

**Recommendations on Statistics of International Migration and Temporary  
Mobility**

United Nations Secretariat  
Department of Economic and Social Affairs  
Statistics Division

## **Recommendations on Statistics of International Migration and Temporary Mobility**

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(Unedited Version)

## Preface

Since the publication of the first international guidelines on migration statistics in 1953, the United Nations has consistently sought to provide actionable recommendations to enhance the collection, analysis, and dissemination of statistics on international migration and migrants. These guidelines have been used by national statistical offices and other relevant stakeholders, enabling them to produce statistics to inform migration policy decisions, improve allocation of services and support international cooperation through comparable data on migration trends and migrant populations.

The previous comprehensive guidelines, "Recommendations on Statistics of International Migration," were published in 1998. Over the subsequent decades, global migration patterns evolved significantly due to increased mobility, technological advancements, and changing socio-political contexts. Recognizing the evolving landscape of international migration and the critical need for improved statistical data, the United Nations Statistical Commission, at its forty-ninth session in 2018, initiated a comprehensive review of the 1998 Recommendations on Statistics of International Migration through its decision 49/101.

The revision process, coordinated by the United Nations Statistics Division, was led by the Expert Group on Migration Statistics, comprising subject matter experts from national statistical offices, international, regional and subregional organizations, migration-relevant line ministries of countries, and other experts in the area.

The Expert Group was divided into five task forces:

- **Task Force 1:** Task force on Data and Indicators Set on International Migration
- **Task Force 2:** Task force on Key Concepts and Definitions related to International Migration
- **Task Force 3:** Task force on Data Integration for Disaggregated Statistics on International Migration
- **Task Force 4:** Data Sources for International Migration Statistics and Operationalisation of Revised Conceptual Framework
- **Task Force 5:** Global Programme on Migration Statistics

The Task Forces undertook the work of revising the recommendations over the span of several years. A new conceptual framework was first developed by Task Force 2 and endorsed by the Statistical Commission in 2021 through its decision 52/109. This new framework makes a clear distinction between international migration and temporary mobility as two separate types of international mobility. It emphasizes alignment between migration and population measurement, between stocks and flows, and disaggregation of population and migration statistics by both country of citizenship and country of birth.

Task Force 1, in turn, developed a list of core and additional migration indicators based on the revised conceptual framework. The indicator list was discussed and endorsed by the Statistical Commission at its 54th session in 2023 through its Decision 54/104.

Task Forces 3 and 4 undertook additional in-depth work in support of the operationalisation of the conceptual framework, each producing a technical report. The Task Force 3 report aims to support countries to produce disaggregated data to measure international migration through micro and macro data techniques, comprising case studies from a variety of countries at different stages of statistical

development who have volunteered their experiences. The Task Force 4 report provides guidance on improving the use of data sources, data availability and overall quality of statistics on international migration and temporary mobility. The reports were submitted as background documents to the Statistical Commission at its 56<sup>th</sup> session in 2025, together with the revised Recommendations.

The work of Task Force 5 to develop a Global Programme on Migration Statistics is ongoing.

This publication integrates and builds on the work of the task forces. It emphasizes strengthened use of administrative data sources, particularly for measuring migration flows, the importance of developing legal frameworks for data sharing, establishing international cooperation mechanisms, and implementing effective communication strategies for migration statistics. It provides practical guidance on establishing and improving migration data systems and on data integration techniques for countries at different stages of statistical development, from those relying primarily on field-based data sources to those with integrated administrative systems.

At its fifty-sixth session in March 2025, the Statistical Commission endorsed the revised Recommendations contained in this publication, highlighting the benefits of integrating migration data systems into broader population data systems and welcoming their alignment with other international statistical frameworks relevant to migration. The Commission recognized the diversity of migration data systems and data capacities, as well as the challenges faced by countries in producing migration data. It emphasized the crucial role of capacity-building, resource mobilization, and sharing lessons learned to support implementation efforts. The Commission also underscored the importance of collaboration among national statistical offices, data sharing within countries, and bilateral data exchange between countries to strengthen and harmonize statistics on migration and migrants.

Member States are encouraged to actively implement these recommendations thus strengthening their capacity to address the challenges and opportunities presented by contemporary international migration and mobility patterns.

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This publication is the result of a collaborative effort involving migration specialists from national statistical offices, regional entities, and various United Nations and international organizations. The revision process was coordinated by the United Nations Expert Group on Migration Statistics, a diverse body of over 80 migration experts representing all world regions and relevant agencies. Special acknowledgement is extended to the following chairs of the Expert Group who served during different phases of the revision process: Diego Iturralde (Statistics South Africa), Elisa Benes (ILO), Ferenc Urbán (Statistics Hungary), Frank Laczko (IOM).

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## Executive Summary

These revised Recommendations provide a comprehensive framework for measuring international migration flows and international migrant stocks to support evidence-based policymaking and improved understanding of migration patterns. The framework encompasses the following eight key recommendations for countries to apply in their migration data systems, which are elaborated in the document:

1. Establish a **clear distinction between international migration and international temporary mobility**. International migration is defined by a change in country of residence, while temporary mobility includes all other international border crossings that do not result in such a change.
2. Ensure **statistical alignment between migration and population measurement**. The measurement of migration flows should correspond with the definition and measurement of the resident population, ensuring consistency in duration criteria for identifying both immigrants/emigrants and the resident population at the national level.
3. **Disaggregate population and migration statistics by citizenship status and birthplace to produce statistics on native-born citizens, native-born foreign citizens, foreign-born citizens, and foreign-born foreign citizens** to establish a meaningful basis for understanding the impacts of migration on population and social change. These statistics should be embedded in a demographic accounting model that includes births, deaths and naturalizations (transfers from foreign to native citizenship) for completeness.
4. **Strengthen and leverage administrative data sources for measuring migration and temporary mobility flows**. Administrative data, including residence permit and border control statistics, typically provide the most comprehensive information on the numbers of persons entering or exiting the country over time.
5. **Develop legal frameworks and data sharing agreements** among government departments within countries to enable data integration and use for multiple purposes, including migration statistics and population estimation, in line with relevant data governance and protection standards. Such frameworks should promote collaboration not only between agencies, but also across departments within national statistical offices to mainstream migration statistics across relevant statistical domains, ensuring comparability and improved complementary use of different data sources. Migration flow and stock data should be part of any major national data infrastructure system.
6. **Promote collaboration among national statistical offices and with international organizations** to ensure data comparability, process efficiency and quality. As migration involves movement between countries, measurement could be improved through sharing information on entries, exits, stays, residence and change of migration status by country of birth and citizenship. Such cross-border collaboration on data sharing may require the

development of dedicated regulative frameworks<sup>1</sup> or become part of regional integration processes.

7. **Combine different data sources and use data integration techniques** to make better use of existing information, to generate new datasets and estimates and to provide more complete statistics on migration, temporary mobility and migrants.
8. **Develop strategic plans and targets for improving the production of migration and temporary mobility statistics.** The Recommendations propose strategies tailored to countries' current data infrastructure capabilities. This includes incorporating experimental statistics to explore different data sources and measures of migration, including non-traditional data sources, to fill data gaps or generate more timely estimates.

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<sup>1</sup> Specific safeguards should be introduced in the legal systems of each country preventing the sharing of such data concerning refugees and asylum-seekers with the country of origin as well as with other countries whenever there is a risk of such information being transferred to the country of origin.

## 1. Introduction

1. International migration and temporary mobility are top priorities on the policy agenda of many countries across the world. In recent years, increasing levels and changing patterns of international migration have intensified the demand for accurate and timely data to support evidence-based policy development.<sup>2</sup> It is an explicit and first objective of the Global Compact for Safe, Orderly and Regular Migration adopted by the UN member states in December 2018. These data are essential for estimating population changes and for integrating migrants into national development planning. With many countries experiencing rising life expectancy and declining fertility rates, migration has become a crucial component of both demographic and social change.

2. Quality data on international migration and temporary mobility are needed for a variety of reasons. They are vital for understanding population growth or decline, socioeconomic development and inequality, political conflict and environmental concerns. For local authorities, timely counts of individuals using local services such as housing, healthcare, social services, and schools are essential for effective planning and resource allocation. On a national level, stakeholders require data on the size, characteristics, and distribution of migrants across the country to develop targeted and data driven migration or sectoral policies, such as on socioeconomic development, employment, entrepreneurship and education. Migrant countries of origin require data on the number and characteristics of their citizens abroad to design effective diaspora engagement strategies, consular support and migrant worker rights protection.

3. As international mobility involves movements of persons from one country to another, there is a need for sharing data on these movements and ensuring that they are comparable over time. Without such data, it is impossible to estimate the size of countries' diasporas abroad or to benchmark the size and characteristics of international migration stocks and flows. Moreover, the lack of reliable data hampers efforts to meet the data requirements set forth by the United Nations' Global Compact for Safe, Orderly and Regular Migration<sup>3</sup> and Sustainable Development Goals.<sup>4</sup>

### a. Reasons for revisiting the 1998 Recommendations on Statistics of International Migration

4. For more than twenty years, the definition of international migrant as stipulated in the 1998 Recommendations on Statistics of International Migration<sup>5</sup> has supported comparability across countries to a limited degree. Modern communication technologies and the increased convenience of travel have lessened the psychological impact of living in other countries, as migrants have been able to remain in frequent contact with families and friends in their origin countries. It also enabled migrants to engage in frequent travel between countries, strengthening the increasingly dynamic, cyclical and temporary nature of migration, in policy circles more and more referred to as "human

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<sup>2</sup> International Migration Statistics, Report of the Secretary General, Statistical Commission, Fiftieth session, 2019.

<sup>3</sup> United Nations International Organization for Migration: <https://www.iom.int/global-compact-migration>.

<sup>4</sup> United Nations Division for Sustainable Development Goals, <https://sustainabledevelopment.un.org/>.

<sup>5</sup> United Nations, Recommendations on Statistics of International Migration, Revision 1, 1998 (ST/ESA/STAT/SER.M/58/Rev.1), [https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles\\_and\\_Recommendations/International-Migration/SeriesM\\_58rev1-E.pdf](https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles_and_Recommendations/International-Migration/SeriesM_58rev1-E.pdf)

mobility”. This applies to both temporary and permanent moves associated with education or job opportunities, as well as those due to political or environmental circumstances. Several regional agreements emerged that allow free movements amongst certain countries, raising new measurement challenges even for countries with relatively developed statistical systems.

5. Since the publication of the 1998 Recommendations, several critical issues have been highlighted regarding the relevance and applicability of concepts related to international migration. Key questions have arisen, such as whether the concepts of “long-term migrant” and “usual resident population” are too rigid to effectively capture population changes in today’s dynamic world. Additionally, there were concerns about the extent to which the 1998 Recommendations meet policy needs and provide data for analyzing the impact of international migration on a country’s economic and social situation. Another area of concern was whether changes to the status of international migrants, such as transitions from being foreign citizens to citizens or from visitors to migrants or residents, are adequately reflected in the 1998 Recommendations. Additionally, the conceptual inclusion of refugees and asylum seekers as a subset of international migrants in migration statistics has not adequately reflected the specific protection needs of forcibly displaced.<sup>6</sup> Finally, despite continuous efforts made at the international and national level to promote the adoption of the 1998 Recommendations, widespread adoption of the Recommendations by countries has not been achieved. The 1998 Recommendations were often seen as a theoretical framework that is difficult to operationalize, requiring advanced administrative data systems, with little attention paid to population stocks.

6. How countries measure international migration has also changed over the past 20 years. Many European countries and some countries in other regions have established or are moving towards integrated statistical population register systems and linking other types of administrative records. While this can improve the efficiency of national statistical systems in data production, it also has limitations. It is important that international recommendations on migration statistics address data integration by identifying the relative strengths of each data source and applying them towards producing statistics on international migration flows and on migrant populations stocks.

7. The revised conceptual framework addresses several important issues related to the measurement of international migration and temporary mobility. The first major issue concerns the misalignment between flows of international migration and stocks of immigrant populations. International migration flows generally refer to all persons immigrating (emigrating) to (from) a country during a particular time period (“change of residence” criterion). Immigrant populations, on the other hand, are measured primarily using information on country of birth or citizenship at a point in time. The second issue concerns the increasingly temporary nature of international mobility and the need for a distinction between international migration and international temporary mobility. The revised conceptual framework provides guidance on the durations and types of movements that need to be measured to understand international migration and temporary mobility. Related to this, the third issue concerns consistency in the measurement of international temporary mobility and corresponding temporary populations.

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<sup>6</sup> For a detailed discussion, see the *International Recommendations on Refugee Statistics (IRRS)* (2018, pp. 27-29), which explains that forced displacement cannot be regarded merely as a subset of international migration from a statistical perspective, as many refugees—such as children born in exile—do not actually cross an international border.

8. The revised conceptual framework strives to be relevant for national policymaking and aims to promote comparability across different international statistical frameworks while acknowledging the challenge of developing concepts and definitions that are applicable to all countries.

9. The major aims of this revision to the Recommendations include: (a) building stronger links with data needs for policymaking; (b) providing guidance on data collection and analyses; (c) clarifying the concept of “international migrant” and related phenomena for statistical purposes and introducing a new statistical term “temporary mobility”; (d) recognizing new migration patterns and new data sources; and (e) incorporating relevant frameworks, such as the 2018 International Recommendations on Refugee Statistics,<sup>7</sup> the 2023 International Recommendations on Statelessness Statistics,<sup>8</sup> the new guidelines of the International Labour Organization concerning statistics on international labour migration<sup>9</sup>, the limited set of indicators for the Global Compact for Safe, Regular and Orderly Migration,<sup>10</sup> and the fourth revision of the Principles and Recommendations for Population and Housing Censuses<sup>11</sup>, while ensuring harmonization across them.

#### b. Policy areas relevant for statistics of international migration and temporary mobility

10. Six policy areas, informed by and aligned with the 2030 Agenda for Sustainable Development and the Global Compact for Safe, Orderly and Regular Migration, have been identified as particularly relevant:

1. Improve the measurement of international migration and temporary mobility stocks and flows,
2. Address irregular cross border movements and visa overstays,
3. Ensure access to basic services by migrants and temporary populations vis-à-vis other population groups,
4. Increase the integration and wellbeing of migrants,
5. Empower labour migrants, and

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<sup>7</sup> The International Recommendations on Refugee Statistics (IRRS) were developed by the Expert Group on Refugee and Internally Displaced Persons Statistics (EGRIS) published by the European Union and United Nations (2018); Available at: [https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles\\_and\\_Recommendations/International-Migration/2018\\_1746\\_EN\\_08-E.pdf](https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles_and_Recommendations/International-Migration/2018_1746_EN_08-E.pdf)

<sup>8</sup> <https://egrisstats.org/recommendations/international-recommendations-on-statelessness-statistics-iross/>

<sup>9</sup> ILO, Room Document 17: Recent global developments and proposed updates to the 20<sup>th</sup> ICLS guidelines concerning statistics of international labour migration, 21st International Conference of Labour Statisticians, 2023. Available at: <https://researchrepository.ilo.org/esploro/outputs/995331820302676>

<sup>10</sup> Available at <https://migrationnetwork.un.org/indicators>

<sup>11</sup> Forthcoming; to be discussed by the UN Statistical Commission at its 56<sup>th</sup> session in March 2025.

6. Eliminate all forms of discrimination and end violence against migrants and temporary populations.
11. To effectively address these policy areas, horizontal integration of migration as a cross-cutting topic is recommended. National statistical offices (NSOs) should mainstream international migration into their statistical work programs and foster collaboration across departments to ensure a comprehensive approach. For example, migration statistics units can work with labour statistics teams to analyze employment conditions of migrants and with education statistics teams to study school enrollment and outcomes for migrant children. Additionally, collaboration across national statistical system (NSS) institutions can enhance data quality and ensure the alignment of statistics with policy needs.
12. For each migration policy area, an associated set of indicators to collect and produce regularly has been identified to address, monitor, and evaluate the situation of international migrant populations.<sup>12</sup> Four core migration statistics are associated with policy area 1 (described in Chapter 3). Additional indicators are proposed for policy area 2. Indicators for disaggregation by migratory status and migration-relevant topics that countries may already be producing are presented for policy areas 3-6. Almost all of these indicators are part of the global indicator framework for Sustainable Development Goals (SDGs).
13. Primary topics for disaggregation are proposed for all policy areas. Additional indicators and secondary topics for disaggregation are also provided for each policy area, so that countries may gain a more detailed understanding of international mobility processes. These indicators and topics are considered optional and may be collected and disseminated according to national priorities or circumstances.
14. Primary and secondary topics for disaggregation were determined by the UN Expert Group on Migration Statistics<sup>13</sup>, taking into account practices, aspirations, and challenges at the national level. All indicators referring to international temporary mobility and temporary populations are considered additional as per Decision 51/109 of the UN Statistical Commission.

## 2. Concepts and definitions of international ‘migration’ and ‘temporary mobility’ for statistical purposes<sup>14</sup>

15. All movements that cross international borders within a given year can be classified as international mobility. There are two categories of international mobility: international migration and international temporary mobility. **International migration is defined as a change in the**

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<sup>12</sup> See technical report (<https://unstats.un.org/unsd/demographic-social/sconcerns/migration/Indicators-for-international-migration-and-temporary-mobility.pdf>) for details on the policy areas and associated set of indicators.

<sup>13</sup> The UN Expert Group on Migration Statistics was established by the Statistical Commission at its 49<sup>th</sup> session, consult <https://unstats.un.org/unsd/demographic-social/sconcerns/migration/> for details on its work and outputs.

<sup>14</sup> See Annex D: Glossary of Terms

**country of residence, while international temporary mobility includes all international border crossings (events) other than those related to changes in country of residence.**

a. **Linking migration to changes in the country of residence**

16. Since the distinction between international migration and international temporary mobility rests on the concept of residence, it is important to clearly define what constitutes residence or place of residence. In line with the UN Principles and Recommendations for Population and Housing Censuses (Revision 4 par. 2.61),<sup>15</sup> it is recommended that countries apply a threshold of 12 months when considering place of residence according to one of the following two criteria:

a. The place at which the person has lived continuously for most of the last 12 months (that is, for at least 6 months and one day), not including temporary absences for holidays or work assignments, or intends to live for at least 6 months and one day;

b. The place at which the person has lived continuously for at least the last 12 months, not including temporary absences for holidays or work assignments, or intends to live for at least 12 months.

17. Thus, populations stocks and their corresponding international mobility (flows) can be split into two distinct groups: (i) resident population and international migration and (ii) temporary (non-resident) population and international temporary mobility. This distinction is an important one and constitutes the first key recommendation presented in the executive summary of this document. Consequently, **the resident population is defined for statistical purposes as the population with place of residence in the country, provided they meet the minimum duration of residence requirement (actual or intended<sup>16</sup>) in the country**, regardless of their legal status or the purpose of this residence (e.g. education, family unification, work or self-employment, international protection and other humanitarian reasons). In other words, the resident population includes persons who may be irregular or undocumented, as well as asylum seekers and persons who applied for or were granted refugee status or similar types of international protections.

