUSEHOLD OR FAMILY MEMBERS[72]

Now I am going to ask you about the time you dedicate to caring for children aged 0 to X *(use country definition of child)* in your household and/or for family not living with you for which you did not receive a payment.

NOTES	***For persons N+ (countries need to define age of respondents) with children (use country definition of child) in their households or family***	
	Reference period: day	**Reference period: week**
Essential ICATUS	D1.a. (Yesterday/Assigned day/Last week) did you feed, bathe, change diapers, dress, put to bed, talk to, or play with a child in your household or family? 1.Yes→D1.b 2. No→D2.a	

[72] If section D is limited to unpaid care work activities for household members, section E needs to be added and wording marked in grey needs to be deleted.

<table>
<tr><td>411,414,415,
416</td><td>D1.b How much time did you spend on it? Exclude time that you care for children while performing other activities.
[ ] hours and [ ] minutes
Hours and minutes
Monday to Friday [ ] and [ ]
Saturday and Sunday [ ] and [ ]</td></tr>
<tr><td rowspan="2">Essential
ICATUS
413 and 417</td><td>D2.a. (Yesterday/Assigned day/Last week) did you assist children in your household or family with schoolwork or participate in meetings with school or care service providers?
1.Yes→D2.b
2. No→D3.a</td></tr>
<tr><td>D2.b Including commuting and waiting times, how much time did you spend on these tasks?
[ ] hours and [ ] minutes
Hours and minutes
Monday to Friday [ ] and [ ]
Saturday and Sunday [ ] and [ ]</td></tr>
<tr><td>Essential
ICATUS
412</td><td>D3.a. (Yesterday/Assigned day/Last week) did you provide healthcare to children in your household or family (giving medicines, taking temperature, applying bandages, assisting with physical therapy, taking children to medical appointment)?
1.Yes→D3.b</td></tr>
</table>

	2. No→D4.a	
	D3.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

Now I am going to ask you about the time you dedicate to care work activities for adults aged X+1 and above *(use country definition)* in your household and/or for family members not living with you for which you did not receive a payment.

NOTES	***For persons N+ (countries need to define age of respondents)***	
	Reference period: day	**Reference period: week**
Essential ICATUS 421,424,425,431,432	D4.a. (Yesterday/Assigned day/Last week) did you feed, bathe, dress, put to bed, talk, and listen to, a household or family members aged X+1 and above? 1.Yes→D4.b 2. No→D5.a	
	D4.b How much time did you spend on it? Exclude time that you care for persons over X +1 years while performing other activities	

	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 422,426	D5.a. (Yesterday/Assigned day/Last week) did you provide healthcare or planned for health care services to a dependent or sick household or family members aged X+1 and above? *(giving medicines, taking temperature, applying bandages, assisting with physical therapy taking adults to medical appointments)*? 1.Yes→D5.b 2. No→D6.a	
	D5.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 423	D6.a. (Yesterday/Assigned day/Last week) did you help household or family members aged X +1 and above with personal forms or accounts *(assisting with banking transactions, reading, or completing forms)* ? 1.Yes→D6.b 2. No→E1.a (or F1.a)	

	D6.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION E: UNPAID DOMESTIC AND CARE ACTIVITIES FOR NON-HOUSEHOLD FAMILY MEMBERS[73]

Now I am going to ask you about the time you dedicate to domestic and care work activities for family members who do not live with you for which you did not receive a payment.

NOTES	***For persons N+ (countries need to define age of respondents)***	
	Reference period: day	**Reference period: week**
Optional To be applied only if previous questions of section C and D were asked only about services for household members	E1.a. (Yesterday/Assigned day/Last week) did you do any kind of domestic work *(clean and tidy indoors, cook meals, set the table, or clear away dishes)* for family members who do not live with you without receiving payment? 1.Yes→E1.b 2. No→E2.a	
	E1.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	E2.a. (Yesterday/Assigned day/Last week) did you spend any time caring for children from your family not living with you *(feed, bathe, change diapers, dress, assist with schoolwork, provide or plan for health care)* without receiving payment? 1.Yes→E2.b 2. No→E3.a	
	E2.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes

[73] Apply this section if sections C and D exclude activities for the provision of services to non-household family members.

		Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	E3.a. (Yesterday/Assigned day/Last week) did you do any kind of care work without receiving payment for family members aged X+1 and above who do not live with you? 1.Yes→E3.b 2. No→F1.a	
	E3.b Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION F: VOLUNTEERING

Now I am going to ask you about the time you dedicate to volunteering activities for your community or organizations or helping others.

NOTES	***For persons N+ (countries need to define age of respondents)***	
	Reference period: day	**Reference period: week**
Essential ICATUS 51 and 52	F1a. (Yesterday/Assigned day/Last week) did you dedicate any time to help neighbors, friends, or others without receiving payment or did you volunteer for the community or for an organization? 1.Yes→F1.b 2. No→G1.a	
	F1.b How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION G: SOCIALIZING AND LEISURE ACTIVITIES

Now I am going to ask you about the time you dedicate to socialize and for leisure activities

NOTES	***For persons N+ (countries need to define age of respondents)***

	Reference period: day	**Reference period: week**
Essential ICATUS 83	G1.a. (Yesterday/Assigned day/Last week) did you participate in a sport or exercise? 1.Yes→G1.b 2. No→G2.a	
	G1.b Including commuting and waiting times, how much time did you spend on it? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 82	G2.a. (Yesterday/Assigned day/Last week) did you participate in any form of art *(painting, music, theatre, dance, photography)*, spend time on a hobby or play games? 1.Yes→G2.b 2. No→G3.a	
	G2.b Including commuting and waiting times, how much time did you spend on it? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 81	G3.a. (Yesterday/Assigned day/Last week) did you go to a cultural, entertainment or sport event? 1.Yes→G3.b 2. No→G4.a	
	G3.b Including commuting and waiting times, how much time did you spend on it? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 72, 73 and 74	G4.a. (Yesterday/Assigned day/Last week) did you join in community festivities or events, attend civil obligations, or participate in religious celebrations or practices? 1.Yes→G4.b 2. No→G5.a	

	G4.b Including commuting and waiting times, how much time did you spend on it? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 71	G5.a. (Yesterday/Assigned day/Last week) did you get together with others for social purposes, chat, wrote or read a social letter or email? 1.Yes→G5.b 2. No→G6.a	
	G5.b How much time did you spend on it? [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 841	G6.a. (Yesterday/Assigned day/Last week) did you read for leisure *(newspapers, books, e-books, social media, magazines)* without performing other activities simultaneously? 1.Yes→G6.b 2. No→G7.a	
	G6.b How much time did you spend on it? Exclude time that you read for leisure while performing other activities already mentioned. [ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS 842 y 843	G7.a. (Yesterday/Assigned day/Last week) did you watch TV, listen to radio or streaming without performing other activities simultaneously? 1.Yes→G7.b 2. No→end of time-use module (or H1.a)	
	G7.b How much time did you spend on it? Exclude time that you watch TV, listen to radio or streaming while performing other activities already mentioned. [ ] hours and [ ] minutes	Hours and minutes

	end of time-use module (or H1.a)	Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ] end of time-use module (or I1.a)

SECTION H: OTHER ACTIVITIES[74]

Now I am going to ask you about the time you dedicate to other activities not already mentioned.

NOTES	***For persons N+ (countries need to define age of respondents)***	
	Reference period: day	**Reference period: week**
Optional	H1.a (Yesterday/Assigned day/Last week) did you carry out any other activity that I have not asked you about? 1. Yes→ _____ Specify activity →I1.b 2. No→ end of time-use module	
	H1.b How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	end of time-use module	

[74] Optional question to identify problems of cognition in terms of how activities should be allocated (i.e., reporting of other activities that should have been reported in the prior domains).

Optional section for recollecting broader information about the production of goods for own final use[75]

SECTION B*: Production of goods for own final use **Now I am going to ask you about the time you dedicated to unpaid activities, you may have done to produce different goods for use by your household or family. That is, not to sell.**

<table>
<tr><td></td><td>Reference period: day</td><td>Reference period: week</td></tr>
<tr><td>NOTES</td><td colspan="2">For all persons aged N+</td></tr>
<tr><td rowspan="3">Optional

ICATUS Major Division 2</td><td colspan="2">B*.1a [Yesterday/assigned day/Last week] did you: read and mark all that apply