18. **The temporary population refers to all persons present in the country at a specific point in time who are not residents, i.e. have not resided or plan to reside in the country for the duration criteria defined above.** Since official statistics on population numbers represent

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<sup>15</sup> The Principles and Recommendations for Population and Housing Censuses, Rev. 4 (expected to be discussed and endorsed by the Statistical Commission at its 56<sup>th</sup> session in 2025) suggest using the concept of ‘usual residence’ from which ‘usually resident population’ is generated. Several other population definitions, such as legal place of residence, registered residence, and permanent residence are used in practice ([https://www.unecce.org/fileadmin/DAM/stats/documents/ece/ces/ge.41/2019/mtg1/WP2\\_Eurostat\\_Lanzieri.pdf](https://www.unecce.org/fileadmin/DAM/stats/documents/ece/ces/ge.41/2019/mtg1/WP2_Eurostat_Lanzieri.pdf)).

This document recognises the international effort to review the concept of usual residence and uses a broader concept of “place of residence” instead of place of usual residence. Also, to be aligned with this terminology, “resident population” is used instead of “usually resident population”.

<sup>16</sup> Countries may determine duration in a variety of ways, including actual duration, intended duration, legally granted (based on the validity of a permit), or a mix of all three depending on the data sources.

resident populations (de jure) or present populations (de facto),<sup>17</sup> it is important to link both to the conceptual framework for measuring international migration and temporary mobility.

19. Producing comparable statistics on both international migration and temporary movements is likely to be difficult and complex for any country, but particularly for those without access to individual data on all border crossings. There can be challenges in applying the concept of a ‘country of residence’ if a person considers that she/he has more than one place of residence, sometimes in different countries. In principle, based on the minimum duration requirement for defining resident population, persons who spend shorter amounts of time in the country are excluded from the resident population. One difficulty arises when, say, a person spends short amounts of time (less than minimum duration criteria) in three or more countries throughout the year. In this situation, potentially no country would consider the person to be a resident. Similarly, a person could spend multiple short periods of time in the same country or two countries. In both cases, the residence of the person would most likely default to the previous residence observed<sup>18</sup>.

20. In those instances where persons do not meet the duration criteria of either the origin or destination country for a given year or meet the duration criteria for both the origin and destination country at the same time, migrants may be missed<sup>19</sup> or double-counted respectively, and the numbers would have to be adjusted or harmonized for use at the international level.

21. Recognizing that many countries currently apply different concepts of resident population, what is important for measuring international migration is for countries to ensure consistency between flows and the measurement of resident (or registered) population stocks<sup>20</sup> within a their national statistical system, as further described below. This ensures consistency in the production of national statistics, particularly since migration is a key component of population change that is necessary for the production of population estimates and projections. This alignment of migration and population measurement is the second key recommendation presented in the executive summary of this document.

22. Such consistency is ensured if stock and flow data are derived from the same source, as is the case when population estimates are based on registered resident population, for which the rules for inclusion or not in the resident population are usually regulated by national law and administrative regulation. On the other hand, when population estimation involves integration of data from different data sources, e.g. administrative and statistical, the consistency between stocks and flows should be ensured by appropriate methodologies and statistical definitions and classifications.

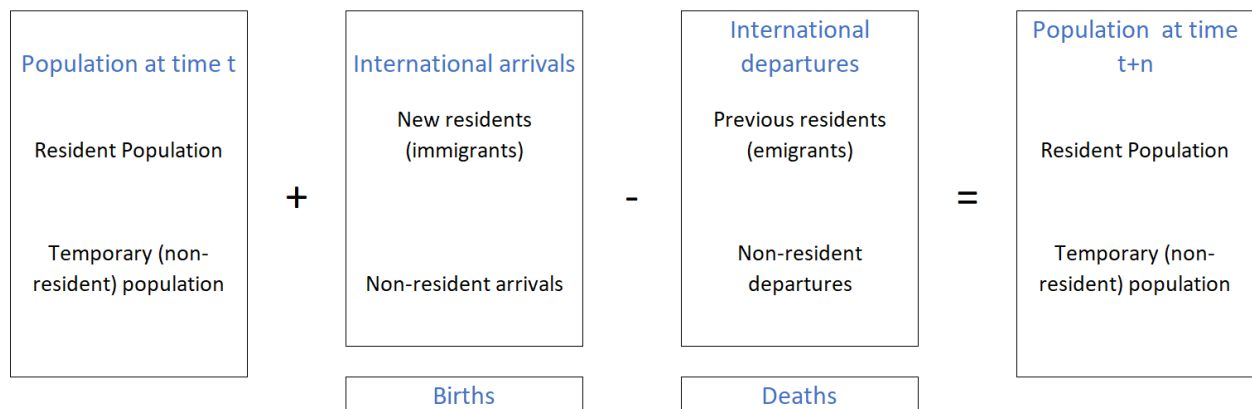
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<sup>17</sup> United Nations (2025) Principles and Recommendations for Population and Housing Censuses, Revision 4. ST/ESA/STAT/SER.M/67/Rev.4, Department of Economic and Social Affairs, Statistics Division, United Nations, New York (forthcoming).

<sup>18</sup> For more information about who will be included in or excluded from the resident population, see paras 2.61- 2.65 of the UN Principles and Recommendations for Population and Housing Censuses Revision 4.

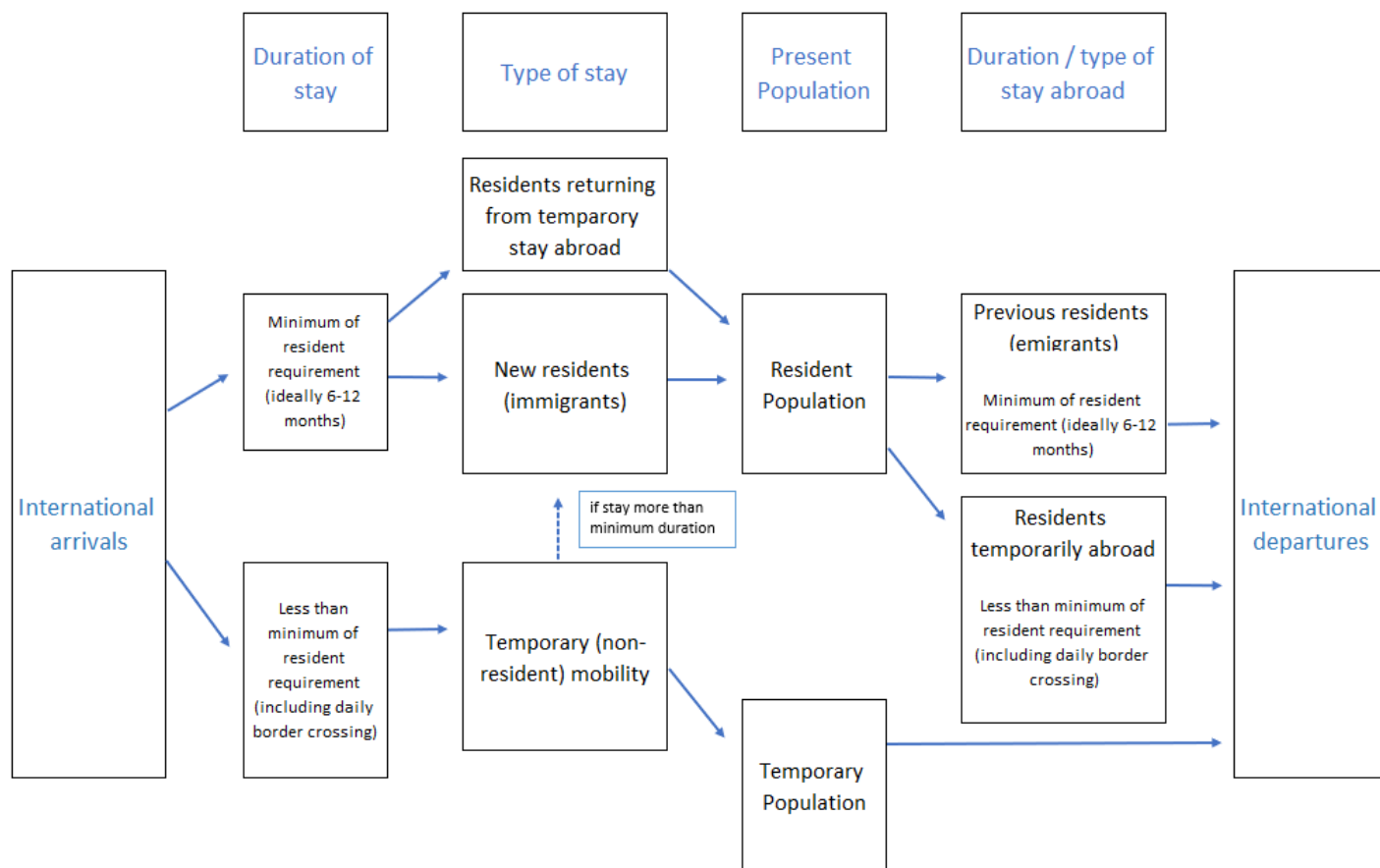
<sup>19</sup> For example, if the country of origin and country of destination use the different definitions. Person residing in Country of origin X for 4 months, and country of destination Y for 8 months. Country X defines place of residence based on the six months and one day rule and Country Y defines place of residence using the at least 12 months rule, the person could foreseeably be neither a resident of country X nor Y.

<sup>20</sup> The framework requires flows of international migration aligned with country's official definition of population. For example, for a registered population, the persons newly registered (de-registered) in a given year would be considered in measuring flows.



**Figure 1: Overarching conceptual framework on international mobility**

23. Figure 1 shows the overarching conceptual framework on international mobility, which includes both the resident population and the temporary (non-resident) population. The resident population changes between time  $t$  and  $t+n$  by the addition of new residents and births and the subtraction of previous residents (i.e., persons leaving the country to become resident in another country) and deaths. Similarly, temporary (non-resident) population changes by adding arrivals of people who are not residents of the country (and possibly births among them) and subtracting departures of people who are not residents (and possibly deaths among them). This framework indicates that arrivals and departures should be classified by arrivals of new residents and non-residents and departures of previous residents and non-residents. Note, residents who are temporarily staying in other countries are not removed from the (origin) resident population.



**Figure 2. Intersection between duration of stay and international mobility**

24. Figure 2 shows how international arrivals link with the present population, which includes all persons present in the country at a particular time, excluding residents temporarily abroad. As previously mentioned, the key distinguishing factor between international migration and other international population movements is actual or intended duration of stay in the country or abroad<sup>21</sup>. The framework includes individuals who never become part of the resident population, as well as changing status from temporary population to resident population for persons who stay more than the minimum duration criteria while they are still present in the country. For statistical purposes, persons who stayed longer than minimum duration criteria and do not possess a valid visa or other immigration documentation should be still considered part of the resident population.

<sup>21</sup> Countries may determine duration in a variety of ways, including actual duration, intended duration, legally granted (based on the validity of a permit), or a mix of all three depending on the data sources.

## b. Conceptualization of immigrants, emigrants and returned migrants<sup>22</sup>

25. For the purposes of measuring international migration, the **immigrant population (stock) includes all persons who reside in the country who are either born in another country or who do not hold national citizenship (including stateless persons) at a given point in time.** Persons entering the country and becoming part of the resident population in a given year (flow) are considered immigrants, including persons with national or foreign citizenships or stateless persons. Persons who are born in the country and have national citizenship are not considered part of the immigrant population, although they can be considered (recent) immigrants or part of the immigration flow if they returned and changed their country of residence.

26. **The emigrant population (stock) includes all national citizens or persons who were born in the country and are residing in another country at a given point in time.** Residents leaving the country to become part of another country's resident population within a given year (flow), including persons with national or foreign citizenships or stateless persons, are emigrants.

27. **Returned migrants (stock) refer to persons who previously resided in the country of measurement (i.e. met the duration of stay criteria for residence) who emigrated and subsequently came back to live in the country and stayed or intended to stay for the minimum duration required for residence.** Note that, depending on national criteria for duration of stay, individuals may obtain (lose) resident status in one country in the period of reference but not in another country, implying that statistics at the international level may not be entirely comparable unless all countries have the same requirement of duration of stay for establishing country of residence for statistical purposes.

## c. Conceptualization of international temporary mobility related or relevant to international migration

28. In its endorsement of the overall conceptual framework presented here, the UN Statistical Commission emphasized that there are challenges with the measurement of international temporary mobility and recommended<sup>23</sup> that the work on international migration statistics be prioritized. While measuring temporary mobility and creating meaningful categories for policy is a complex and currently daunting undertaking for most countries, there is nevertheless a policy need and interest in measuring certain types of international mobility that do not result in a change in country of residence, but significantly influence the economic and social setting of a country. Of particular interest are those types of international temporary mobility that have a high probability of eventually becoming part of the international migration flow.

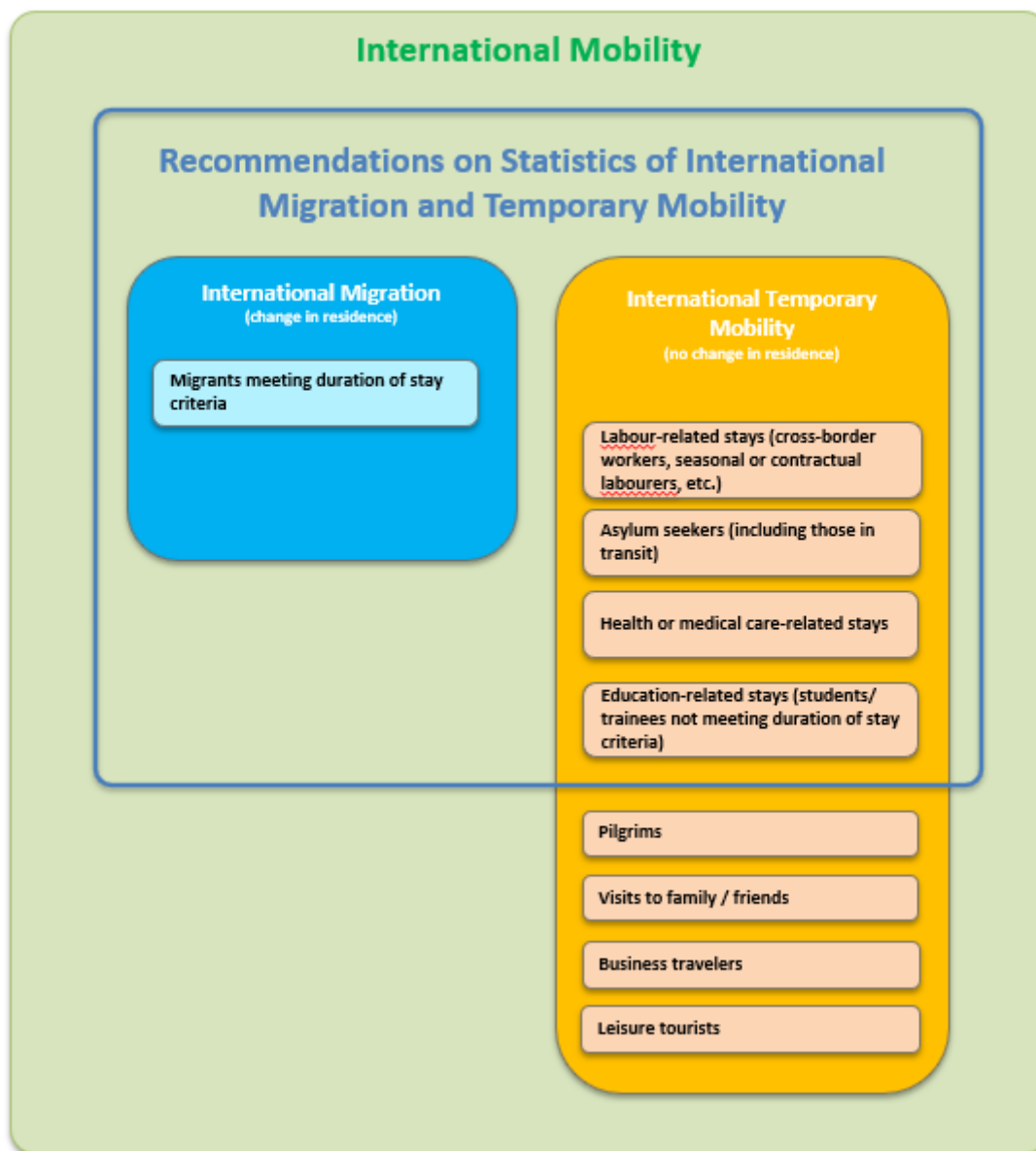
29. **International temporary mobility is comprised of all international movements which result in stays of less than the minimum duration of stay requirement,** including for example, those associated with daily commuting, tourism, pilgrimage, business, medical treatment, visits to family or friends, seasonal labour, and education. **The international temporary mobility framework presented in this document focuses on types of temporary mobility that could**

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<sup>22</sup> See Annex D: Glossary of Terms for additional definitions of concepts.

<sup>23</sup> Decision 52/109 of the UN Statistical Commission (<https://unstats.un.org/unsd/statcom/52nd-session/documents/2021-30-FinalReport-E.pdf>)

**potentially evolve into international migration**, with an emphasis on movements associated with (1) the labour market, (2) education or training services, (3) health or medical care services; and (4) asylum seekers, including those in transit, that do not meet the duration of stay criteria for international migration (see Figure 3). For operational purposes, tourism and business travel are excluded from this statistical framework and are considered separate from other types of international temporary mobility, as there are dedicated standards for statistics on tourism<sup>24</sup>.

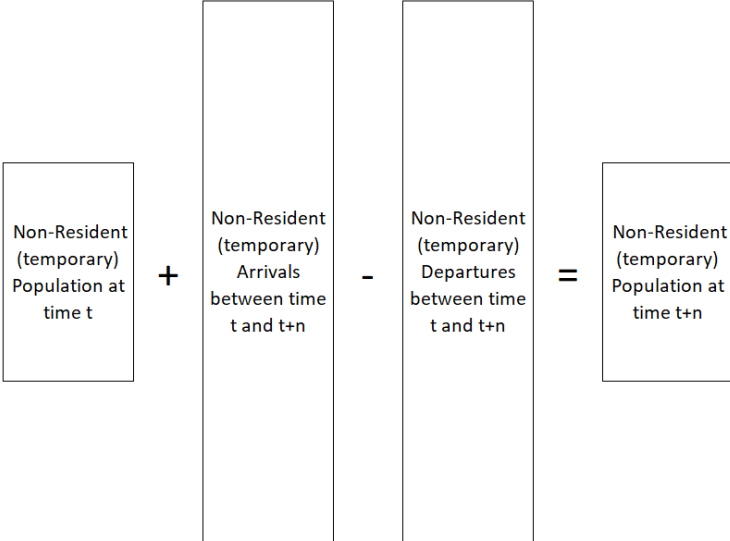


**Figure 3. International mobility covered by the Recommendations**

<sup>24</sup> <https://www.unwto.org/tourism-statistics/standards>

30. **Temporary population include forcibly displaced persons which result in stays of less than the minimum duration of stay**, such as asylum seekers and other persons in transit and those who move for environment or climate-related reasons. It should be noted that displacement situations that are not quickly resolved may become protracted. Many persons in these situations seek solutions other than return, such as local integration or resettlement to another country. A suite of international recommendations for statistics on forcibly displaced persons exist; of particular relevance are those on refugee statistics.<sup>25</sup>

31. Temporary population mobility may be circular, involving the same persons repeatedly crossing the same international borders during a particular year who may be commuting daily, weekly or monthly for reasons related to work or study, or because they have second homes or family in another country. They may also constitute temporary stays that only occur once or a handful of times in a year and may include short-term contract workers or seasonal agricultural workers. In any case, it is important to capture not only the events of the movements, but also the durations of stay and purposes of the movements.<sup>26</sup> By capturing both the number of persons and their average time spent by various categories of temporary population movements (see Figure 4 for examples), the relative impacts of the moves for populations, education sectors, employment sectors, and local economies can be assessed.