1. [ ] Work or help in any farming activities to produce food for the family
2. [ ] Keep or help in a family (kitchen garden or orchard)
3. [ ] Rear or tend farm animals kept by the family
4. [ ] Work or help in family fishing (or fish farming) activities
5. [ ] None of the above →B*.3.a</td></tr>
<tr><td>B*.1.b How much time did you spend on it?
[ ] hours and [ ] minutes</td><td>B*.1b What days and how time did you spend on it last week?
Hours and minutes
Monday [ ] and [ ]
Tuesday [ ] and [ ]
Wednesday [ ] and [ ]
Thursday [ ] and [ ]
Friday [ ] and [ ]
Saturday [ ] and [ ]
Sunday [ ] and [ ]</td></tr>
<tr><td colspan="2">B*.2a What are the main (animals, farming, and/or fishing) products that you are working on for the family? For example: (citrus fruits, vegetables, freshwater fish, cattle, chicken, rice)

_____
MAIN CROPS</td></tr>
<tr><td></td><td colspan="2">B*.2b ISIC CODE: _____</td></tr>
</table>

[75] Optional section based on the Modulo OPA and OPG from ILO (2020) LFS Questionnaire for PAPI. Core modules for working age persons. Job-type start (v4)

B*.3a [Yesterday/assigned day/Last week] did you gather wild food such as mushrooms, berries, herbs...?
1.Yes→B*.3b
2. No→B*.4a

B*.3b How much time did you spend on it?
[ ] hours and [ ] minutes

B*.3b What days and how time did you spend on it last week?

	Hours	and	minutes
Monday	[ ]	and	[ ]
Tuesday	[ ]	and	[ ]
Wednesday	[ ]	and	[ ]
Thursday	[ ]	and	[ ]
Friday	[ ]	and	[ ]
Saturday	[ ]	and	[ ]
Sunday	[ ]	and	[ ]

B*.4a [Yesterday/assigned day/Last week], did you go hunting for *bush meat*...?
1.Yes→B*.4b
2. No→B*.4a

B*.4b How much time did you spend on it?
[ ] hours and [ ] minutes

B*.4b What days and how time did you spend on it last week?

	Hours	and	minutes
Monday	[ ]	and	[ ]
Tuesday	[ ]	and	[ ]
Wednesday	[ ]	and	[ ]
Thursday	[ ]	and	[ ]
Friday	[ ]	and	[ ]
Saturday	[ ]	and	[ ]
Sunday	[ ]	and	[ ]

B*.4a [Yesterday/assigned day/Last week], did you prepare preserved food or drinks for storage *such as flour, dried fish, butter, cheese*...?
1.Yes→B*.4b
2. No→B*.5a

	B*.4b How much time did you spend on it? [ ] hours and [ ] minutes	B*.4b What days and how time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.5a [Yesterday/assigned day/Last week] did you do any construction work to build, renovate or extend the family home or help a family member with similar work? 1.Yes→B1.5b 2. No→B1.6a	
	B*.5b How much time did you spend on it? [ ] hours and [ ] minutes	B*.5b What days and how time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.6a [Yesterday/assigned day/Last week] did you spend any time making goods for use by your household or family (*such as mats, baskets, furniture, clothing)*? 1.Yes→B*.6b 2. No→B*.7a	
	B*.6b How much time did you spend on it? [ ] hours and [ ] minutes	B*.6b What days and how time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ]

		Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.7a [Yesterday/assigned day/Last week] did you fetch water from natural or public sources for use by your household or family? 1.Yes→B*.7b 2. No→B*.8a	
	B*.7b How much time did you spend on it? [ ] hours and [ ] minutes	B*.7b What days and how time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.8a [Yesterday/assigned day/Last week] did you collect any firewood or other natural products for use as fuel by your household or family? 1.Yes→B*.8b 2. No→ C1.a	
	B*.8b How much time did you spend on it? [ ] hours and [ ] minutes	B*.8b What days and how time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]

OPTION 2

Now I am going to ask you about the time you dedicated to unpaid activities, you may have done to produce different goods for use by your household or family. That is, not to sell.

NOTES	*For all persons aged N+*	Reference period: day	Reference period: week
Optional ICATUS Major Division 2	B*.1 [Yesterday/assigned day/Last week] did you do any of those following activities for your household or for family members living in other households? Please indicate the time you spend in each of the activities you have done.		
	[ ] Do any farming and fishing	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Gather wild food *such as mushrooms, berries, herbs...*	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Go hunting	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Prepare preserved food or drinks for storage *such as flour, dried fish, butter, cheese...*	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Do any construction work to build, renovate or extend the family home or help a family member with similar work	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Spend any time making goods *such as mats, baskets, furniture, clothing...*	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Fetch water from natural or public sources	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Collect any firewood or other natural products for use as fuel	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

Table A3-1: Relationship between the Diary format and Stylized questionnaire format of the Minimum Harmonized Instrument					
Diary			**Stylized Questionnaire**		
#	**Activity**	**ICATUS 2016**	**Section**	**Number of questions**	**Prioritization**
1	Working in paid job or income generating activities	Division 11, 12, 13, 15, 16 and 18	B: Employment and production of goods for own final use	5	Essential
2	Making goods for own household or family use	Major Division 2			
3	Volunteer work	Divisions 51 and 52	F: Volunteering	1	Essential
4	Preparing and serving food and meals for own household or family members.	Division 31	C: *Unpaid domestic work activities for household or family members*	1	Essential
5	Cleaning own or family dwelling	Division 32		1	

6	Maintaining and making small repairs in own or family dwelling	Division 33		1	
7	Cleaning and care of clothing and footwear of own household or family members	Division 34		1	
8	Managing own household	Division 35		1	
9	Taking care of pet of own household or family	Division 36		1	
10	Shopping for own household or family	Division 37		1	
11	Taking care of own (household or family) child (use country definition of child)	Division 41	D: Unpaid c*are activities for household or family members*	3	Essential
12	Taking care of or helping adults (own household or family) (use country definition of adult)	Divisions 42 and 43		3	Essential
4-12	Unpaid domestic services and unpaid caregiving for non-household family members	Divisions 3 and 4	E: Unpaid domestic and care activities for non-household family members	3	Optional *To apply only if previous questions of*

					section C and D were asked only about services for household members.
13	Education	Major Division 6	A: Self-care and learning activities	2	Essential
14	Socializing and communication	Division 71	G: Socializing and leisure activities	7	Essential
15	Community participation, civic and related responsibilities, and religious practices	Divisions 72, 73 and 74			
16	Cultural, entertainment and sports events	Division 81			
17	Hobbies, games, and other pastime activities	Division 82			
18	Sport participation and exercising	Division 83			
19	Reading for leisure	Group 841			
20	Watching TV/Listening to radio or streaming	Group 842 and 843			
21	Sleep	Division 91	A: Self-care and educational activities	1	Essential
22	Eating and drinking	Division 92		1	Essential

23	Personal hygiene and care	Divisions 93 and 94		1	Essential
24	Travel		*Travel and waiting times are included in previous activities, except for commute to work and education-related activities where travel times are asked under sections A and B*		
25	Other activities		H: Other activities	1	Optional

Annex 3: Questions capturing economic and labor characteristics of respondent

To maintain the "light" nature of the recommended instrument, care should be taken to limit the topics covered in the background module only to those needed to support coding of time-use data and to create variables of analytical interest.

However, countries may choose to capture additional selected economic characteristics of respondents to enable further analysis of time-use data. Additional topics that might be of analytical interest include:

- Identification of unemployed persons
    - Job search during specified time (four weeks/30 days/calendar month)
    - Availability to work in specified time (week/7 days) and/or (subsequent 2 weeks/14 days)
    - Reasons for not seeking work
- For persons employed in the specified week:
    - Additional characteristics of main / second job
        - Working time (hours usually worked or hours actually worked)
        - Full-/Part-time employment status
- Main activity status as self-declared

Two alternative model question sequences covering the essential and optional recommended topics are presented in this annex for illustration purposes only, containing the following:

-Model Labour Force question sequence

SECTION A contains questions for the identification of persons employed in the reference week;

SECTION B contains questions related to the employment characteristics;

SECTION C contains the question about the main activity status as self-perceived.

-Alternative Labour Force question sequence

ALTERNATIVE MODEL for SECTION A contains a question sequence model for the identification of persons employed in the reference week to be used by countries where small-scale family farms and fishing activities are prevalent (starting with own-account agriculture work);

-SECTION D contains questions to be asked during and after the diary.

Model questions necessary for coding are labelled “essential”, and questions countries may want to ask depending on their analytical goals are labelled “optional”.