**Figure 4. Relationship between international temporary mobility flows and the present non-resident population at different times**

Notes: (1) *n* could be days, weeks, months; (2) non-resident (temporary) population include persons who are present in the country at a particular time but not considered part of the resident population; (3) arrivals / departures between *t* and *t+n* are expected to be larger than the population at time *t* or *t+n*.

<sup>25</sup> IRRS, 2018

<sup>26</sup> For cases where a significant proportion of the population providing or using services in a country are not residents of the country, the UN Principles and Recommendations for Population and Housing Censuses, Revision 4 (paras 5.42-5.45) recommends a ‘service population’ count.

32. Figure 3<sup>27</sup> describes the connection between the present temporary population at time  $t$  and the arrivals and departures of temporary populations between time  $t$  and  $t+n$ , where  $n$  could be days, weeks or months. Whereas with international migration the assumption is that the immigrant population accumulates over time, with international temporary mobility, it is the opposite: the temporary population may fluctuate over time (both seasonally and annually) and the flows are likely to be much larger than the temporary population stocks at any given time. Also, as shown in Figure 2, some temporary populations may transfer to the resident population.

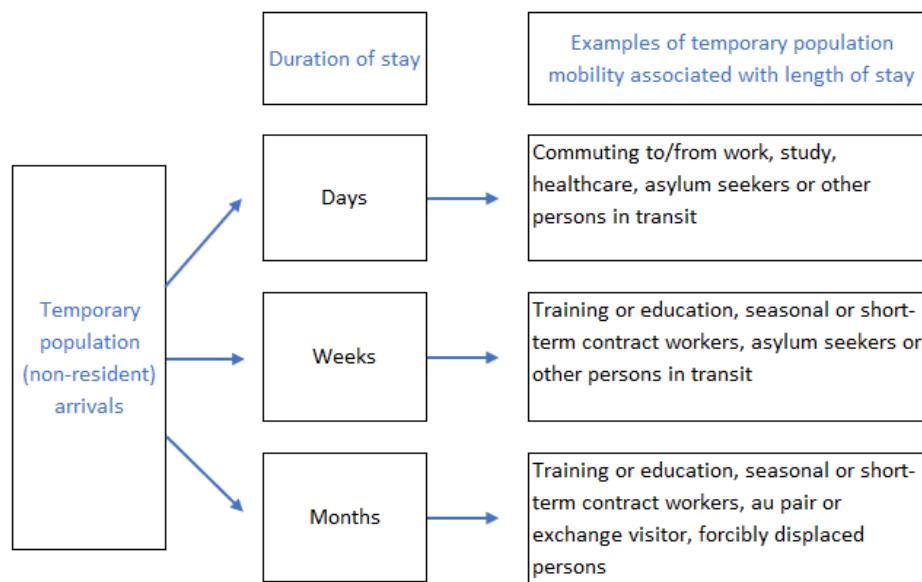
33. There are many specific challenges associated with international temporary population mobility. For example, the duration of stay for asylum seekers may not be known until a decision has been made regarding their application for refugee status. In this case, the person or family may stay for a few days or even longer than a year to receive a decision. If the legal process takes longer than the minimum duration requirement for residence, as it often does, then that person or family should be considered part of the resident population.

34. While estimating the expected duration of individual displacement is a methodologically challenging and to date unresolved task, the available evidence suggests that refugees tend to stay in their country of asylum for at least several years, and sometimes for decades in protracted situations. Refugees and persons in refugee-like situations born outside their country of asylum will, therefore, in most cases eventually meet the minimum duration requirement for a change in their country of residence. They should generally be counted as international migrants for statistical purposes and be added to the resident population of their country of asylum as foreign-born foreign citizens. However, it is critical to note that identifying refugees as a statistical subset of international migrants in no way diminishes their distinct legal status, protection needs, or the specific vulnerabilities they face. Statistical systems should maintain the capacity to separately identify and analyse refugee and asylum-seeker populations in alignment with the International Recommendations on Refugee Statistics (IRRS) and should ensure data collection methods reflect their specific circumstances (see Box 1).

35. By a similar rationale, other groups – such as those arriving for employment, education or family reunification – may also eventually meet the minimum duration threshold for residence. One possible approach is for national statistical offices to collect information on the average duration of stay across different categories of temporary populations to determine the proportion of each group that falls under the scope of international migration. Another challenge refers to undocumented or irregular moves, including persons who enter the country legally but overstay their permitted time, as well as those who enter undetected and are not registered by administrative systems upon entry. In these cases, where the durations are unknown, other methods may be needed to estimate whether the persons are contributing towards temporary (non-resident) arrivals / departures or immigration / emigration.

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<sup>27</sup> The conceptual framework presented in this section is motivated by a paper by Charles-Edwards E, Bell M, Panczak R and Corcoran J entitled “A framework for official temporary population statistics.” *Journal of Official Statistics* 36(1), 1-24, 2020.



**Figure 5. Examples of temporary population mobility associated with length of stay**

36. Figure 4 describes the relationship between duration of stay and examples of different types of international temporary population mobility. Similar to international migration, there are a wide range of reasons for crossing international borders for short durations. For more detailed analyses and recommendations regarding different types of temporary mobility, the International Recommendations for Tourism Statistics<sup>28</sup> and the forthcoming Guidelines concerning statistics of international labour migration<sup>29</sup> should be consulted. Depending on purposes of the travel, there may be points of contact, for example, with statistics on tourism<sup>30</sup> and statistics related to other activities, such as education or healthcare. It is also important to consider that there is a possibility that persons who enter the country on a tourist (or other temporary) visa might change their intentions or meet the minimum duration of stay required for residence (such as by overstaying their visa), thereby entering the resident population, and their movement now becoming part of the international migration flow.

#### d. Population groups that require special attention

37. There are certain population groups for which some uncertainty may arise about their inclusion in the resident population. For accurate estimation of international migration whatever

<sup>28</sup> UN, International Recommendations for Tourism Statistics, 2008, [https://unstats.un.org/unsd/publication/Seriesm/SeriesM\\_83rev1e.pdf](https://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf)

<sup>29</sup> ILO, <https://ilostat.ilo.org/topics/labour-migration/>

<sup>30</sup> International tourism, which comprises inbound tourism and outbound tourism, that is, the activities of resident visitors outside the country of reference, either as part of domestic or outbound tourism trips and the activities of non-resident visitors within the country of reference on inbound tourism trips. For more information, see UN International Recommendations for Tourism Statistics, 2008.

data source is used, the following population groups should be included in the resident population<sup>31</sup>, for statistical purposes:

- a. Nomads and other persons (such as those who move frequently) who are present in the country at the reference time but for whom it is difficult to identify their country of residence;
- b. National military, naval and diplomatic personnel and their families, located outside the country, irrespective of their duration of stay abroad;
- c. Foreign citizens working within the country (not including foreign diplomats or military forces) and their families, provided that they meet the duration of stay criteria for residence in the country;
- d. Merchant seafarers and fishers who meet the criteria to be considered residents of the country but who were at sea at the reference time (including those who have no place of residence other than their quarters aboard ship);
- e. Irregular or undocumented migrants, who are foreign citizens (or stateless persons) and stay in a country without the appropriate documentation, provided that they meet the duration of stay criteria for residence in the country;
- f. Asylum seekers and persons who have applied for, or been granted, refugee status or similar types of international protections, regardless of the type of living quarters in which they are residing, provided that they meet the duration of stay criteria for residence in the country<sup>32</sup>;
- g. Persons who cross a frontier daily or weekly to work or study in another country, provided that they meet the duration of stay criteria for being residents of the reference country;
- h. Children born in the 12 months before the reference time and whose families are residents in the country;

38. On the other hand, the following groups should be excluded from the resident population:

- a. Foreign military, naval and diplomatic personnel and their families, located in the country, regardless of their duration of stay in the country;
- b. Tertiary education students who are absent or intend to be absent from the country for the minimum duration of stay required for residency or longer;

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<sup>31</sup> UN Principles and Recommendations for Population and Housing Censuses, Revision 4 (forthcoming), paras 2.61-2.65.

<sup>32</sup> Asylum-seekers and refugees or persons granted other international protection status may not fulfil the criteria established at national level to qualify for resident status or may remain in the country of asylum for a shorter period than the one established in the stay criteria.

### **Box 1 : Special Statistical Considerations for Refugees and Asylum-Seekers**

While refugees and asylum-seekers are included in the statistical framework of these Recommendations, it is essential to recognize their distinct legal status and protection needs. Their forced displacement circumstances and international protection requirements distinguish them from other migrant groups in ways that have important statistical implications.

The statistical treatment of refugees is governed by several international frameworks that establish specific obligations and standards:

- The 1951 Geneva Convention Relating to the Status of Refugees (particularly Article 35.2)
- The New York Declaration for Refugees and Migrants (UNGA, A/Res/71/1)
- The Global Compact on Refugees (particularly paragraphs 45-48)
- The "Leave No One Behind" principle of the 2030 Agenda for Sustainable Development

Countries are strongly encouraged to implement the detailed guidance provided in the International Recommendations on Refugee Statistics (IRRS) and International Recommendations on Statelessness Statistics (IROSS) alongside these general migration recommendations. When relevant to the national policy context, countries may choose to include "reason for migration" or "legal status" as disaggregation variables to enable separate identification of refugee populations.

## **3. Compiling statistics on stocks and flows of migration**

39. Understanding migration patterns and their implications across societies requires robust and comparable data on both migration flows and migrant population stocks. These statistics are fundamental for supporting evidence-based policies in countries of origin, transit, and destination. Migration flow statistics capture the movements of individuals across international borders within a given period, while stock statistics provide a snapshot of the size and characteristics of migrant populations at a specific point in time. Together, these data form the foundation for analyzing the dynamics of international migration and mobility.

40. *Flow* statistics are critical for policies governing entry and exit, including legal arrangements for foreign citizens, visa or residence status changes, and initiatives to encourage the return of nationals and their descendants living abroad. Flows encompass a wide range of movements, from brief visits (temporary mobility) to longer durations that may result in a change of residence (migration) and may involve journeys crossing multiple countries. It is important to know how many persons are arriving (departing) during a period of time and key information about their demographic characteristics (age, sex). It is also useful to know whether the entries (exits) are made up of citizens or foreign citizens. Among foreign citizen entries, categories of authorization or entry permits are key to understand the rights and entitlements attached to them.

41. *Stock* statistics can capture the size, characteristics and geographic distributions of international migrant and temporary populations present in the country at a particular point in time. With appropriate disaggregation, they can also be used to quantify the importance of migration and mobility across a range of policy areas, from integration to infrastructure, to assess migrants' contributions to the labour market and their need for health and social services, and to gain

knowledge of particular sub-groups such as return migrants. In addition, other countries' migrant population stock data may be used to quantify and describe emigrant populations living abroad.

42. Table 1 presents the four core migration statistics,<sup>33</sup> two dedicated to measuring international migration stocks, and two dedicated to measuring international migration flows, that every country should strive to produce. These core migration statistics are considered necessary for understanding international migration flows and stocks and their changes over time.

**Table 1. Core migration statistics and topics on measuring international migration stocks and flows**

CORE			ADDITIONAL	
Migration Statistics			Primary topics for disaggregation	Secondary topics for disaggregation
STOCKS	1.1	Number/proportion of _____ in the total resident population <b>Foreign-born persons</b> <b>Foreign citizens</b> <b>Foreign-born citizens</b> <b>Native-born foreign citizens</b> <b>Foreign-born foreign citizens</b> <b>Native-born (native) citizens</b>	1.Age 2.Sex 3.Country of birth 4.Country of citizenship	Duration of stay; Educational attainment; Labour force status; Location of residence within country; Reasons for migration; NB/FB status of parents
	1.2	Number of _____ who obtained citizenship over a given year <b>Native-born foreign citizens</b> <b>Foreign-born foreign citizens</b>	1.Age 2.Sex 3.Country of birth 4.Country of citizenship	Educational attainment; Labour force status; Location of residence within country; Duration of stay; Legal grounds for obtaining citizenship (or reasons for migration); NB/FB status of parents
FLOWS	1.3	Annual number of _____ immigrants who are _____ <b>Foreign-born persons</b> <b>Foreign citizens</b> <b>Foreign-born citizens</b> <b>Native-born foreign citizens</b> <b>Foreign-born foreign citizens</b> <b>Native-born (native) citizens</b>	1.Age 2.Sex 3.Country of birth 4.Country of citizenship	Country of previous residence; Educational attainment; Reason for move; Labour force status prior to move; Location within country

<sup>33</sup> Recommended data tabulations needed for producing the statistics are presented in Appendix A.

	<b>1.4</b>	Annual number of emigrants who are _____ <b>Foreign-born persons</b> <b>Foreign citizens</b> <b>Foreign-born citizens</b> <b>Native-born foreign citizens</b> <b>Foreign-born foreign citizens</b> <b>Native-born (native) citizens</b>	1.Age 2.Sex 3.Country of birth 4.Country of citizenship	Country of next residence; Educational attainment; Reason for move; Labour force status; Departure location within country
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43. The first core statistic on stocks (1.1) is the absolute number and the proportion of the foreign-born population, foreign citizens, foreign-born citizens, native-born foreign citizens, foreign-born foreign, and native-born (native) citizens in the total resident population. The primary topics for disaggregation are age, sex, country of birth, and country of citizenship. This measure is important for determining the main migrant subpopulations living in the country and counted as part of official statistics. By gathering information on population by foreign country of birth and citizenship, the basic characteristics and sizes of the immigrant population can be compared with the native-born and/or citizen population. There are six secondary topics (optional) that are also important for understanding the migrant populations and their well-being: duration of stay, educational attainment, labour force status (employed, unemployed, outside labour force), location of residence within the country, reason for migration, and parents' native-born or foreign-born status.

44. The second core statistic on stocks (1.2) is the absolute number of native-born foreign citizens and foreign-born foreign citizens obtaining citizenship over a given year. This statistic quantifies the number of persons living in the country and changing their status to national citizen. Thus, it measures events that result in a change of status of members of the resident population stock. Acquisition of citizenship may not be possible for some or all migrants or refugees in some countries. The primary topics for disaggregation are age, sex, country of birth, and current country of citizenship.

45. The core flow statistics 1.3 and 1.4 capture the annual numbers of persons migrating in and out of the country by different categories of citizenship and/or country of birth. These numbers are important for understanding net gain or loss from the resident population each year. If it is the case that the input information to compute statistics 1.3 and 1.4 is not available, then net migration, or the difference between immigration and emigration, may be computed, bearing in mind that this information is not necessarily collected but is often the outcome of an estimation process. This can be measured as a residual in a demographic accounting equation, where net migration is equal to the change in the population,  $P(t+1) - P(t)$ , minus births plus deaths. However, this approach is not optimal as it may also contain errors from the measures of population or vital events. Additionally, when looking at net migration trends calculated from residuals, it is not clear whether they are the result of changes in immigration, emigration, or both, complicating its use in policymaking. However, the outlined approach can be used to evaluate regular estimates of immigration and emigration between the last two censuses after a census round.

46. The four core statistics presented in Table 1 for international migration stocks and flows provide the basis for understanding the numbers and impacts on sending and receiving countries. They represent the most basic information needed to understand global migration processes and how they are changing over time. Statistics on international migrants are important for national

statistical offices (NSOs) to determine the contributions of international migration towards resident population changes across age and sex groups.

47. Table 2 presents additional statistics for measuring international migration and temporary mobility, which are considered ancillary depending on national circumstances and priorities. Four of the additional statistics are for measuring temporary mobility, from which two are dedicated to stocks, and two to flows, respectively. The statistics on temporary mobility concentrate their focus on selected population groups that are particularly relevant for international migration statistics. Considering that in a number of countries, the measurement of (non-resident) flows of foreign citizens is highly topical, it is recommended that countries put in place a robust coordination mechanism with NSOs and Ministries in charge of migration policies to discuss the pertinence and relevance of measuring temporary population mobility.

48. Table 2 also contains an additional statistic on the total net migration over a given year (1.5) that is only to be computed in cases where information required to compute 1.3 and 1.4 is not available to the NSO.

49. The first temporary mobility statistic, 1.6, represents the number of foreign citizens temporarily present in the country who are cross-border workers, engaged in seasonal work, other types of employment, training or education, seeking health-related treatments, or asylum seekers/refugees. In parallel, statistic 1.7 represents the number of national citizens temporarily absent from the country who are cross-border workers or engaged in seasonal work. Temporary populations by other reasons of entry (exit) are heterogeneous across countries and their harmonization goes beyond the scope of these recommendations. Nevertheless, for most countries, temporary populations can have huge impacts, notably on local labour markets, and detailed information on them would be useful to collect.

50. The additional flow statistic 1.8 refers to the annual number of foreign citizens entering the country temporarily by reason of entry (cross-border workers, engaged in seasonal work, other types of employment, training or education, seeking health-related treatments, or asylum seekers/refugees) – these flows are short-term with regard to duration of stay and do not result in a change in the resident population. Statistic 1.9 captures the annual number of resident foreign citizens and citizens departing the country for temporary stays abroad. These two additional statistics on temporarily mobile populations provide the means to examine migration and mobility processes in more detail.

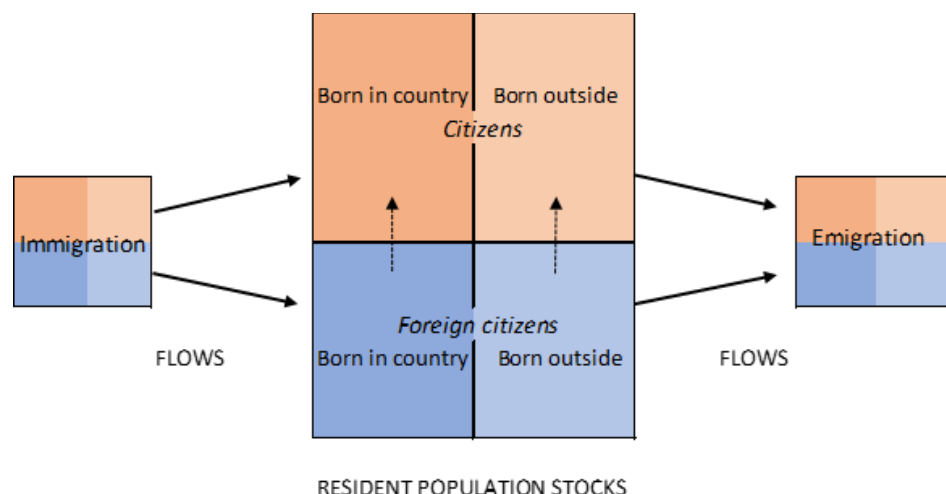
**Table 2. Additional statistics and topics on measuring international migration and temporary mobility stocks and flows**

<b>ADDITIONAL</b>			
<b>Migration Statistics</b>			<b>Primary topics for disaggregation<sup>1</sup></b>
<b>Flow</b>	<b>1.5</b>	Total net migration over a given year <sup>2</sup>	1.Age 2.Sex
<b>Temporary Mobility Statistics</b>			<b>Primary topics for disaggregation<sup>1</sup></b>

<b>Stock</b>	<b>1.6</b>	Number of foreign citizens temporarily present in the country who are _____  (a) cross-border workers (b) engaged in seasonal work (c) engaged in other types of employment (d) engaged in training or education (e) seeking health-related treatments (f) asylum seekers/refugees	1.Age 2.Sex  3. Duration of stay
	<b>1.7</b>	Number of national citizens temporarily absent from the country who are ____  (a) cross-border workers (b) engaged in seasonal work	1.Age 2.Sex 3. Duration of stay
<b>Flow</b>	<b>1.8</b>	Annual number of foreign citizens entering the country temporarily for _____ (a) cross-border work (b) seasonal work (c) other types of employment (d) training or education (e) health-related treatments (f) seeking asylum /refugees	1.Age 2.Sex 3. Duration of stay
	<b>1.9</b>	Annual number of resident _____ departing the country for temporary stays abroad* (a) Foreign citizens (b) Citizens  * excluding tourism and business travel	1.Age 2.Sex 3. Expected duration of stay 4.Country of final destination

**a. Aligning flows of migration with migrant population stocks at the national level**

51. The alignment of migration flows with migrant population stocks at the national level ideally involves disaggregation of the resident population by both country of birth and citizenship with corresponding flows of immigration and emigration, as shown in Figure 5. This is the basis for the recommendations on the collection and dissemination of data on international migration and immigrant populations, indicating the coherence between flows and stocks. Changes in the size and structure of the ‘stock’ of migrants are determined largely by the flows. Migrant births and deaths can also influence changes to the migrant population stock, and they should be included as part of the data collection and reconciliation. The framework also includes the possibility of changing status from foreign citizen to (national) citizen through naturalization, whether by declaration, marriage or other means according to the national legislation and the possibility of loss of citizenship through revocation or renunciation.



**Figure 6. Conceptual framework on international migration and the coherence between flows and stocks**

**b. Four main resident subpopulations of interest and their demographic components of change**

52. For the resident population, there are four subpopulations critical to understanding immigrant and emigrant populations: native-born citizens, native-born foreign citizens, foreign-born citizens and foreign-born foreign citizens.<sup>34</sup> Disaggregating population and migration statistics by citizenship status and birthplace to produce statistics on these four subpopulations is the third key recommendation presented in the executive summary of this document. Foreign born / native born and citizen / foreign citizen are the two main disaggregations used to identify immigrant and emigrant population data available. Arguably, neither are ideal measures of migrant populations. Thus, combining these two measurements together into one framework provides a more powerful tool for understanding international migration and its consequences for demographic and social change over time.<sup>35</sup> Note, a person cannot change their country of birth, but they can change their country of citizenship.<sup>36</sup>

<sup>34</sup> Stateless persons and those without citizenship are considered together with the foreign citizen disaggregation for the purposes of coherence between flows and stocks at the national level. Specific recommendations on statelessness statistics are outlined in the International Recommendations on Statelessness Statistics (IROSS), of the Expert Group on Refugee, IDP and Statelessness Statistics (EGRISS) endorsed by the Statistical Commission in 2023. In contexts where stateless populations are prevalent, further disaggregation is recommended.

<sup>35</sup> Further on the relevance of the combined use of country of birth and citizenship in migration statistics, see “An alternative view on the statistical definition of migration”, Working Paper 5 for the UNECE Work Session on Migration Statistics.

([https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.10/2019/mtg2/2.5\\_Definitions\\_Eurostat.pdf](https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.10/2019/mtg2/2.5_Definitions_Eurostat.pdf))

<sup>36</sup> It is possible for ‘country of birth’ to change when country borders change or new countries or formed, after birth, but this is not a common occurrence.

53. The advantage of country of birth in defining the migrant population is its consistent definition over time, that is, a person may only be born in one country and if it is different from the country of residence, it shows that this person moved to another country at least once in her/his life. However, with these data, it is not known when the migrants arrived or whether they have permission to remain indefinitely. Citizenship, on the other hand, distinguishes access to a range of services and protections in a country. For immigrants, obtaining citizenship is a significant milestone for social integration and permanency. However, once a person becomes a citizen, information about their previous or other countries of citizenship is typically not tracked or considered important. Also, persons can become citizens even though they have never lived in the country (e.g., children of citizens living abroad). Alternatively, persons may be born in the country but remain foreign citizens. Indeed, these persons are part of the resident population in the measurement country, given that their duration of stay has reached the minimum threshold. For instance, many refugees have been born in displacement and have never migrated during their lifetimes. In this case, they would be included in the native-born foreign-citizen resident population group unless they naturalized.

54. Table 3 highlights the data needed to reconcile the foreign-born and native-born populations and their international migration flows. The sum of numbers in the rows add up to the resident populations at the beginning of the time interval,  $P_{R,i}(t)$ . Note, the subscript  $R$  for resident population is implied and not included here and below for simplicity of expression. The balancing term or persons not changing their resident population status,  $R_i$ , is obtained by subtracting the total number of persons that emigrated in the time interval (emigrations),  $E_i$ , and deaths,  $D_i$ , from the population at the beginning of the time interval, that is,

$$R_i = P_i(t) - E_i - D_i.$$

55. The variables in the columns of Table 3 add up to the populations at the end of the time interval (i.e.,  $t+1$ ). These can be computed by adding to the balancing term the total number of persons that immigrated in the time interval (immigrations),  $I_i$ , and births,  $B_i$ , that is,

$$P_i(t+1) = R_i + I_i + B_i.$$

56. If the two above equations are combined, the balancing term cancels out, and results in the familiar components of the population change equation:

$$P_i(t+1) = P_i(t) - E_i - D_i + I_i + B_i.$$

**Table 3. Accounting table for resident population by birthplace**

	Native-born	Foreign-born	Emig- ration	Deaths	Total
NB	$R_{NB}$		$E_{NB}$	$D_{NB}$	$P_{NB}(t)$
FB		$R_{FB}$	$E_{FB}$	$D_{FB}$	$P_{FB}(t)$

Immigration	$I_{NB}$	$I_{FB}$			$I_+$
Births to native-born parent(s)	$B_{NB}$				$B_{NB}$
Births to foreign-born parent(s)	$B_{FB}$				$B_{FB}$
Total	$P_{NB}(t+1)$	$P_{FB}(t+1)$	$E_+$	$D_+$	

Notes:  $t$  = time,  $t+1$  = time plus one year,  $P$  = population,  $R$  = population that remains or does not change resident status,  $E$  = emigration,  $D$  = deaths,  $I$  = immigration,  $B$  = births,  $NB$  = native born or born in country;  $FB$  = foreign-born or born abroad.

57. As the above accounting equations show, in order to measure the foreign-born population and how it changes over time, data on population stocks, births, deaths, immigration and emigration disaggregated by country of birth are needed. Births to foreign-born persons are automatically native-born and are added to the native-born population. The determination of foreign citizens born in the country, however, depends on the legislation in each country with some countries designating them citizens and others foreign citizens (i.e., jus sanguinis and jus soli systems). Also, countries may change borders or define country of birth differently (based on actual place of birth or mother's usual residence at time of birth) leading to potentially inconsistent categorizations.

58. The demographic accounting table for changes to the foreign citizen and national citizen populations from time  $t$  to time  $t+1$  is shown in Table 4. Again, the sum of the numbers in the rows adds up to the populations at the beginning of the time interval and the sum of the numbers in the columns add up to the populations at the end of the time interval. The  $R$  term represents persons not changing their resident population status, including those not transferring from being a foreign citizen ( $F$ ) to a national citizen ( $C$ ), denoted by  $T_{F-C}$ . For example, the demographic accounting model for the foreign citizen population is:

$$P_F(t+1) = P_F(t) - E_F - D_F - T_{F-C} + I_F + B_F.$$

59. In this case, births to foreign citizen parents are added to the foreign citizen population. Note, in some countries, these births may be automatically considered national citizens, and, in that case, they should be added to the national citizen population (similar to the treatment of births in Table 3). Also, transitions from citizen to foreign citizen are not considered due to the close to zero occurrence for most countries collecting and reporting the data as it is not clear why someone make such a transition in the country where they are both citizen and resident. As the above accounting equations show, in order to measure the foreign citizen population and how it changes over time, citizenship information is needed on population stocks, births, deaths, immigration, and emigration, as well as information on transfers to national citizenship.

**Table 4. Accounting table for resident population by citizenship**

	Citizen	Foreign citizen	Emigration	Deaths	Total
Citizen	$R_C$		$E_C$	$D_C$	$P_C(t)$
Foreign citizen	$T_{F-C}$	$R_F$	$E_F$	$D_F$	$P_F(t)$
Immigration	$I_C$	$I_F$			$I_+$
Births	$B_C$	$B_F$			$B_+$
Total	$P_C(t+1)$	$P_F(t+1)$	$E_+$	$D_+$	

Notes:  $t$  = time,  $t+1$  = time plus one year,  $P$  = population,  $R$  = population that remains or does not change resident status,  $T$  = transition to another citizenship status (e.g., foreign citizen to national citizen),  $E$  = emigration,  $D$  = deaths,  $I$  = immigration,  $B$  = births,  $C$  = national citizen, and  $F$  = foreign citizen.

60. Related to Figure 5 are corresponding demographic accounts presented in Table 5, which can also be thought of as extensions to Tables 3 and 4. Consider the foreign-born citizen population,  $P_{FB/C}$ , and how it changes from time  $t$  to  $t+1$ :

$$P_{FB/C}(t+1) = P_{FB/C}(t) - E_{FB/C} - D_{FB/C} + T_{FB/F-FB/C} + I_{FB/C}.$$

61. Note that births to foreign-born citizens are not included because they would be considered native born and added to the native-born foreign citizen or citizen population. The determination of foreign citizens born in the country, however, depends on the legislation in each country with some countries designating them citizens and others foreign citizens (i.e., jus sanguinis and jus soli systems). Also, countries may change borders or define country of birth differently (based on actual place of birth or mother's usual residence at time of birth) leading to potentially inconsistent categorizations. Transitions from citizen to foreign citizen are not considered due to their rare occurrence and unlikely transition in a country where they are both citizen and resident. As the above accounting equations show, in order to measure the foreign-born citizen population and how it changes over time, data on population stocks, transfers, births, deaths, immigration and emigration disaggregated by both country of birth and citizenship status are needed.

**Table 5. Accounting table for resident population by citizenship and birthplace**

	Native-born citizen	Foreign-born citizen	Native-born foreign citizen	Foreign-born foreign citizen	Emigration	Deaths	Total
NB citizen	$R_{NB/C}$				$E_{NB/C}$	$D_{NB/C}$	$P_{NB/C}(t)$
FB citizen		$R_{FB/C}$			$E_{FB/C}$	$D_{FB/C}$	$P_{FB/C}(t)$

NB foreign citizen	$T_{NB/F-NB/C}$		$R_{NB/F}$		$E_{NB/F}$	$D_{NB/F}$	$P_{NB/F}(t)$
FB foreign citizen		$T_{FB/F-FB/C}$		$R_{FB/F}$	$E_{FB/F}$	$D_{FB/F}$	$P_{FB/F}(t)$
Immigration	$I_{NB/C}$	$I_{FB/C}$	$I_{NB/F}$	$I_{FB/F}$			$I_+$
NB births	$B_{NB/C}$		$B_{NB/F}$				$B_{NB+}$
FB births	$B_{FB/C}$		$B_{FB/F}$				$B_{FB+}$
Total	$P_{NB/C}(t+1)$	$P_{FB/C}(t+1)$	$P_{NB/F}(t+1)$	$P_{FB/F}(t+1)$	$E_+$	$D_+$	

Notes:  $t$  = time,  $t+1$  = time plus one year,  $P$  = population,  $R$  = population that remains or does not change resident status,  $T$  = transition to another resident status (e.g., foreign citizen to citizen),  $E$  = emigration,  $D$  = deaths,  $I$  = immigration,  $B$  = births,  $NB$  = native born or born in country;  $FB$  = foreign born or born abroad,  $C$  = citizen, and  $F$  = foreign citizen.

62. The minimum set of recommended tabulations is presented in Annex B.

## 4. Establishing or improving national migration data systems

63. National systems of migration statistics may be divided into three broad categories: those relying entirely on field-based data collection (population censuses and household or other surveys), those with fully administrative systems (well-established register-based statistical systems) and those using a combination of both field-based and administrative sources. All three types of systems face common cross-cutting challenges, such as needing to account for the highly mobile nature of migrant populations, which makes them difficult to measure.

### a. Overview of sources of data

64. This section highlights different data sources - field-based, administrative and non-traditional, that can be used to produce statistics on international migration flows and various groups of the resident population stock. In order to choose the most appropriate methodology for producing migration statistics, the key priority for a country should be to identify the most appropriate data sources and set of rules for applying the definition of international migrant that ensure consistency between data on international migration flows and the resident population stock, and the full coverage of the related population.

### Field-based data sources

#### i. Field-based population census

65. Population censuses are widely recognized as the primary source of statistics on international migrant stocks (stock of foreign-born and stock of foreign citizens) and often serve as the only reliable source of information on international migrants in countries lacking robust administrative registers. The key strength of censuses lies in their broad coverage of the resident population, including undocumented migrants, refugees, stateless persons, and those living in

group quarters. While some degree of undercoverage may occur, censuses remain a vital tool for capturing comprehensive data on international migration.

66. Censuses that gather a wide range of demographic and socioeconomic information via their questionnaires offer valuable insights into international migrants. This allows for comparisons between migrants and non-migrants, particularly in terms of access to housing, employment, and social services.

67. Censuses are also adaptable, with NSOs being able to incorporate the duration of stay criteria and to formulate questions according to internationally agreed statistical definitions for migration. They offer a unique advantage in ensuring consistency between stocks (or resident population) and recent flows of international migration, as both are derived from the same data source.

**Table 6. UN Recommendations for direct measurements of international migration in population censuses**

<b>Core census topics<sup>37</sup></b>	<b>Corresponding migration data</b>
Place of usual residence	-Resident population
Country of birth	-Stock of foreign-born population
Place of previous residence	-Stock of immigrants
Place of residence at a specified date in the past	-Estimate of immigration flow over time period
Country of citizenship	-Stock of foreign-citizen population
Country of birth and country of citizenship (cross-tabulation)	-Stock of: Foreign-born citizens Native-born foreign citizens Foreign-born foreign citizens Native-born (native) citizens
Year or period of arrival	-Estimate of immigration -Duration of stay
Year or period of arrival and country of citizenship (cross-tabulation)	-Recent immigration of foreigners -Recent immigration of citizens (return migrants)
<b>Additional census topics</b>	<b>Corresponding migration data</b>
Acquisition of citizenship	-Classification of resident population by the method of acquisition of citizenship
Ever resided abroad	-Stock of immigrants -Stock of return migrants
Reason for international migration	-Reasons of migration

<sup>37</sup> Principles and Recommendations for Population and Housing Censuses, Revision 4, forthcoming.

68. In many countries, population censuses play a critical role in developing or updating the sampling frame for national household surveys over the next decade. Census data on international migration are essential for designing survey sampling frames that specifically target migrant populations.

69. At the same time, censuses have several limitations when it comes to measuring international migration<sup>38</sup>. First, censuses capture the population living in the country and are not designed to capture persons who have left the country (i.e., emigrants and emigration). Second, censuses are prone to under-coverage, as compared to the non-migrant population, of certain migrant groups such as highly mobile individuals, undocumented migrants, stateless persons, and refugees, who may be less likely to be enumerated due to their transient living situations. Participation errors can also arise when migrants, especially those in irregular situations, are reluctant to participate in the census due to mistrust of authorities or concerns about data confidentiality. Additionally, measurement errors may occur when migration-related questions are answered inaccurately, either because proxy respondents provide incomplete or incorrect information (e.g. when reporting on entire households that have emigrated) or because respondents lack clarity on complex questions related to migration.

70. Since field-based census data are typically collected only once every 10 years, they are not suitable for monitoring more frequent changes in migrant populations.<sup>39</sup> Finally, because censuses can accommodate only a limited number of questions related to migration, they cannot provide the detailed information needed for a meaningful analysis of the causes or consequences of international migration.

## ii. Household and other sample surveys

71. To supplement census data and provide a more comprehensive understanding of migration between census years, it may be necessary to use additional data sources, such as surveys. Several types of sample surveys can be employed for this purpose: (a) specialised international migration surveys, (b) forced displacement surveys (FDS), (c) modules added to existing household surveys (such as the Labour Force Survey (LFS), Demographic and Health Survey (DHS) and Living Standards Survey(LSS)), and (d) passenger surveys conducted at the border.

### *Specialised international migration survey*

72. Specialized international migration surveys aim to capture detailed information about migration and migrants, requiring a sample that explicitly targets migrants to minimize coverage bias and improve the precision of estimates for migrant populations compared to general household surveys. Their flexibility allows for targeted design, focusing not only on migrant stocks and flows

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<sup>38</sup> For more details, see Handbook on Measuring International Migration through Population Censuses (<https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Handbooks/international-migration/2022-UNSD-Handbook-Meas-Intern-Migration-E.pdf>)

<sup>39</sup> However, the gradual shift toward register-based or combined census methods in some countries allows more frequent or continuous collection of population data.

but also on the causes, consequences, and characteristics of migration and migrants, providing opportunities to study various migrant groups in depth. To enable meaningful comparisons, the survey design should also include non-migrants, allowing for analysis of differences in socio-economic characteristics, migration determinants, and outcomes between migrants and non-migrants.<sup>40</sup> For undocumented migrants or forcibly displaced populations, for example, specialized surveys combined with qualitative fieldwork can provide insights into their entry methods, living conditions, and socio-economic characteristics, including labour market participation in destination countries. These methods can also be used to study return migrants and how they reintegrate into labour markets of their country of origin.

73. International migration surveys can be carried out in both the receiving and sending countries. In receiving countries, surveys usually collect data only for immigration stocks and flows, and in sending countries data is usually collected for return migrants. Surveys in sending countries also interview non-migrants as a reference group to determine their migration intentions. There are few examples of surveys conducted simultaneously in both the sending and receiving countries.<sup>41</sup>

74. In order to address the challenge of survey sampling design to produce reliable data on migrants, stratification of areas in the country according to the prevalence of migrants could be conducted, followed by the use of oversampling to select primary and secondary sampling areas with more migrants of interest, and finally two-phase sampling in the last stage. Some specialized migration surveys use lists based on registers as sampling frames.

75. While a source of detailed information on migration and migrants, specialized international migration surveys are quite costly, which limits their frequency and geographic scope, making them unsuitable for annual international migration statistics.

### *Forced displacement surveys*

76. The Forced Displacement Survey (FDS) is a new household survey programme, managed and implemented by UNHCR<sup>42</sup>, bridging humanitarian and development data needs designed to standardize, streamline, and build on the existing UNHCR survey landscape to produce high-quality and timely data on forcibly displaced populations. The FDS data series is comparable across countries and over time, and aligned with international statistical standards. The evidence and anonymized micro-data produced with FDS is publicly available under the Open Data principles, and can be used to inform, design and prioritize programming, advance partnerships, including with donors and development institutions as well as provide indicators for global commitments, among others.