It should be noted that the proposed sequences are abridged reflecting on the lightness of the instrument, and the approach requires the interviewer to follow the skip patters. However, the sequences could be modified according to the objectives of the study and countries are recommended to use the approach already established at the national level to capture those characteristics in surveys.[10] For example, in the first model sequence persons who have paid jobs or businesses will not be asked to report if they also do own-account farming (as a secondary activity). Regardless, time spent on own-use production of goods will be captured with the

dedicated activity in the diary component of the instrument. In comparison, the alternative model for section A sequence, predominantly suitable for countries where small-scale family farms and fishing activities are prevalent, captures people engaged in these activities. More detailed explanatory notes describing questionnaire conventions will be prepared by the Group to accompany the model sequences.

Model Labour Force question sequence (for illustration purposes only)

The wording in italics are aids (for example, interviewer should not read aloud).

SECTION A: Identification of persons employed in reference week

	NOTES
A1.[11] Last week, from (DAY) to (DAY), did you do any of the following…? 1. Work for pay ([as employee, labourer, …]) → B1 2. Work in your own or the family farming or fishing activities 3. Work in any other kind of business activity → B1 4. None of the above → A4	Essential Part of sequence to identify the employed
A2. Are the farming or animal products that you worked on intended…? 1. Only for sale → B1	Essential To distinguish employment from own-

2. Mainly for sale → B1 3. Mainly for family consumption 4. Only for family consumption	use production in agriculture / fishing
A3a. What are the main products/animals that you are working on? *(WRITE MAIN GOODS –e.g. maize, rice, apples, oranges, cattle, sheep, fresh water fish...)* _____	Essential To assign ICATUS-16 code 21 and code occupation and industry for own-use producers in agriculture
A3b. Last week, how many hours did you work in these farming or fishing activities?	Optional
A4. Last week, did you …? 1. Do any (other) activity to generate an income, even for 1 hour (e.g. casual work, make things to sell, provide services for pay,…) → B1 2. Help without pay in a family business → B1 3. Did not do any income generating activity, not even for 1 hour.	Essential Part of sequence to identify the employed (Employment activities that can be under-reported would be prompted under this question)
A5a. Even though you did not work, last week, did you have a paid job or business to which you expect to return?	Essential

1. YES 2. NO→ A6	Part of sequence to identify the employed
A5b. Why did you not work last week? 1. SHIFT WORK, FLEXI-TIME, NATURE OF WORK → B1 2. VACATION, HOLIDAYS → B1 3. OWN ILLNESS, INJURY, ACCIDENT → B1 4. MATERNITY, PATERNITY LEAVE → B1 5. LOW OR OFF SEASON 6. WORK-RELATED REASONS (DISPUTE, LAY-OFF, WORK BREAK) 7. OTHER REASONS (SPECIFY):_____	Essential Part of sequence to identify the employed
A5c. Including the time that you have been absent, will you return to that same job or business in 3 months or less? 1. YES → B1 2. NO	Essential Part of sequence to identify the employed
A6. In the last 4 weeks, from [DATE] up to [DAY last week], did you look for a paid job or try to start a business 1. YES 2. NO	Optional Part of sequence to identify the unemployed
A7. If a job or business opportunity became available, could you start working [last week/within the next two weeks]	Optional

1. YES → C1 2. NO → C1	Part of sequence to identify the unemployed

SECTION B: Employment characteristics

For persons employed in reference week	**NOTES**
B1. Last week, did you have more than one job or [business / income generating activity]? 1. Only one job/business → B2 2. More than one job/business	Essential
READ: **The next questions are about the job or income generating activity in which you usually work the most hours**…	Essential
THE BELOW QUESTIONS SHOULD BE REPEATED FOR MAIN, SECOND JOB	
B2.[12] In your (main/other) job, what kind of work do you do? *(Write the occupation title and main tasks and duties –e.g [Cattle farmer –breed, raise and sell cattle; Policeman –patrol the streets; Primary school teacher –teach children to read and write])*	Essential Occupation

OCCUPATION TITLE:_____ MAIN TASKS AND DUTIES:_____	
B3. Do you work ...? 1. As an employee 2. On your own account, as a free-lancer *(without hired employees)* →B5 3. As an employer *(with hired employees)* →B5 4. Helping without pay in a family business or farm →B5 5. Paid apprentice, intern 6. OTHER (specify): _____	Essential Status in employment
B4.[13] Do you work in…? 1. A government agency or state-owned enterprise →B7a 2. A private business or farm	Essential Institutional sector