77. The FDS programme collects data on nationally representative samples of refugees and asylum-seekers as well as comparable data on the host population, i.e. nationals who live in

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<sup>40</sup> UNSD, Handbook on Measuring International Migration through Population Censuses

<sup>41</sup> See Specialized migration surveys: 6 regional examples improving research (<https://www.migrationdataportal.org/blog/specialized-migration-surveys-6-regional-examples-improving-research>)

<sup>42</sup> Managed and implemented by UNHCR's Global Data Service and supported financially and technically by the Division of Resilience and Solutions and the World Bank-UNHCR Joint Data Center on Forced Displacement. Data collected by local partners.

proximity to the refugee population and are potentially affected by them. As a multi-topic survey, the FDS collects household- and individual-level data on socio-economic and living conditions, broadly covering demographics, legal status, socio-cultural, economic and civil-political areas of lives of the target population. Given the different contexts, data needs and resources, the FDS adopts a modularized approach, divided into core and non-core questionnaire modules, that can be included or excluded based on the relevance of specific topics in each country. Data is collected through face-to-face household interviews.

### *Other-purpose household surveys*

78. Other-purpose household surveys (e.g., demographic, labour-force, or living standards surveys) are generally conducted more regularly and can be adapted to collect information on international migration by adding relevant questions or modules and assessing the suitability of the sampling design to cover migrant populations. These surveys may be used for gathering data on the survey topic that allows comparisons between the migrant and non-migrant populations, providing information on migrant integration or other parameters.

79. However, using sample surveys to study international migration presents its own challenges. Sample size requirements are a primary concern due to the typically small proportion of migrants in most populations. Large samples are needed to identify enough migrants for meaningful analysis, and this requirement increases for studies focusing on specific migrant subgroups or measuring migrant flows and stocks. Coverage bias is another issue, as migrants not living in conventional private households may be excluded, and concepts of household membership used in surveys may not adequately apply to their living situations. Participation can also be lower for migrants in surveys not specifically designed for them, due to language barriers, lack of familiarity with surveys, or the need for cultural sensitization. Additionally, non-response bias is a concern as migrants may be reluctant to participate due to their status or mistrust of survey processes, potentially skewing results.

80. Surveys should include the same basic questions as censuses, with the option to add more specific migration-related inquiries. This allows for mainstreaming migration data into various social areas covered by the surveys. Survey design should ensure adequate representation of population subgroups and geographic areas relevant to international migration and have a large enough sample size to support reliable estimation and subgroup analysis.

81. Adding migration modules to existing surveys is cost-effective but may require increasing sample size and adjusting sample selection to account for migrant distribution. When considering this approach, it's crucial to evaluate the existing survey's sample design, size, geographic coverage, and the prevalence of migrants in the country. Adding migration modules to these surveys may risk compromising their quality or primary objectives.

82. While national coverage is generally desirable, the concentration of migrants in specific regions or cities means that survey design must carefully balance representativeness with the need to capture sufficient data on migrant populations.

83. Longitudinal and multi-wave surveys<sup>43</sup> are better suited for tracking migration processes over time, though they present additional organizational challenges, particularly with highly mobile migrant populations that are harder to contact for follow-up.

### *Labour Force Surveys*

84. The Labour Force Survey (LFS) is an example of a national survey that is generally well established, conducted on a frequent and regular basis with national coverage, secure funding and using a large sample to collect comprehensive individual and household data. As such, the LFS is a prime candidate for adding international migration modules to improve the availability of data on the labour force participation and working conditions of international migrants. This would allow countries with an immigrant labour force to produce statistics to monitor the relative labour market situation of migrants and non-migrants without the need to establish a separate specialized survey.

85. When modules are included in a national LFS with an appropriate sample design, they can generate valuable data on migrants' situations, working conditions, labour market integration, and migration experiences<sup>44</sup>. To-date however, most LFS are not yet designed specifically to ensure coverage of all relevant groups of international migrants in a way that supports preparation of separate estimates of key labour market indicators by international migrant status and other cross-cutting characteristics with sufficient precision. In countries where the share of immigrants is relatively large and where an important proportion of the migrant population resides in collective living quarters, it will be important to review the survey's sampling design and integrate the production of key estimates by international migrant status, as part of the survey's measurement objectives. Integrating such measurement objectives will serve not only to generate needed data on the labour market situation of different groups of international migrants, but also improve the overall quality and relevance of labour force statistics to monitor changes in the labour market and the contributions of migrants to employment in particular sectors, as international migrants tend to display different labour market dynamics and concentrate in selected industries compared to the general population. This approach could serve as a model for mainstreaming migration status disaggregation in other major national household surveys, covering domains like health and poverty.

### *Passenger surveys*

86. Passenger surveys directly target individuals crossing national borders. The surveys are carried out via face-to-face interviews with a sample of passengers as they enter or leave the

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<sup>43</sup> Examples include the Canadian Longitudinal Survey of Immigrants to Canada (LSIC), the Mexican Migration Project (MMP) and the German Emigration and Remigration Panel Study (GERPS).

<sup>44</sup> The International Labour Organization (ILO) has developed modular sequences to integrate migration-related topics into LFS, aligned with international standards. These modules include sequences to identify different target groups (e.g., foreign-born population, foreign citizens, return migrants) and to capture priority topics such as employment experience abroad and migrant recruitment costs (relevant to SDG 10.7.1) as relevant (see: <https://ilostat.ilo.org/topics/labour-migration>).

country. The survey design involves sampling specific routes or ports on given days and systematically selecting passengers for interviews within set periods.

87. While these surveys can provide information on international mobility, they face several challenges when it comes to measuring international migration, including the lack of an appropriate sampling frame, potential exclusion of less frequent origins/destinations, a low proportion of migrants among all border-crossers, and limited interview time, restricting the number of questions.

88. These surveys are more feasible in countries with few entry points and where travellers arrive and depart in discrete groups, such as at airports or seaports. Despite their limitations, passenger surveys can offer valuable insights into border-crossing patterns and temporary mobility when properly designed and implemented.

### **Administrative data sources**

#### **iii. Administrative data sources (including population registers and other administrative sources)**

89. Administrative data, collected for governmental tasks, offer a valuable resource for producing international migration statistics. As traditional censuses and surveys become more challenging and costly, many NSOs are turning to administrative databases for more timely and cost-effective migration data. These sources provide high reliability, completeness, and lower processing costs, allowing for continuous monitoring of migration flows and timely updates of population stocks. This section discusses some common examples of administrative data sources that can be used for migration statistics.

90. Integrated population registration systems are among the most comprehensive sources for measuring migration stocks. They provide timely and cost-effective data on population stocks, including migrants, and can measure flows if integrated with border control systems or immigration records. However, these systems often exclude temporary populations, undocumented migrants, and asylum seekers. Integrated population registers are linked or easily linkable with other administrative registers of persons, and usually include historical data.

91. Centralized population registers offer basic demographic information and can be linked with other sources using unique ID codes or a set of specified common variables. They have essentially the same characteristics as integrated population registers, except that they are not integrated with other administrative databases at the individual record level, and thus have fewer available variables to characterise population stocks and international migrants. They may face challenges with data linkage and coverage discrepancies between databases, potentially leading to inconsistencies in migrant stock and flow estimates.

92. Residence permit databases, as well as work or study permit records, can be used to estimate documented foreign population stocks and their reasons for establishing a new residence, as well as regular immigration flows. They can provide detailed information on foreign citizen residents, including their purpose of stay and duration of residence. The issuance of first-time permits can be used to estimate immigration flows, while expirations or non-renewals can indicate potential emigration or aid an approximation to the study of irregular migration. The longitudinal nature of permit data allows for analysis of migrants' trajectories and change of status over time,

including transitions between different permit types and pathways to permanent residence. However, these databases may not cover all foreign citizens due to visa-free arrangements or bilateral agreements, potentially underestimating certain migrant populations. Also, whereas the duration of validity of a permit may be used to classify migrants as part of the resident population in accordance with the recommended statistical definition, some residence permit holders may have left the country before the end of validity of their permit and/or never become a resident. Furthermore, these databases may not capture emigration accurately, as migrants may not always report their departure.

93. Countries which have comprehensive border registration for all movements and the capacity to track persons across their entries and exits would be able to provide consistent and comparable statistics on both immigration and emigration flows. Border records include the mode of travel and the port of entry/exit, as well as key passport information such as date and place of birth, sex and country of citizenship. Distinguishing migrants from other travellers often requires additional information, and sophisticated data linkage is necessary to track individuals over time and determine their migration status. Records also include the processing of passengers who require a visa to enter the country. However, as only a small part of border crossing cases can be classified as international migration, the register owner may not prioritize spending resources for processing these data. Typically, the unit of analysis in border records is the movement or event. Thus, once the NSO gains access to border records, it is important to highlight that these data need to be heavily processed in order to transform records of events (entries and exits) to records of persons, who may have one or more movements in a given year. In addition, monitoring of exits has been shown to be less rigorous than entries, which impacts data quality and can lead to coverage issues<sup>45</sup>.

94. Work or study permit records are particularly useful for understanding managed labour migration or student mobility, revealing trends in skill profiles and changes in sectoral distribution of migrant workers, crucial for policymakers in areas of workforce planning and employment and educational policy design. On the other hand, they may not capture accompanying family members, transitions to other migration statuses or participation in informal employment.

95. Visa databases can identify potential immigrants based on visa types and durations, making them useful for analyzing trends in migration flows. They can also provide early indicators of changing migration patterns. Visa-free movements would not be captured, leading to an underestimation of migration flows, while the intentions stated on visa applications may not always match actual behaviour, leading to potential overestimation of migration flows.

96. Social security, health insurance, income and tax registers can serve to generate data on foreign citizens formally employed who are contributors. If nationals and foreign citizens are distinguishable in the social security register, the stock of foreign citizens residing in the country and contributing to its social welfare instruments could be identified with some basic demographic variables, such as sex, date of birth, country of citizenship and possibly country of birth. Some portion of immigration and emigration flows can be estimated by looking at new registrations and de-registrations (while accounting for in-country status changes). These registers can be

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<sup>45</sup> ECLAC, 2011, *Viejos y nuevos asuntos en las estimaciones de la migración internacional en América Latina y el Caribe*, LC/L.3290-P.

particularly useful for understanding the economic integration of migrants, as well as capturing the return migration of national citizens. However, while these data sources capture established migrants who are integrated into the formal labour market and the country's welfare systems, they typically exclude recent arrivals, those unemployed or in informal employment, dependents, and those without access to public health insurance, potentially underestimating certain types of migration flows. Additionally, delays in registration or de-registration can lead to timing discrepancies between actual migration events and their statistical recording.

97. Consular registers represent an interesting data source and the only one to collect data on diaspora (or national citizens living abroad) if they include the majority of national citizens outside the home country. However, due to the voluntary nature of registration, these registers often suffer from incomplete coverage. The quality of data can vary significantly, with some emigrants choosing not to register or to update their information regularly. Data from consulates can be compared with mirror data from relevant host countries, taking into consideration the number of people with dual citizenship.

98. Passport issuance databases, while primarily designed for document issuance, can offer indirect insights into potential emigration flows. In many countries, spikes in passport applications or renewals can signal increased intentions for international mobility. These databases can be particularly useful in countries where reason for passport issuance is tracked, e.g. if obtaining a passport is closely associated with plans for work or study abroad. However, the link between passport issuance and actual migration is tenuous at best. Many passport holders may never change their country of residence.

99. Civil registers, though not directly measuring migration, play a crucial role in understanding the demographic impact of migration flows if they capture migration related data (such as citizenship, country of birth). By providing accurate data on births, deaths, and marriages involving foreign citizens, these registers offer insights into the natural increase of migrant populations and patterns of family formation. They are particularly valuable for studying second-generation migrants and understanding long-term integration processes in countries where the registers contain parental birthplace information. The main challenge with civil registers in the context of migration lies in their coverage. Events involving the temporary population or those in irregular situations may not be fully captured. Additionally, the registration of vital events for citizens occurring abroad can be incomplete, complicating efforts to track diaspora populations.

100. Acquisition of citizenship databases provide accurate data on naturalization flows, which affect both foreign and national population stocks, as shown in Tables 4 and 5. They can offer insights into the long-term integration of migrants. However, citizenship acquisition represents only one possible outcome of migration processes. Many long-term residents may never naturalize, either by choice or due to policy restrictions. Moreover, the wide variation in citizenship policies across countries makes international comparisons challenging, limiting the utility of these databases for understanding global migration trends.

#### iv. Challenges with using administrative sources

101. Using administrative data for the purpose of producing migration statistics presents several challenges. A primary issue is aligning administrative definitions with statistical concepts, particularly those of the resident population, migration and migrants. Since definitions and data

collected are determined by administrative needs, they may not correspond to statistical requirements. Generally, administrative databases apply the concepts of legal or authorized residence, using the duration of the registration or permit as a proxy for intended duration, which may not align with statistical definitions. Other databases lack residence information entirely but contain relevant migration categories. Furthermore, administrative registers often contain data based on events and need to undergo statistical treatment to be transformed into person-based data. To address these challenges, it is important to ensure that administrative systems capture sufficient relevant information to allow mapping or converting to statistical definitions. This can involve collecting data on the duration and purpose of residence, entry and exit dates, or demographic characteristics. In the case of event-based administrative data, statistical processing, such as linking multiple records for the same individual over time, can be undertaken to construct person-based datasets that reflect migration flows and stocks in line with statistical definitions.

102. To effectively use administrative data for migration statistics, methodological considerations are paramount. A specialized methodology is required to align administrative records with international statistical recommendations. This may involve adjusting for specific population groups, such as including international students who meet residence criteria or excluding naturalized citizens from foreign citizen migrant stock counts.

103. Data access and integration present further complications<sup>46</sup>. Administrative bodies typically own the data, which may limit access for statistical purposes. Moreover, integration of multiple data sources is often necessary to produce comprehensive migration statistics, as different aspects of migration may be captured across several administrative systems. Establishing legal frameworks for data sharing between agencies is crucial, defining the requirements and expectations for data exchange.<sup>47</sup>

104. Despite these challenges, administrative data can be used as complementary sources to fill significant gaps left by infrequent censuses or surveys. They offer continuous recording of population events and can capture migration flows through visa issuances, border crossings, and citizenship changes. This continuous nature allows for more frequent and timely statistical outputs compared to field-based methods.

#### v. Non-traditional data sources

105. The term "big data" includes anonymized data generated by mobile devices, internet-based platforms and digital sensors. Big data can be said to be big in terms of its volume, but it is also the speed at which it is collated and the complexity of its information that are distinguishing features. Unlike survey data from random samples, it derives from a full count of digital events and requires sophisticated analysis. These "digital traces" offer an opportunity to supplement traditional migration data sources, potentially addressing current data gaps and offering new insights in a much timelier manner.

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<sup>46</sup> See Chapter 5 for details.

<sup>47</sup> Handbook on Management and Organization of National Statistical Systems, Version 2022/A, United Nations, 2022. Available at: <https://unstats.un.org/capacity-development/handbook/index.cshtml>

106. Mobile phone data (MPD) is one of the most promising sources of big data for human mobility statistics. By tracking the movement of uniquely identified accounts between different cell towers, this data can provide a highly accurate picture of where individuals are traveling, making it particularly useful for estimating flows. MPD has the advantage of being collected continuously and automatically, offering granular insights into both domestic and international mobility in nearly real-time. However, its application in international migration statistics presents several challenges. Migrants often switch SIM cards or mobile providers when crossing borders, making it difficult to track movements resulting in a change of residence and potentially leading to fragmented or incomplete data. The representativeness of MPD can also be limited, as it may not adequately capture marginalized groups or those with restricted access to mobile devices. Additionally, privacy concerns and the proprietary nature of MPD requires negotiated public-private partnerships in order to obtain sustainable access to the data for statistical purposes and to be able to aggregate information across providers.

107. Social media data can be used to estimate migration flows by analyzing geotagged posts or self-declared locations in user profiles, and potentially to provide insight into the integration of migrants in host societies. The advantage of social media data lies in its global reach, which can help track migration trends across a wide range of regions and demographics. However, it is not representative, since social media use varies significantly by age, socioeconomic status, and geographic location. Additionally, not all users update their location in real-time or accurately report their movements, leading to potential inaccuracies in measuring stocks or flows of migrants.

108. Messaging apps and other mobile applications that track location information can also provide insights into mobility patterns through GPS, IP addresses, and network connections. While this data could reveal migration trends, especially among younger populations, users may disable tracking features or switch apps after migration. Privacy regulations and varying app usage across demographics and countries would need to be accounted for to harness this data effectively.

109. While big data holds significant potential for enhancing mobility statistics, particularly in terms of capturing real-time flows and understanding temporary mobility, the limitations related to privacy, representativeness, consent and data access must be carefully managed. Additionally, big data requires complex analysis, which often necessitates additional capacity and infrastructure. Despite these challenges, the potential of big data to enhance understanding of mobility patterns and trends makes it a valuable complementary tool for statisticians, researchers and policymakers.

#### b. Data sources for measuring international temporary mobility and temporary populations

110. Measuring international temporary mobility presents unique challenges and requires approaches tailored to the specific context and policy interests of a country. Temporary mobility can include diverse patterns, such as seasonal workers migrating for short-term employment, students enrolled in exchange programs, or individuals traveling for medical care. Each country may define and classify these populations differently, depending on its legal and statistical frameworks.

111. Traditional censuses are generally inadequate for capturing temporary movements due to their infrequent nature and fixed point-in-time approach. They fail to reflect the seasonality and short-term fluctuations inherent in temporary mobility patterns. They also often exclude non-

residents. Administrative records, on the other hand, offer more promising avenues for measuring these movements.

112. As with international migration, administrative data sources can track temporary movements continuously over time, offering valuable insights into temporary mobility. However, the key challenge lies in applying the criterion to determine whether a change in residence has occurred. Data sources such as residence registration records, visa issuance records, residence and work permit databases, tax and social security registers, border crossing data, and airline passenger information each capture different aspects of mobility. Aligning the definitions and criteria for change of residence with statistical concepts is essential for accurately distinguishing temporary mobility from international migration.

113. Additionally, most administrative databases are designed to track specific groups, such as contractual workers, seasonal labourers, border workers, students, pilgrims, etc., based on, for example, the type of visa or work permit they hold. Comprehensive coverage of all types of temporary mobility is probably not relevant for policy formulation and monitoring; moreover, it would be necessary to combine data from a wide variety of datasets. Rather, the recommendation for NSOs is to focus on key temporary population groups that are relevant to the national context. To produce data on temporary mobility, it is crucial to collect information on the reasons for temporary presence in the country. Emphasis is recommended on movements associated with: (a) the labour market (cross-border workers, engaged in seasonal work, other types of employment); (b) utilization of education or training services; (c) utilisation of health care or medical care services; and (d) asylum seekers and those with protection as refugees. For this last category, statistics offices should ensure that data sharing and processing methods are aligned with the more detailed guidance provided in the International Recommendations on Refugee Statistics (IRRS), recognizing the unique challenges and sensitivities involved in collecting data on these populations. This includes appropriate protection safeguards for personally identifiable information and ensuring that statistical activities do not compromise asylum processes or protection needs.

114. Border control systems offer one of the most comprehensive sources of data on temporary mobility. They can potentially capture information on all travellers crossing national borders, including both entry and exit data (although entries generally tend to be better recorded than exits, particularly at land border crossings). This allows for the computation of the duration of stay or absence. Additional forms or passenger surveys at border points can provide supplementary information on reasons for travel and expected duration of stay.

115. Additional data sources for specific groups include:

- Work permit databases maintaining information on seasonal and short-term workers
- Educational databases with information on short-term students and trainees
- Health registers recording medical tourists
- Asylum seeker databases recording applications and cases

116. Another key challenge with administrative data sources lies in the fact that data are generally collected on an event basis and potentially require linking multiple events associated with the same individual for accurate estimates of stocks and flows.

117. Field-based censuses may capture information necessary for estimating temporary population stock, but their infrequency limits their ability to track rapidly changing temporary populations. To better estimate the size of the temporary population, census questionnaires should include questions at the individual level that inquire whether any household member or institutional resident is temporarily absent at the time of the census. To properly identify the temporary population, questions should be included about an absent individual's usual residence and their location on the census reference day. The accuracy of temporary population estimates depends on a clear definition of "temporary" in the census questionnaire. This includes specifying a minimum duration of absence or the purpose of the absence. Including a question about the reason for movement would also allow the census to offer insights into the composition of the temporary population on the census reference day, providing more context on their mobility patterns. Combining census data with other sources, such as administrative records, can improve the accuracy of temporary population estimates.

118. As discussed in the previous section, emerging data sources, such as social media, MPD and other forms of big data, offer promising new avenues for estimating both stocks and flows of temporary mobility. These sources can potentially provide near real-time insights into population movements. However, methodological and other challenges remain in harnessing these data sources effectively and ethically for statistical purposes.

#### c. Recommendations for systems of migration statistics relying primarily on field-based data sources

119. Censuses form the backbone of primarily field-based systems for migration statistics, as they provide the essential stock data needed to understand population dynamics. The census is then used to generate sampling frames for additional field-based surveys. For statistics on international migration, census recommendations tend to focus on two subgroups of the population: foreign-born and foreign citizens living in the country. In addition, it is recommended that the population census collect data on the year or period of arrival in the country, so as to establish the duration of stay of international migrants in the country (See Table 6 for a list of recommended census topics).

120. The question on citizenship alone does not identify individuals with migration experience. Some people who hold national citizenship may have obtained it through naturalization and, therefore, belong to the migration-related population. To collect comprehensive data on citizenship, for countries where the population includes a significant proportion of naturalized citizens it may be important to collect information on the method of acquisition of citizenship so as to enable the classification of the population into (a) citizens by birth; (b) citizens by naturalization whether by declaration, option, marriage or other means; and (c) foreign citizens. In such countries it may also be useful to ask questions on previous citizenship and year of naturalization.

121. Certain data collected in population censuses can be exploited to produce rough estimates of international migration flows for specific periods, ending with the time of the census. Together with population data from a previous census, net migration flow for the period between the two censuses can be estimated. Net migration may be estimated for a series of successive census pairs to examine trends in net migration over the decades (accounting for deaths within the migrant stock).

122. For immigration, the census may use a question on place of residence at a specified time in the past. This allows the possibility of obtaining the number of international migrants who arrived during the period considered and remained in the country until the time of enumeration. The most common time frames used in recent censuses are five years and one year prior to the census. When migration-related questions are included in census questionnaires, immigrants during a fixed period prior to the census should be identified by using the same time criterion that determines residence.

123. Other census questions are recommended that, in addition to establishing migration background, collect data that can be used for estimating recent migration flows, such as whether the respondent ever resided abroad and their year or period of arrival. The question on the year of arrival to the country is sometimes collected only from persons born abroad. In this case, data can be used to distinguish between foreign-born migrants who recently arrived and those who arrived a long time ago, which is important for analysing the integration of migrants. Collecting data on the year of last arrival to a country might be more useful as it helps to better estimate recent migration flows. Asking the question to all persons (foreign-born persons and native born) would allow the identification of persons who lived abroad and returned (return migrants). While this would increase the time needed for filling census questionnaires, the usefulness of data collected from all persons who ever migrated would increase migration data availability in countries where other sources do not exist. Information on the country of usual residence one year before the census date could be used for estimating the flow of immigration for both citizens and foreign citizens during the census year.

124. While censuses provide valuable data on migrant stocks and some information on flows, they have limitations in capturing the full dynamics of international migration. To address these limitations and enhance the quality of migration statistics in primarily field-based systems, the planning of upcoming population and housing censuses should incorporate measures targeting migration data quality and coverage. This could include providing specialized training for field workers on migration-related concepts and definitions, developing reference materials and resources specific to migration statistics to ensure accurate data collection, and coordinating census and survey teams or thematic workstreams in NSOs to improve integration of data collection efforts.

125. A critical issue for sample-based field systems is the lack of robust sampling frames, which can lead to coverage gaps, bias, and costly surveys. This is particularly problematic for capturing data on highly mobile populations or those with irregular migration status. Following a population census, countries should focus on developing and maintaining comprehensive sampling frames that adequately represent migrant populations. Countries should also develop sample designs that allow specialized surveys covering migrant populations. This may involve accumulating samples over time to increase representation of harder-to-reach groups, as well as gradually incorporating administrative data sources.

126. Household surveys and field-based censuses face decreasing participation, potentially undermining the quality and reliability of collected data. Certain groups, such as undocumented migrants or highly mobile individuals, may be especially reluctant to participate, leading to underrepresentation in migration statistics. Countries could consider piloting new approaches,

such as adaptive or respondent-driven sampling, to improve coverage of hard-to-reach migrant populations.<sup>48</sup>

127. Finally, countries with primarily field-based systems of migration statistics should strive to gradually transition to a combined statistical system, as described in the following section.

#### d. Integrating the use of administrative data sources for producing migration statistics

128. Countries should work towards establishing an integrated and comprehensive migration data system that harnesses administrative registers for migration statistics, supplemented with field-based data collections relevant to migration, alternative data sources and innovative methods. Data from border crossings, permits, refugee and asylum applications can all be used, as well as data that records apprehensions and deportations. The increased use of administrative data, although not perfect, not only promises a reduction in costs related to the production of migration statistics (and population statistics as a whole) and their improved timeliness but also addresses the issue of decreasing response rates in field-based data collection. The strengthening and utilization of administrative data sources for measuring migration and temporary mobility flows is the fourth key recommendation presented in the executive summary of this document.

129. The establishment of (or transition to) a migration data collection system represents a long-term investment. Capacity building and collaboration are essential for developing a migration data system that is capable of producing relevant, periodical and reliable statistics that meet policy needs. Gradually expanding data collection methods from field-based data collection to the increased use of administrative data sources requires careful planning with the involvement of all relevant stakeholders.

130. A practical first step – discussed in more detail in Annex C: Checklist for transitioning to or improving a combined migration data system – is to map and evaluate current data sources. NSOs should establish strong collaborative relationships with potential data custodians to evaluate the availability and suitability of administrative registers and records for the production of migration statistics. If certain sources are found to be unsuitable, the NSO should document the reasons or challenges preventing their use. This assessment process helps identify potential data sources and highlights areas where improvements in data collection or access may be needed.

131. Once relevant data sources have been identified, the next step is to systematically assess and document their definitions, concepts, content, reference date/period, coverage, and accuracy. For example, when analyzing border records, it is crucial to determine a) whether all arrivals and departures are included, or if certain nationalities are excluded; b) what specific information is available for each individual; c) whether a unique identifier exists for all individuals (important for linking arrival and departure records); d) the main quality concerns associated with the data; e) to what extent estimated flow data is consistent with other data sources (e.g. population census).

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<sup>48</sup> Raifman, S., DeVost, M.A., Digitale, J.C. *et al.* Respondent-Driven Sampling: a Sampling Method for Hard-to-Reach Populations and Beyond. *Curr Epidemiol Rep* 9, 38–47 (2022).

This type of quality assessment should be done for each register or record set being considered for use in migration statistics.<sup>49</sup>

132. After assessing the availability and quality of registers and records, decisions can be made regarding the sources and variables to be used for producing migration statistics. In most cases, migration events are not captured by a single source, necessitating the derivation of migration flows from various data sources.<sup>50</sup> For countries without a reliable population register, passport and visa information, border control records or residence and work permits may be used to assist with the estimation of international migration flows. It is recommended that NSOs identify and establish partnerships with national organisations and units responsible for registering different migrant groups. For example: ministries dealing with migration and asylum may maintain records for foreign migrants, national health authorities, e.g. health insurance offices, may have data on national emigrants and return migrants, and ministries of labour, social affairs and employment may have information on work permits for foreign workers. By collaborating with these diverse data custodians, NSOs can build a more comprehensive picture of migration patterns.

#### e. Enabling environment and coordination

133. Establishing or improving migration data systems requires a well-structured enabling environment and effective coordination among various stakeholders. This involves creating robust legal and technical frameworks that facilitate data sharing, integration, and protection across different organizations and government agencies. A clear legal framework ensures that data can be shared and integrated securely and effectively, while a strong technical framework supports the complex processes of data management, integration, and analysis at the micro-level (individual). Developing legal frameworks and data sharing agreements constitutes the fifth key recommendation presented in the executive summary of this document.

134. Ideally, each country should establish an inter-ministerial committee, a working group or other mechanism aimed at enhancing the coordination between institutions in migration data-related matters – either as stand-alone structures or on the basis of other inter-agency coordination platforms. In some countries, these coordination mechanisms directly manage migration data topics, while in others, migration data becomes a sub-element within broader collaboration processes between NSOs and different ministries. Such mechanisms work to promote standardized definitions and methodologies in alignment with international standards on migration and temporary mobility statistics and ensure appropriate safeguards for data governance, including privacy, confidentiality and security.

### **Creating/Enabling the legal framework**

135. Legal and regulatory frameworks are crucial to establishing an integrated and interoperable migration data system, especially when it comes to the sharing and integration of data assets

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<sup>49</sup> See the Guidelines for assessing the quality of administrative sources for use in censuses, UNECE, 2021 [https://unece.org/sites/default/files/2021-10/ECECESSTAT20214\\_WEB.pdf](https://unece.org/sites/default/files/2021-10/ECECESSTAT20214_WEB.pdf)

<sup>50</sup> See Chapter 5 for a discussion of data integration.

between organizations.<sup>51</sup> They are also essential to data interoperability between sending and receiving countries in the migration context. Legal frameworks vary sharply across different countries and are especially relevant for those with less centralized national statistical systems or countries where data integration is performed outside the NSO.

136. In countries without population registers, which lack the established agreements found in register-based countries, different government agencies need to establish legal agreements with one another for sharing data, which is often coordinated by the NSO. In some cases, countries may already have data sharing systems in place, or established practices for digital public administration and e-governance, in which case data can be shared with NSOs or other statistical agencies for statistical purposes within those general governmental agreements. Concerns about personal data protection, and the potential use of the shared data, are key elements to be addressed in these data sharing agreements. These agreements typically dictate how data sources are linked, how the linkages are maintained in subsequent updates, and how the data will be used, stored, and for how long a period. Different interpretations in terms of what constitute confidential personal data may need to be addressed to enable effective collaboration across governmental departments and how data integration is conducted.

### **Creating/Enabling the technical framework**

137. An effective technical framework is essential for micro-level integration in migration data systems, given the complexity and sheer volume of individual-level records. Systems must be scalable to handle growing data demands and accommodate future expansions in coverage and detail. As new data become available, regular updates are required, which in turn necessitates well-trained IT and statistical staff and clearly defined technical rules to manage workflows and ensure data quality.

138. The effort to integrate existing data from different sources must align with statistical goals and data availability, beginning with the selection of a "spine" dataset to which additional data sources are linked. This spine should optimize coverage of targeted populations, while additional sources should aim to expand the integrated database in two aspects: (1) to improve coverage of populations, and (2) to add more details, such as migration events or socio-demographic characteristics. Only data sources with adequate information and personal identifiable information (PII) for quality linkages should be used.

139. Key variables in operationalizing migration data include country of birth, country of citizenship, arrival date, previous country of residence, and current address. Knowing when a migrant arrived in a country is critical, as entry into a new data system is not always the same as when they arrived in a country (though it often serves as a proxy measure of this). When the same information (e.g. year of naturalization) for an individual across multiple datasets is different, care must be taken to decide which data source is most accurate. Additionally, the time lag between a migrant's arrival and their appearance in the spine dataset can lead to undercoverage, particularly of newly arrived migrants.

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<sup>51</sup> GPSDD, Data Interoperability: A Practitioner's Guide to Joining Up Data in the Development Sector (<https://unstats.un.org/wiki/pages/viewpage.action?pageId=36144005>)

140. To ensure smooth integration, systems should adopt consistent taxonomies, metadata, and data interoperability standards. Implementing automated metadata collection and data harmonization processes can enhance efficiency, ensure consistency, and improve the scalability of data-integration efforts. As data volumes increase and complexity grows, the technical infrastructure must adapt. Flexible databases and cloud-based solutions can accommodate larger datasets, higher query loads, and evolving analytical needs.

141. Accurate integration requires validation and pre-processing of input data, considering changes in administrative processes and individual records over time. This includes reconciling differences such as name changes, citizenship status, and identification numbers. Digital data sharing and database governance systems can further provide quality control, standardize variables, and anonymize PII as needed.

142. Sustainability of data integration projects is critical, requiring significant IT and statistical skills for development and maintenance. Data sharing agreements need regular renewal, and timely data delivery is essential. Early consultations with stakeholders and data users can help identify technical requirements and ensure the resulting system aligns with policy and operational needs. While initial investments in infrastructure and processes may be substantial, over time these integrated systems prove cost-effective by reducing the need for new, large-scale data collection processes.

f. [Additional recommendations for improving systems of migration statistics that combine field-based and administrative data sources](#)

143. Building upon the necessary legal frameworks and technical enabling environments discussed previously, further enhancements can be made to optimize combined systems of migration statistics.

144. One key recommendation is to focus on enhancing data quality through standardization and harmonization of concepts and definitions across different data sources to minimize inconsistencies and facilitate seamless data integration. NSOs should take a proactive role in coordinating this effort to promote the adoption of internationally agreed statistical definitions related to international migration and temporary mobility, both at the NSO and among administrative data producers. Consistent use of concepts such as "residence" and "international migrant" across field-based and administrative sources will facilitate the alignment of migration stocks and flows. This includes reconciling the "registered population" used in administrative systems with the statistical concept of "resident population." While the listing of persons in the population register or other administrative system is in accordance with national legislation for the requisite administrative purpose, for statistical purposes only those persons meeting the duration of stay criteria for being considered residents of the country should be included in the count. For instance, persons who have left the country but are still holding a permanent residence permit should be still listed in the population register, but they should be excluded from the resident population.

145. A challenge that some combined systems face is the tendency for migration stock data covering foreign citizens to be of better quality than national citizen stocks, given that certain registers explicitly record the movements of foreign citizens only. Movements of national citizens are often not maintained or are maintained separately with less oversight. Updating stocks of

foreign-born populations is less feasible due to the lack of data on country of birth in administrative sources.

146. When a population register does not exist or is of poor quality, population census data can serve as a base for updating migration stocks. Annual estimates of migration flows can be produced using existing administrative data sources such as visa records, residence permits, and border control data. Implementation of robust quality assurance mechanisms, such as cross-referencing data from the different sources and conducting regular audits, can identify and rectify any discrepancies. The United Nations National Quality Assurance Frameworks Manual for Official Statistics (UN NQAF)<sup>52</sup> provides recommendations, a framework, and implementation guidance for assuring the quality of official statistics throughout the NSS.

147. Aggregated data from various sources are susceptible to variations in definitions, measurement universes, as well as spatial and temporal coverage. Thus, in combined systems, it is crucial to have a clear understanding of who is included and excluded from administrative data sources and to establish criteria or assumptions that ensure compliance with the definitions of country of residence used in both the census and administrative sources. For example, when data on the flows of foreign citizens are derived from databases of residence permits or visas, the duration of the visa or residence permit should exceed the minimum duration criterion for being considered a resident of the country, which shows the intention to reside in the country.

148. Comparing and reconciling absolute migration numbers from different data sources is often difficult. Instead of making adjustments based on total values, it is advisable to use historical trends observed between data sources to make adjustments. Ensuring consistency of reference periods among data sources is also important to improve comparability.

149. Validation is another major challenge when various data sources are integrated. In situations where migration data are incomplete, or inconsistent across data sources, it can be difficult to find a true value to validate the resulting estimates. In this case, indirect estimates of migration measurements using demographic methods (such as cohort-component or cohort survival) might help to assess the results' plausibility. Further, consulting historical trends, and comparing estimates from different sources can be used to validate estimates of migration stocks and flows. Thorough estimate assessment with multiple sources and clear communication about the margin and causes of error are good practices to enhance data users' perceptions about the estimate's validity and usability.

150. Countries with combined systems should continue to improve data collection, integration, and analysis through leveraging technological advancements, implementing modern data management systems, utilizing secure data-sharing platforms, adopting advanced analytical tools and embracing innovations such as big data analytics, machine learning, and artificial intelligence. Experimentation and innovation in data practices should be promoted and supported as a joint effort between the NSO and other ministries. Establishing low-risk "sandbox" environments can facilitate collaboration, allowing agencies to test new methodologies and technologies without impacting official statistics or the operational registers.

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<sup>52</sup> UN NQAF Manual, <https://unstats.un.org/unsd/methodology/dataquality/un-nqaf-manual/>

151. In regional free movement contexts such as the European Union's Schengen Area, the ECOWAS region, or other similar arrangements, the reduced or absent border controls significantly impact the ability to collect comprehensive data on cross-border movements, particularly temporary mobility. The high volume of movement, combined with limited registration requirements, creates a fundamental tension between theoretical measurement ideals and practical realities. In these contexts, national statistical offices should adopt pragmatic approaches. Rather than attempting to measure all temporary movements comprehensively, countries may need to focus on developing reliable estimates of key migration patterns through alternative methodologies, such as strategic sampling at selected transit points, combined modelling approaches that integrate available administrative data with survey-based estimates, and experimentation with innovative data sources.

**g. Recommendations for improving systems of migration statistics fully based on administrative data sources**

152. Countries utilizing fully administrative systems for migration statistics benefit from timely and comprehensive data derived from administrative registers. These systems offer cost-effective means to measure migration stocks and flows, providing detailed information that is essential for policymaking and planning. However, despite these advantages, there are challenges that can be addressed to enhance the accuracy, comparability, and relevance of the migration statistics produced.

153. One of the primary challenges faced by countries with register-based systems is the variation in definitions of key concepts such as "resident" and "registered" populations. Discrepancies in these definitions can lead to inconsistencies in data, affecting the comparability and coherence of migration statistics both within and across countries. For example, if one administrative register defines a resident as someone who has lived in the country for at least six months, while another uses a twelve-month criterion, merging data from these sources can result in inaccuracies. Establishing regular communication and collaboration between NSOs and administrative data providers allows for early identification of data issues, harmonization of definitions and updating of methodologies, and ensures that all agencies are aligned in their data collection and reporting practices.

154. Another major challenge is that register-based systems may miss certain population groups, such as undocumented or irregular migrants and nomadic populations. Developing targeted data collection strategies for these groups could include conducting special surveys, working with community organizations and NGOs to gather information, and revising registration requirements to encourage broader participation. Using surveys for validation purposes can help improve the reliability of administrative data. Discrepancies identified between administrative records and survey results can highlight areas that require further investigation.