3. An NGO, non-profit, or religious institution →B7a 4. A household as a domestic worker →B8 5. An international organization or a foreign embassy →B7a	
B5: Is (your business/the business or farm where you work) …? 1. An incorporated company ([e.g. Ltd, co., …]) →B7a 2. An independent, personal or family (business/farm) 9. DON'T KNOW	Essential Business incorporation
B6.[14] Is the (business/farm) where you work registered (in/with) [NATIONAL BUSINESS REGISTER OR RESPONSIBLE AGENCY]? 1. YES 2. NO 9. DON'T KNOW	Essential As proxy information to support identification of employment in unincorporated household market enterprises
B7a. What is the name of (your business/the place where you work)? NAME: _____	Essential Industry of establishment

□ WITHOUT NAME	
B7b.[15] What is the main activity of the place where you work? *(Write the type of establishment and main products or services provided –e.g., Restaurant serving meals, Street-stall selling fruit; Taxi bike transporting passengers; Farm growing maize & raising cattle)* ESTABLISHMENT TYPE:_____ MAIN GOODS/SERVICES:_____	Essential Industry of establishment
B8. In this (job /business) do you work…? 1. Full-time 2. Part-time	Optional Self-perceived full-time / part-time status
B9. How many hours per week do you usually work in your (main/other) job? 1. Number of hours (specify): _____ 2. Hours vary	Optional Hours usually worked

9. DON'T KNOW	

SECTION C: Main activity status as self-perceived

For all persons aged N+	
C1. Which of the following best describes what you are doing at present..? 1. Working (for pay/to generate an income) 2. Taking care of the home or family 3. Studying 4. Doing an unpaid apprenticeship, internship 5. [Farming or fishing to produce food for the family] 6. Looking for work 7. [Doing military or civilian service] 8. Doing unpaid voluntary, community, charity work 9. Retired, pensioner 10. With a long term illness, injury, disability 11. OTHER (specify:_____)	Optional Main activity status

END OF MODULE	

ALTERNATIVE MODEL FOR SECTION A: OWN-ACCOUNT AGRICULTURE WORK START

For countries where small-scale family farms and fishing activities are prevalent.

	NOTES
A1. Last week, from (DAY) to (DAY), did you do any of the following activities on your own-account or help the family with..? *READ AND MARK ALL THAT APPLY* 1. Farming or growing food in a plot or kitchen garden 2. Raising or tending farm animals [3. Fishing, fish farming, collecting shellfish] [4. Hunting or gathering wild foodstuff] IF NO TO ALL → A4, ELSE CONTINUE	Essential To capture all persons working in own-account agriculture activities
A2. Are the farming, animal [or fishing] products that you worked on intended…? 1. Only for sale → B1 2. Mainly for sale → B1 3. Mainly for family consumption 4. Only for family consumption	Essential To distinguish employment in agriculture from own-use production in agriculture
A3. What are the main products/animals that you are working on?	Essential

(WRITE MAIN GOODS –e.g. [maize, rice, apples, oranges, cattle, sheep, fresh water fish...]) _____	To assign ICATUS code 21, to code occupation and industry for own-use producers in agriculture
A3b. Last week, how many hours did you work in these farming or fishing activities?	Optional
A4.[16] Last week, did you …? 1. Do any (other) work for pay or in a business activity? → B1 2. Do any activity to generate an income, even for 1 hour (e.g. [casual work, odd jobs, make things to sell, provide services for pay,…]) → B1 3. Help without pay in a family business → B1 4. Did not do any income generating activity, not even for 1 hour.	Essential Part of sequence to identify the employed
A5a. Even though you did not work, last week, did you have a paid job (or income generating activity) or business to which you expect to return? 1. YES 2. NO→ A6	Essential Part of sequence to identify the employed
A5b. Why did you not work last week?	Essential