155. The measurement of emigration flows in administrative data sources presents a particular data quality challenge, since emigrants often fail to deregister. Methods used to detect "signs of life," such as monitoring tax payments, social security contributions, or utility usage, may not accurately capture all instances of individuals leaving the country, which can lead to underestimation of emigration figures. Emigrants who maintain some activities in the country despite residing abroad can further complicate accurate measurement. Refining "signs of life" indicators to integrate multiple administrative data sources can provide a more accurate picture of

whether individuals are still residing in the country. Implementing deregistration incentives or simplifying procedures can also encourage emigrants to officially deregister. Machine learning techniques<sup>53</sup> can also be explored to identify patterns indicative of emigration thereby enhancing detection methods.

156. Register-based systems are also limited in their ability and flexibility to capture detailed demographic and socio-economic characteristics, affecting the depth and utility of the data collected. Administrative registers are typically designed for operational purposes and may not include variables such as education level, occupation, reason for migration, or language proficiency. In addition, lack of metadata, such as data dictionaries with variable definitions, and collection instructions, is a common challenge. This may originate confusion with topics that are semantically similar, for example, “country of origin” vs. “country of birth”. These limitations restrict the ability to conduct comprehensive analyses on the integration and impact of migrants within society. Administrative systems may need to be adapted to collect additional variables, or to better link with other administrative registers using unique identifiers. Administrative data should, at minimum, be disaggregated by sex, age, country of birth and country of citizenship (the primary topics for disaggregation presented in the conceptual framework), and ideally by other relevant characteristics (additional topics).

#### e. General recommendations for improving systems of migration statistics

157. Across all types of migration data systems—field-based, combined, and fully administrative—there are common challenges and opportunities for improvement. By implementing best practices that improve data quality, coverage, and usability, countries can significantly strengthen their migration statistics and support more effective policymaking.

158. One key recommendation, the sixth presented in the executive summary of this document, is to enhance data sharing between origin and destination countries, as well as at the regional level. A persistent challenge in international migration statistics is the mismatch between corresponding flow measurements. Emigration from country A to country B (as measured by country A) should theoretically equal immigration from country A to country B (as measured by country B), but this is often not the case in practice. Sharing both macro-level (aggregated statistics) and micro-level (individual records) data – including producing mirror statistics – allows countries to reconcile discrepancies and fill data gaps, thereby gaining a comprehensive understanding of migration flows and patterns. Establishing formal agreements and protocols for data exchange facilitates this process while ensuring data privacy and security. For countries with substantial bilateral migration flows, establishing dedicated working groups to analyse and address specific discrepancies can be particularly effective.

159. Incorporating qualitative methods alongside quantitative approaches can enrich the understanding of migration dynamics. Qualitative research provides in-depth insights into the experiences, motivations, and challenges faced by migrants, complementing statistical data.

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<sup>53</sup> A notable example of applying machine learning techniques to signs of life methods is the introduction of the Abu Dhabi register-based census in 2023, followed by refinements planned for a second census in 2025. <https://census.scad.gov.ae/Home/About?tab=Methodology&lang=en>

Integrated surveys that combine quantitative and qualitative elements can capture a broader range of information, including attitudes, perceptions, and behaviors related to migration, thereby supporting more nuanced policy development.

160. Engaging and collaborating with a diverse array of stakeholders, including government agencies, non-governmental organizations, academic institutions, private sector entities and migrant communities, is also essential for effective migration data systems. By involving stakeholders outside of traditional survey and administrative data systems, countries can access alternative data sources, expertise, and perspectives. Such collaborative efforts promote inclusiveness in data collection and improve coverage of hard-to-reach populations, ensuring that migration statistics reflect the realities of different migrant groups.

161. Transparency in data methodologies and acknowledgment of data uncertainty are crucial for building trust among data users. Countries should provide detailed metadata—including information on data sources, definitions, methodologies, and limitations—allowing users to understand the context and constraints of migration statistics. Open communication about potential uncertainties and margins of error helps manage expectations and promotes responsible use of the data, increasing the credibility of migration statistics.

162. Building capacity among all stakeholders involved in migration data systems is fundamental for effective data integration and use. Investing in training and professional development enhances the technical skills of personnel involved in data management. Countries should strengthen institutional capacities to ensure that data providers have the necessary resources to produce high-quality migration statistics. Fostering trust among stakeholders encourages cooperation and data sharing, promoting adherence to common standards and practices, which are particularly important for data integration.

163. Gender-sensitive migration statistics deserve special attention to better understand the different experiences and needs of women and men throughout the migration process. Countries should aim to consistently disaggregate all migration statistics by sex, collect data on gender-specific drivers and impacts of migration, as well as data on migrant involvement in care work and informal employment, and develop indicators that capture gender-specific vulnerabilities in migration pathways. This will enhance the evidence base for gender-responsive migration policies and better fulfill the gender-specific commitments in the Global Compact for Migration and the 2030 Agenda.

164. Encouraging innovation in data practices supports the continuous improvement of migration statistics. Experimentation with new methodologies, technologies, and data sources can lead to more efficient and accurate data collection and analysis. For example, experimenting with the use of Big Data to complement traditional data sources can provide new insights and more timely information, while the use of machine learning techniques can assist with probabilistic data integration and interpretation of signs of life across datasets. Adaptation to emerging trends and challenges in migration requires flexibility and openness to change, ensuring that migration data systems remain relevant and effective.

## 5. Data integration

165. Measuring migration is challenging due to its dynamic nature, which is rarely captured in a single data source. Data integration, the process of combining data from two or more sources to produce statistical outputs, represents a useful strategy for improving the quality and availability of migration statistics. In many circumstances, it can provide more timely, accurate, and granular data than relying on a single data source, while incurring lower costs and respondent burden compared to new data collection. Combining different data sources and using data integration techniques to produce more complete statistics on migration and migrants constitutes the seventh key recommendation presented in the executive summary of this document.

166. By leveraging existing data sources, such as tax filings, border control and visa records data, in combination with more traditional data sources, namely census, civil registration data, and household surveys, data integration can facilitate longitudinal analysis of migration patterns. It may also help estimate undocumented migrant populations or country-to-country migration flows using stock data and auxiliary information.<sup>54</sup> Existing data estimation procedures can be refined through the addition and integration of new data sources.

167. Data integration can also help produce migration statistics for migration-related events which traditional data sources cannot adequately measure due to measurement lag or newly emerging concepts of migration. This is often in response to new user or policy needs, perhaps due to changes in migration patterns resulting from natural disasters or pandemics, humanitarian crises, or extreme changes in national migration policy.

168. An “enlarged” dataset could improve coverage of the migrant population, while “enriched” data typically increase the available information about migrants, as well as improving the timeliness, accuracy and level of detail (e.g. subnational estimates) for producing quality migration statistics.

169. Data integration can also contribute both directly and indirectly to the assessment of the quality of published statistics and periodic revisions to improve both data collection and processing to better meet key stakeholder needs.<sup>55</sup>

170. However, some challenges remain to be considered for migration data integration. First, the statistics produced from integrated data may be incompatible with statistics compiled from non-integrated sources, demanding both producers and users of statistics to be mindful about their differences. Second, some countries may be resistant to use estimates from integrated data as official statistics. This resistance could come from different sources (NSOs, policy makers, political lobbyists/think tanks, etc.) and there could be many different reasons for this, including concerns about data quality, reconciliation of different estimates from different sources, political implications, etc. Third, as previous reports have found, countries may lack the required technical expertise to complete integration projects.<sup>56</sup>

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<sup>54</sup> Abel 2017, Azose & Raftery 2019

<sup>55</sup> Raymer et al 2015

<sup>56</sup> UNECE 2019, UNECE 2020

## a. Definitions

171. Data integration may be further defined by the levels of data at which integration takes place. Micro-data integration refers to the integration of data at the record (individual) level, whereas macro-data integration combines data that are already aggregated to produce new statistics. The two broad subsets of data integration have different feasibility conditions. Micro-data integration is only feasible when record-level data from more than two sources are available *and* linkable with key identifying variables, often on the basis of a personal identification number (PIN<sup>57</sup>). In contrast, macro-data integration may use statistical outputs from multiple existing data sources, which are unlinkable, such as not having access to or missing personal identification information (PII<sup>58</sup>), or less constrained by legal restrictions on data confidentiality. In other words, micro-data integration creates new combined data sets which can produce statistics on international migration, while macro-data integration includes methods to produce international migration statistics via the integration of aggregated data from multiple sources.

172. Population registers are typical examples of integrated data at the micro level. Within a population register, information about an individual from various administrative registers such as birth, death, marriage, and migration are linked by personal identification variables or PINs, though in some cases the same information is included on several registers.

173. When the complete register information about immigration and emigration are integrated, it is then possible to tally statistics about migration stocks and flows from the population register. Information on age, sex, and socio-economic characteristics, based on other sources such as tax, social security and health registers, may be used to produce disaggregated migration statistics and to track longitudinal changes in the socio-economic conditions of immigrants.

174. Macro-data integration is frequently used when microdata are unavailable, either because they are not collected or inaccessible due to inadequate PII for linkages, limited resources, legal restrictions regarding data confidentiality and privacy, lack of coordination between agencies, or for other reasons. Macro-data integration methods are thus diverse as they may rely on multiple types of available input data, including administrative data, survey data, as well as aggregated data from the private sector (e.g., flight records).

175. At the macro level, demographic accounting is a common high-level strategy for producing population statistics by combining aggregated data on birth, death, and migration from different sources. In countries without population registers, demographic accounting can be used to produce annual statistics (estimates) during intercensal years, by subtracting deaths and emigrations and adding births and immigrations to the previous year's population count, which come from a variety of data sources.

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<sup>57</sup> A PIN is a synthetic number generated to act as a “translator” across several datasets.

<sup>58</sup> PII is the same variable used in different datasets and attributed to a person's unique characteristics, e.g. a document number, etc.

## b. Micro-data methods

176. Micro-data integration is done through linking individual records across several different data sources, with an emphasis on ensuring that information from different sources is from the same individual. Among other things, integrated microdata may be used to identify migrants through their activities (e.g., border crossings (entries/exits), address registration, etc.), to measure duration of residence since immigration, and to examine migrants' changes in socio-economic characteristics over time. Many different types of data can be linked at the individual level, including multiple administrative data sources, censuses, and household surveys. These data sets can be compiled for a number of different applications, including cross-sectional and longitudinal analysis to inform topics like migrant integration, change of immigration status, and the social and economic impact of migration over time. Micro-data integration thus generates new, more robust, data with no additional respondent burden. Compared to new data collection, micro-data integration tends to generate lower operation costs and produce quality migration estimates in a timelier manner. Further benefits of micro-data integration include improved geographic coverage vis a vis sample survey data.

177. Because micro-data integration involves access to personal identifying information of individuals, it requires a legal framework that allows statisticians in governmental agencies to combine data based on information that can uniquely identify people, while also assuring data confidentiality. The enabling legal framework is even more crucial when data sources are managed by different governmental agencies. Additionally, for countries which are newly embarking on micro-data integration, the initial manpower and financial and technical resources needed to set up a data infrastructure, potentially consisting of millions of records, could be daunting.

178. Once the legal and technical frameworks are in place, the actual integration methodologies are relatively simpler than those employed in macro-data integration. Key methodological concerns are centered upon accuracy of the matched (or linked) records. When an actual identifying variable (such as a national or personal identification number) is available, exact matching can be used. When unique identifiers do not exist, probabilistic matching methods based on names, date of birth, addresses or other common characteristics must be used.

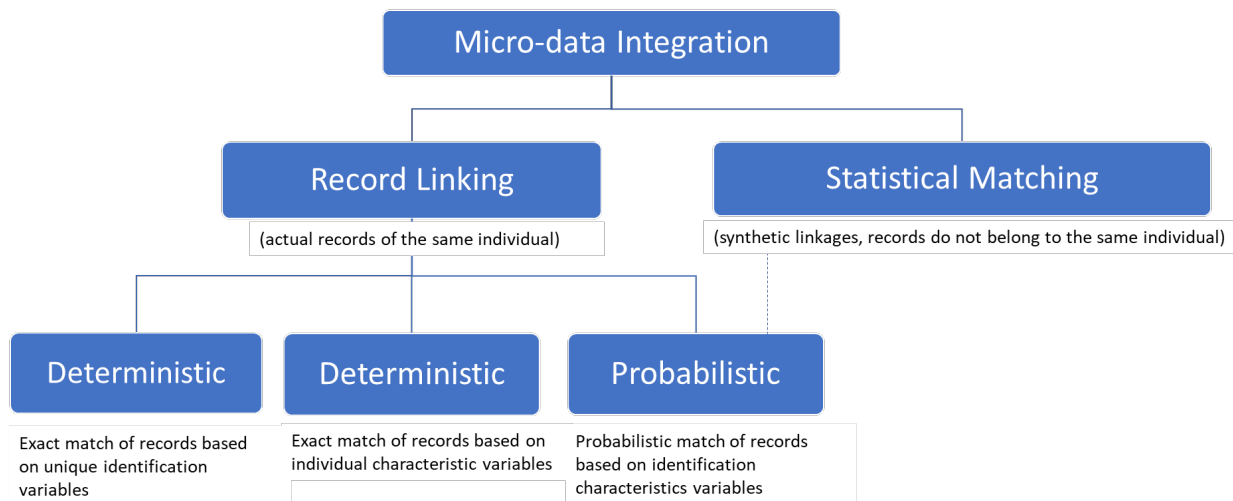
### **Micro-data integration linkage methodology**

179. Micro-data integration links individual records from several different data sources (e.g., nationality from one data source and age from another source). The primary goal is to ensure accurate attribution of information to the same individual. This involves not only data linkages, but also post-linkage methods to deal with validation, duplication, conflict resolution, and editing and imputation of incomplete or missing values.<sup>59</sup> As illustrated in Figure 6, there are four methodological approaches to link data at the record level, two using deterministic, and two using probabilistic methods: (1) deterministic match of records based on unique identification variables included in multiple data sets; (2) deterministic match of records based on individual characteristic

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<sup>59</sup> For more detailed information about post-linkage validation methods, see UNECE (2020), "Guidance on the Use of Longitudinal Data for Migration Statistics," or UNSD (2022), "Handbook on Registers-Based Population and Housing Censuses," Chapter IV, "Transforming administrative data into census data."

variables; (3) probabilistic match of records based on identification characteristic variables; and (4) statistical matching using probabilistic models to generate synthetic linkages (and data) from records which do not belong to the same individuals.



**Figure 7. Methodological approaches to linking record level data**

180. Deterministic (or “exact”) matching is done when a person can be linked across datasets using a pre-existing unique identifier, or by linking through shared “true” identification variables that exist across data sets (name, sex, date of birth, residence, etc.). A “true” identification variable, such as a PIN, refers to a unique attribute that is given and maintained by a specific administrative office to ensure that the attribute does not change over time and that it is unique to an individual.

181. Using the Personal Identification Number as the unique identifier, information collected by different state agencies and over time can be linked to the same record. Additional variables that do not change over time, such as date of birth, may be used to identify and correct possible errors. Further, variables used for identification (e.g. date of birth, sex, etc.) must be changed if any of the information elements change across datasets, meaning the updated status of the variables must be the same in all datasets before an exact match can occur.

182. In the absence of unique identifiers, it is also possible to make direct deterministic linkages based on shared individual characteristic variables like age, sex, date of birth, and address. In this type of deterministic matching, a person is often determined to be the same person if more than one of these variables are shared across datasets. This is more typical in small populations where different types of names are common, and combinations of date of birth, name, sex, and address are unique. This method differs from probabilistic matching using these same variables, where a unique identifier is created using the likelihood that individuals across datasets are the same person.

183. In contrast to deterministic matching, the most common probabilistic matching method involves matching records based on the likelihood that a person is the same across two or more

datasets. This method generates synthetic identification variables to determine this likelihood, which are based on a combination of variables that may uniquely identify an individual. This method often generates a unique identifier based on these probabilities, which is used to link new data with existing records when new data becomes available. This strategy is adopted when a unique identifier variable is not available. Relatively time invariant variables, such as date of birth, place of birth, sex, and name are used in combination to identify the likelihood a person is the same individual across data sources.

184. A probabilistic matching procedure typically compares several fields of values between two records and assigns a weight that indicates a possible match between them. The comparison method and the weight threshold for records to be considered a match differ across different matching algorithms.<sup>60</sup> Probabilistic matching methods recognize that identifiers for identical individuals can diverge in different data sets for many reasons, such as data entry errors, surname changes, or address changes which cannot always be updated immediately.

185. Pre-processing to standardize formats of identifying variables such as date of birth, names in different languages, or name changes are crucial to the quality and success of subsequent matching procedures.

186. In many cases, unique identifier (“true identification”) numbers only cover a specific population (e.g., citizens) while omitting others (e.g., foreign citizens). A hybrid approach which combines true identification variables and probabilistic matching is useful to expand the coverage population while also improving the quality of matching.

187. In addition to record linking through deterministic or probabilistic matching, statistical matching is a probability model-based imputation method based on similar units. Employing both parametric and non-parametric methods, statistical matching may be used to impute important characteristics, such as whether an individual is a migrant in data sets where such information is unavailable. From a micro-data integration perspective, a new “synthetic” data set is created from multiple data sets (which do not contain the same units), where data on all variables is available for every unit. These “synthetic” records are based on an informative set of common variables across the original data sets.

188. Operationalizing migration measures, such as emigration or immigration events, involves logical inferences across data sources based on expert knowledge. The “signs of life” principle, which identifies an individual’s presence in a country through activities like tax filing or education, is commonly used. Additionally, family association methods capture dependent family members and children who may not have individual records in the main data sources.

### **Challenges for micro-data integration**

189. Integrated microdata is a powerful tool to enhance migration statistics, and linking records is widely used and accepted in register-based statistical systems. However, data access can still be a major challenge for integration efforts in other country contexts. Even when microdata are available, the legal framework on data privacy and confidentiality determines whether and how

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<sup>60</sup> For a detailed overview of matching algorithms, please refer to UNECE-HLG MOS (2017).

data can be used for statistical purposes. Thus, NSOs must develop collaborations with relevant governmental agencies to create enabling rules for their data integration projects.

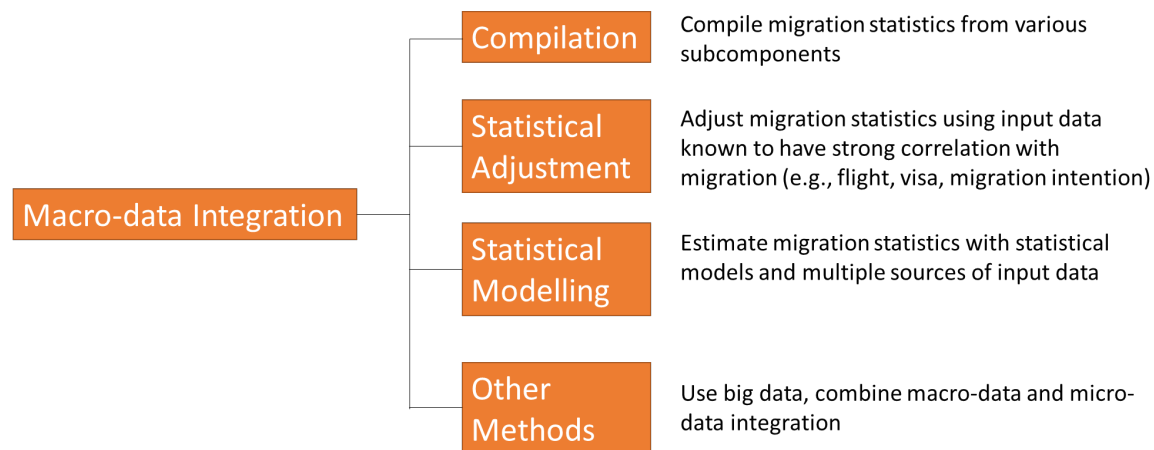
190. There also data privacy risks that must be assured, especially when integrating data and measuring vulnerable populations like refugees or irregular migrants. This can complicate the development of legal data sharing arrangements between agencies, as privacy and confidentiality concerns are particularly salient when linking records using probabilistic methods. Particular care must be taken to ensure confidentiality of individuals, through the anonymization or pseudonymization of individual records, both used in the matching process, as well as when data are disseminated or accessible by the data user community.