1. WORKING-TIME ARRANGEMENTS, NATURE OF WORK, COMPENSATION FOR OVERTIME → B1 2. VACATION, HOLIDAYS → B1 3. OWN ILLNESS, INJURY, ACCIDENT → B1 4. MATERNITY, PATERNITY LEAVE → B1 5. LOW OR OFF SEASON 6. WORK-RELATED REASONS (DISPUTE, LAY-OFF, WORK BREAK) 7. OTHER REASONS (SPECIFY):_____	Part of sequence to identify the employed
A5c. Including the time that you have been absent, will you return to that same job or business in 3 months or less? 1. YES → B1 2. NO	Essential
A6. In the last 4 weeks, from [DATE] up to [DAY last week], did you look for a paid job or try to start a business 1. YES 2. NO	Optional Part of sequence to identify the unemployed
A7. If a job or business opportunity became available, could you start working [last week/within the next two weeks] 1. YES → C1 2. NO → C1	Optional Part of sequence to identify the unemployed

SECTION D: Questions asked during and after the DIARY

- To link diary information on employment and own-use production of goods to the relevant information captured in the background questionnaire
- The wording will require adaptation depending on the data collection mode (PAPI, CATI, CAPI or CAWI/App)[17]

Clarifying questions, asked during diary	**NOTES**
D1. [If "working" is reported in the diary, but respondent has been classified as not employed]: I need to verify some information with you. I recorded earlier that you do not own either a business or a farm, that you did not do any work for pay in the last week, and that you did not have a job, including a job from which you were absent. Is this correct? 1. YES → Continue with diary 2. NO → Correct responses to relevant labour force questions	This clarifying question would pop-up when the inconsistency occurs.
D2. [If a multiple jobholder reports working, but does not specify at which job]: Was that for your main job or your other job?	To link diary responses to specific jobs.
Summary questions, asked after completion of the diary, to learn more about specific activities:	Useful for identifying and coding activities done for pay or profit.
SUM1. [For employed respondents]: You said you were working from [start and stop time for diary reports of working	If diary does not include a report of working

associated with the main/only job] [at your main job]. Were there any [other] activities that were done as part of your [main] job or business? Please do not include getting ready for work or commuting.	associated with the main/only job, skip the first sentence. If needed, review or show reported diary activities.
SUM2. [For respondents with more than one job]: You said you were working at your other job from [start and stop time for diary reports of working associated with a second job]. Were there any [other] activities that were done as part of your other job or business?	If diary does not include a report of working associated with a second job, skip the first sentence. Repeat and tweak the question to ask about work for each of the respondent's jobs/businesses.
SUM3. [Asked of respondents with own-account farming/fishing] Were there any activities done as part of your (own/household/family) farm/fishing activities? Which ones?	
SUM4. [Asked of all respondents]: Were there any [other] activities that you were paid for or will be paid for?	

Annex 4: Correspondence table for activities of Minimum Harmonized Instruments regional Time-use Survey Classification

Harmonized European Time-use Survey Classification

No.	MHI Activity	HETUS ACL 2028 3-digit codes
1	Working in paid job or income generating activities	111
2	Making goods for own household use	314 [1], 323, 342, 345 [2], 351, 353, 621, 713
3	Volunteer work	411, 412 [3]
4	Preparing and serving food and meals for own household	311, 312, 313
5	Cleaning own dwelling	321, 322, 324, 325, 329, 341
6	Maintaining and making small repairs in own dwelling	352, 354, 355 [4], 359
7	Cleaning and care of clothing and footwear of own household	331, 332, 339
8	Managing own household	362, 371, 300
9	Taking care of pet of own household	343, 344, 349
10	Shopping for own household	361, 369
11	Taking care of own (household or family) child	381, 382, 383, 384, 389, 423, 424
12	Taking care of or helping adults (own household or family)	391, 392, 421, 422, 425, 426 [5], 429

13	Education	211, 212, 214, 215, 219, 221
14	Socializing and communication	511, 512, 514, 515, 516, 519
15	Community participation, civic responsibilities, religious practices	431, 432, 433, 439, 513, 995
16	Cultural, entertainment and sports events	521, 522, 523, 524, 525, 526, 529
17	Hobbies, games and other pastime activities	531, 711, 712, 719, 721, 722, 729, 731, 732, 733, 734, 735, 739, 998, 999
18	Sport participation and exercising	611, 612, 613, 614, 615, 616, 619, 631
19	Reading for leisure	811, 812, 819
20	Watching TV/Listening to radio or streaming	821, 831
21	Sleep	011
22	Eating and drinking	021, 121
23	Personal hygiene and care	031, 032, 039, 012
24	Travel	910, 920, 936, 938, 939, 940, 950, 960, 980, 900
25	Other (specify)	129, 213

Notes:

1. Proposed new HETUS ACL 2018 code: 314 = Baking and other manufacturing of food and beverage.

2. Proposed new HETUS ACL 2018 code: 345 = Growing crops, kitchen gardening, forestry and logging.

3. Proposed new HETUS ACL 2018 code: 412 = Direct help to people living in other households, community and environment (direct volunteering for non-family members).

4. Proposed new HETUS ACL 2018 code: 355 = Repairing and maintaining household equipment.

5. Proposed new HETUS ACL 2018 code: 426 = Help in domestic task to non-cohabitant family

Classification of Time-Use Activities for Latin America and the Caribbean (CAUTAL)

Minimum harmonized instrument of the United Nations Statistical Commission			Proposed harmonized minimum list of time use activities for Latin America and the Caribbean		
Number	**Activity**	**International Classification of Activities for Time-Use Statistics (ICATUS) 2016**	**Classification of Time-Use Activities for Latin America and the Caribbean (CAUTAL)**	**Activity**	**Number**
1	Working in paid job or income generating activities	Major division 1	Major division 1	Employment and related activities	1
2	Making goods for own household use	Major division 2	Major division 2	Own-use goods production	2
3	Volunteer work	Divisions 51 and 52	Divisions 52 and 53	Unpaid work for the community and volunteer work	3
4	Preparing and serving food and meals for own household	Division 31	Division 31	Food preparation and serving for houseold me,bers	4
5	Cleaning of own or family dwelling	Division 32	Division 32	Cleaning of the home	5
6	Maintaining and making small repairs in own dwelling	Division 33	Division 34	Maintenance and minor repairs for own household	6
7	Cleaning and care of clothing and footwear of own household	Division 34	Division 33	Cleaning and care of clothes and footwear	7
8	Managing own household	Division 35	Division 35	Household management	8
9	Taking care of pet of own household	Division 36	Division 37	Pets and plants care	9
10	Shopping for own household	Division 37	Division 36	Shopping for the household	10
			Group 511	Unpaid domestic tasks for other households	11
11	Taking care of own (household or family) child	Division 41	Group 411 and 441	Caregiving and support for household members aged 0 to 14	12
			Group 412 and 442 Subgroup 4142 and 4431	Temporary health care for household members aged 0 to 14	13
			Group 413		14

			Subgroup 4141	School or learning support for household members aged 0 to 14	
12	Taking care of or helping adults (own household or family)	Divisions 42 and 43	Groups 421, 431 and 441 Subgroups 4230, 4330and 4430	Caregiving and support of adult household members	15
			Groups 422, 432 and 442 Subgroups 4231, 4331 and 4431	Health care for adult household members	16
			Groups 420, Subgroup 4231 Subgroup 4230,4430 and 4332	Support activities for adult household members with legal, administrative and financial errands	17
			Group 512	Unpaid care of people from other householdss	18
13	Education	Major division 6	Major division 6	Learning and study	19
14	Socializing and communication	Division 71	Group 711	Socializing with family, friends or others	20
15	Community participation, civic responsibilities, religious practices	Divisions 72, 73 and 74	Group 712	Attending community, civic or religious celebrations	21
16	Cultural, entertainment and sports events	Division 81	Division 72	Attendance at cultural, entertainment and sports events	22
17	Hobbies, games and other pastime activities	Division 82	Division 73	Art and hobbies	23
18	Sport participation and exercising	Division 83	Division 74	Sport and physical exercise	24

19	Reading for leisure	Group 841	Division 81	Reading for leisure	25
20	Watching TV/Listening to radio or streaming	Group 842 and 843	Divisions 82,83 and 84	Watching television or videos, or listening to radio or other audio media	26
21	Sleep	Division 91	Group 922	Sleeping	27
22	Eating and drinking	Division 92	Group 921	Eating and drinking	28
23	Personal hygiene and care	Divisions 93 and 94	Division 91	Self-care	29
24	Travel		Divisions 14 and 62	Commuting to and from work and travel for study activities (other travel is included in the activity)	30
25	Other (specify)			Other activities	31