191. Unequal coverage and quality issues in data sources further pose challenges for micro-data integration projects. Some specific migrant groups (e.g. those in irregular status) might not be included in data sets, while for migrants who are included in one dataset, unmatched cases to another dataset must be dropped, resulting in less reliable results. Additionally, significant time and effort may be required to evaluate and correct errors in data sources. Correction of errors may be a significant challenge for countries with lower levels of technical capacity or low data quality. In the pre-processing stage, the specific goals of an integration project may be altered to align with actual conditions of data quality, as well as budget and time constraints.

192. Time lags in measuring migration through integrated microdata are also a concern. For instance, defining an emigrant as someone who stays away for at least 12 months means a one-year lag in identifying the event. Additionally, the complex integration process can introduce further delays, especially in new projects requiring extensive pre-processing. Legal and administrative barriers can exacerbate these issues. Despite these challenges, integrating existing data sources can potentially provide more timely estimates than new data collection efforts.

### c. Macro-data methods

193. Macro-data integration focuses on creating new statistics from existing aggregated data. This approach is often necessary when microdata are unavailable, of poor quality, or inaccessible due to legal constraints. The methods used are diverse and can include simple compilations of migrant stocks or flows, or more complex projects involving modelling and generation of estimates of hard-to-measure groups like undocumented migrants. Further, macro-data integration may introduce unconventional data sources such as flight or social media data to improve migration estimates when existing sources are inadequate.



**Figure 8. Categories of macro-data integration**

194. Macro-data integration methods can be divided into three broad categories: (1) additive or “compilation” methods, (2) statistical adjustment methods, and (3) statistical modelling methods according to Figure 7 above. A fourth category, “other methods,” includes the use of big data or combining macro- and micro-data integration, though practical examples in official migration statistics are rare.

195. Compilation methods combine datasets from various sources (“subcomponents”) to produce statistics, such as combining data on foreign work permits, student arrivals, and asylum seekers to estimate immigration.

196. In contrast, statistical adjustment methods are used when the migration measure is available but lacks accuracy or timeliness. Statistical adjustment methods use estimates from one or more data sources to refine existing migration statistics. These methods, often called “correlation methods,” rely on strong relationships between the data sources and migration statistics. For instance, flight data may be used to correct estimates of migration flows in cases where flight records and migration flows are found to be strongly correlated. These methods are particularly useful during unexpected events like natural disasters or pandemics, which cause sudden migration fluctuations not immediately captured by surveys. Household surveys only record migration after migrants are included in the sample, so abrupt changes are often reflected in data with a delay.

197. Statistical modelling methods refer to the broad range of techniques used when both the migration statistic in question and its subcomponents are completely missing from one or more data sets. In these cases, statistical modelling methods improve the quality and availability of migration statistics by borrowing strengths from other data sources that offset weaknesses in the primary data source (including conceptual coherence, timeliness, and spatial-temporal coverage) to improve final estimates. They help to improve migration estimates by accounting for: (1) missing data (e.g., certain characteristics are not asked in household surveys or census questionnaires), (2) improved balance between data accuracy and timeliness (3) inaccurate estimates for small populations and small areas/geographies, and (4) inconsistent measurement operationalizations over time and space. This category of methods may include familiar technical names such as imputation or indirect estimation.

198. For small populations and smaller areas/geographies where migration statistics may be unavailable or inaccurate, integration projects may use data from multiple sources to generate disaggregated statistics and benchmark them.<sup>61</sup>

199. Statistical modelling methods can integrate multiple non-migration data sources to generate migration estimates. One example is the generation/distribution model, a two-step model that first estimates the possible number of migrants that can be “generated” within a migration system, and then “distributes” the migrants into bilateral migration flows based on covariate information.<sup>62</sup> The model relies primarily on covariate data, which are measures theoretically known to have a relationship with migration flows, such as population size, GDP, contiguity, and bilateral trade.

200. Given that migration flow data are much less readily available than static migration stock or migrant population data, several data integration efforts in recent years have been developed to estimate migration flows from migration stock data, which is also known as the “flows from stocks” estimation method. Academic researcher Guy Abel developed a method to indirectly derive the number of global bilateral (country-to-country) migrant flows by integrating information on bilateral migrant stocks, births, and deaths in a demographic accounting system. The major challenge is that there are many possible combinations of migration events that can take place over the period to match the observed changes in bilateral migrant stocks.<sup>63</sup> Subsequent studies further consider the plausibility of the “flows from stocks” method and add measures of uncertainty using Bayesian methods to the flow estimates.<sup>64</sup>

201. In practice, a macro-data integration project may combine two or three categories of methods described above. For instance, emigration flow statistics may first be compiled using various known components and then statistically adjusted with auxiliary data sources. Statistical modelling may sometimes be added to provide detailed measure of uncertainty (e.g., the confidence interval for an estimate) or to estimate characteristics of missing populations (e.g. emigrants).

202. The obvious advantage of macro-data integration methods is that most aggregated data are already available, sometimes even for public access. This means that estimates based on integrated macrodata may be produced relatively quickly to provide more timely insights on migration patterns than what can typically be used (e.g., annual household surveys or decennial censuses).

203. "Mirror statistics," where immigration data from one country are used to estimate emigration from another, are common among neighbouring countries or those with strong agreements. However, limitations include missing or inaccessible data, varying definitions, and inconsistent timeliness of data sources.

204. Cross-country comparisons of international migration patterns are difficult and confusing due to differences in definitions and measurement methods. Data integration may help to overcome the conceptual coherence of migration measures, including different definitions of a migrant and different migration duration criteria.

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<sup>61</sup> Raymer et al 2020, Wilson 2017

<sup>62</sup> Willekens & Baydar 1986

<sup>63</sup> Abel 2017

<sup>64</sup> Azose and Raftery 2019

## Challenges for macro-data integration

205. Macro-data integration faces two main challenges in generating migration statistics from inconsistent and incomplete data: internal consistency and estimate validation.

206. Internal consistency is a major challenge due to variations in input data sources. Aggregated data from various sources are susceptible to variations in definitions, measurement universes, as well as spatial and temporal coverage. Careful data cleaning and statistical adjustment must be done to reconcile such differences. The notion of a ‘true measure’ is key for alignment; each data source needs to be assessed in relation to the measure of interest prior to integration. For example, it is often difficult to compare and reconcile absolute migration numbers coming from different data sources (e.g. administrative data vs survey estimates), thus rather than making adjustments based on total values, one must use historical trends seen between data sources to make adjustments.

207. Collaborative agreements across different data providers may also help to resolve issues of data inconsistency, and stronger collaborative efforts among different entities of the national statistical system should be encouraged. While organizational structures and data release policies might pose challenges that hinder collaboration, specific collaborative agreements could generate synergies in terms of how initial data are tabulated, e.g., based on a universal conceptual framework, definition, or time frame. Similarly, international collaborative agreements may help to enhance the comparability of “mirror statistics,” for instance, country-specific migration flows may be disclosed to a partnered statistical office for data integration purposes.

208. Validation is another major challenge for macro-data integration projects. In situations where migration data are missing, incomplete, or inaccurate, it can be challenging to find a true value to validate the resulting estimates. Sometimes, the true value is simply missing. Governmental statistics offices and researchers have come up with multiple methods to assess the results’ plausibility, such as by consulting historical trends, and comparing estimates from different sources and methods. Thorough estimate assessment with multiple sources and clear communications about the size and the causes of error are good practices to enhance data user’s perceptions about the estimate’s validity and usability. It should be noted that measures of uncertainty can be difficult to generate using macro-data integration methods, as datasets which would normally be used to produce error indicators, are combined to produce the final estimate. As they are, it is often beneficial to consider the resulting measure of uncertainty as a range rather than a fixed number.<sup>65</sup>

209. It can be difficult communicating measures of uncertainty to the general public, but there is benefit for more advanced data users to have this information or at least make more quality assessments publicly available. However, as macro-data integration incorporates a wide range of available data sources, it limits external or “independent” sources to validate the model, which could be a significant concern, given official statistics need to be accepted by the public.

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<sup>65</sup> For more details about estimate assessment, readers may refer to Raymer et al. 2015.

#### d. Non-traditional data sources and experimentation

210. Some approaches do not fit neatly into the definition of macro-data integration, including cases which use both micro- and macro-data integration methods, or new data sources, such as big data.

211. As detailed in Chapter 4, Big Data, especially social media data, represent a new opportunity for migration data integration. Estimates derived from social media data represent unique new sources for migration data which can arguably be timelier and provide better coverage for hard-to-reach populations (e.g. certain race or ethnic groups, recent or undocumented migrants, refugees, etc.), compared to traditional data sources, particularly after certain events (e.g. “migration shocks”) which cause rapid changes in migration patterns.<sup>66</sup>

212. Mobile phone data is another potential source of information on migrants, though most studies have been regulated to analysis of commuting and internal mobility patterns.<sup>67</sup> For example, it might be possible to look at the destination of phone calls originating from specific places in a country using mobile positioning data to gauge the geographic distribution of specific-migrant groups, including irregular migrants, in those countries.<sup>68</sup> In addition, it could be possible to use mobile phone data to validate the stock of migrants measured in other data sources (e.g. census), if it contains information to identify the populations of interest.

213. However, there are still many limitations to use of big data in the production of official statistics, including access to data, data privacy and legal concerns, coverage of the total population of interest, self-selection bias, data quality and measurement issues (e.g. limited ability to identify migrants by nativity, resident or legal status, or reason for move), multiple and fake/inactive accounts, changes to methods used to collect data, as well as the need for specialized tools, software and technical expertise to process, analyze, and visualize these complex datasets.

214. National statistical offices should establish innovation units or dedicated working groups to pilot innovative and experimental approaches while addressing challenges related to data access, representativeness, privacy protection, and methodological validation.

## 6. Communicating international migration statistics

215. International migration is one of the most polarizing and contested policy areas globally, with media and public debates often leaning heavily on statistical evidence. The demand for statistics comes not only from policymakers and rapidly changing media ecosystems, but also businesses, civil society and an increasingly data-literate public. NSOs are tasked with providing accurate and timely data, adapting to constantly advancing technologies for collecting, displaying, and disseminating statistical information to meet the needs of various stakeholders. Effective communication of migration statistics is essential not only for informing evidence-based

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<sup>66</sup> Gendronneau et al 2019

<sup>67</sup> UNESCAP (2021)

<sup>68</sup> Luca et al. 2021

policymaking but also for fostering public understanding and dialogue, helping to dispel myths and prevent the spread of misinformation.

216. Communication about international migration statistics requires careful consideration at all stages of the process - before, during and after data collection. This chapter analyses key factors that NSOs need to consider when communicating about international migration statistics and provides guidance for developing effective communication strategies.

#### a. User-friendly communication of statistics

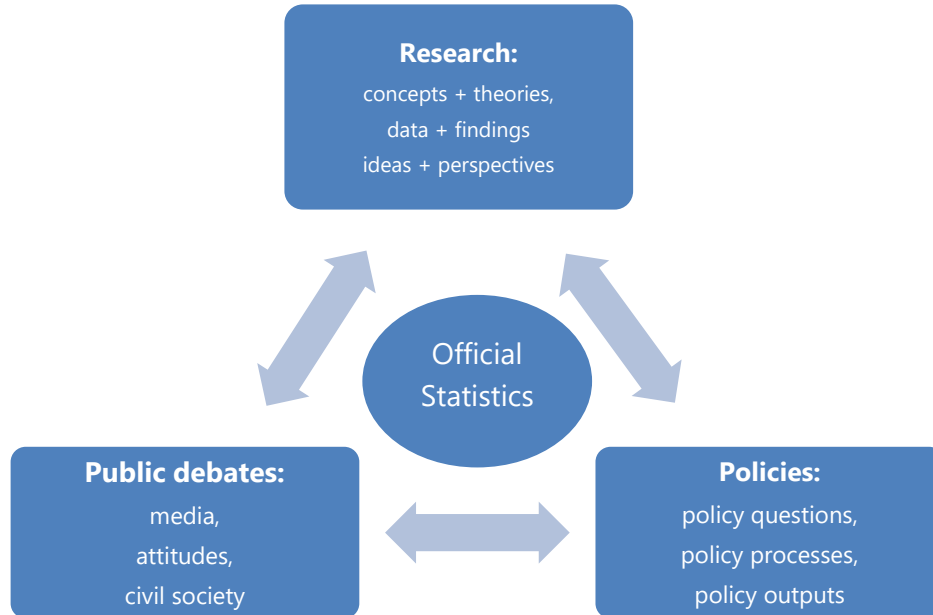
217. The communications environment for data and statistics has developed rapidly in the 21st century. Data and statistics are communicated using images, numbers and text to create understanding and meaning in complex policy spaces like international migration. This places a responsibility on those producing migration statistics to provide explanation, context and clarity to prevent misuse and misunderstanding of these data, and to ensure a human rights-based approach that considers the human beings behind the datapoints.

218. One substantial challenge when presenting demographic and migration data dealing with millions of people is simply understanding scale – determining whether a number is, in relative terms, “big” or “small”. Without proper context, large figures can be misleading or overwhelming. Therefore, it is crucial to situate numbers alongside other relevant data and provide meaningful comparisons to aid interpretation.

219. Producers of migration statistics must recognise their role in the dynamic process of migration policymaking. One way to understand this is as a “triangular” relationship between those undertaking research, public debates, and policies, each drawing on official statistics<sup>69</sup> (see Figure 8). Understanding which factors within policy and public debates are driving demand for certain migration data – and how that information might be used or misused – can guide how statisticians display and contextualise that data.

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<sup>69</sup> RUHS, Martin, TAMAS, Kristof, PALME, Joakim, Introduction : making linkages between research, public debates, and policies on international migration and integration, in Martin RUHS, Kristof TAMAS and Joakim PALME (eds), *Bridging the gaps : linking research to public debates and policy-making on migration and integration*, Oxford : Oxford University Press, 2019, pp. 1-20[Migration Policy Centre] - <https://hdl.handle.net/1814/63886>



**Figure 9: Triangular relationships between research, public debates, and policies**

220. Narrative explanations and graphical representations of published data and technical notes serve to guide the user, bringing real benefits for understanding and stimulating users to interrogate and explore the statistical information further.

221. Reporting numbers without proper context can overwhelm audiences and undermine public empathy. This has practical implications, as research shows that people's perceptions of the scale and impact of migration significantly influence their preferences for migration policy.<sup>70</sup>

222. This emphasis on narrative and graphical representations does not supersede the fundamental importance of providing structured datasets. Rather, it acknowledges that these datasets must be situated in their proper context, with clear explanations to prevent misrepresentation, misunderstanding or misuse. Statistical offices should adhere to the Fundamental Principles of Official Statistics<sup>71</sup>, maintaining professional independence, impartiality and accountability. One important aspect of this is recognising political motivations or pressure to present data in particular ways. Recognizing that decisions to highlight certain statistical information while downplaying other data can fundamentally shape debates, official statisticians should apply their expertise to ensure data are presented impartially and transparently. NSOs should proactively exercise their professional agency to balance attempts to politicize

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<sup>70</sup> Blinder, Scott. "Imagined immigration: The impact of different meanings of 'immigrants' in public opinion and policy debates in Britain." *Political Studies* 63, no. 1 (2015): 80-100.

<sup>71</sup> A/RES/68/261

migration statistics, ensuring that data dissemination supports informed and unbiased public discourse.

#### b. An end-to-end approach to communication

223. Communication about migration statistics must be viewed as a strategic and integrated process that extends throughout the statistical lifecycle, not merely the dissemination of final products. This integrated approach requires careful consideration of communication needs at every stage of statistical production, from initial planning through data collection to final dissemination and subsequent use.

224. A critical first step in developing effective communication strategies is clearly defining intended audiences, as this shapes both the information and the methods used to communicate it. Different audiences have distinct needs, technical capabilities, and ways of engaging with statistical information that must be considered throughout the end-to-end process. By identifying as many potential audiences as possible early in the process, NSOs can tailor their data collection methods and communication strategies to meet the specific requirements of each group.

225. An example breakdown of data user audiences could be the following<sup>72</sup>:

##### 1. *Expert analysts: academics, think tanks, policy analysts and other researchers*

These are professionals who download spreadsheets to create their own charts and analysis. They want quick access to raw data (numbers rather than percentage changes), with clear links to historical data releases. They prefer underlying datasets to statistics and need data revisions and changes to methodology to be communicated clearly.

##### 2. *Information foragers: businesses, administrators, and policymakers*

These are users looking to enhance their understanding of migration patterns for practical business, administrative, or political purposes. This includes business analysts, policymakers, civil servants, and local government administrators. This audience wants timely, easy-to-find data, often with a focus on local demographics and trends.

##### 3. *Inquiring public, migrants and journalists*

These are occasional visitors searching for unbiased, trustworthy information on topical issues. They want visually engaging summaries and infographics that are easy to share. They prefer clear data points that verify facts and put numbers into context.

### **Before and during data collection**

226. Before data collection begins, NSOs should engage with potential users of the data – including policymakers, researchers, businesses, civil society organizations, and migrant communities – to understand their information needs and how they intend to use the statistics. This

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<sup>72</sup> Adapted from UK Office for National Statistics Service Manual: User personas. <https://service-manual.ons.gov.uk/content/writing-for-users/user-personas>

engagement can help shape the design of surveys, questionnaires, and administrative data systems to ensure that the collected data will be relevant and useful.

227. Considering the perspectives and concerns of migrant communities and individuals who will provide the data is also essential. Early communication with these groups helps build trust and encourages participation, which is particularly important when collecting sensitive information. By explaining the purpose of data collection and how the information will be used to inform policies and programs that may benefit them, NSOs can increase willingness to participate. Addressing privacy and confidentiality concerns through transparent communication about data handling practices serves to alleviate fears and encourages honest responses.

228. During data collection, effective communication with respondents is crucial to encourage participation and ensure the quality of the data collected. Tailoring communication methods to the cultural and linguistic contexts of different communities can enhance engagement. This may involve translating materials into multiple languages, employing culturally sensitive messaging, or working with community leaders as intermediaries. Offering support to respondents who may have difficulty understanding or completing surveys – such as through helplines or in-person assistance – can improve response rates and data quality.

229. Special attention should be given to engaging hard-to-reach or vulnerable populations, such as undocumented migrants, refugees, or marginalized communities. These groups may have higher levels of mistrust or face barriers to participation. Partnering with non-governmental organizations, community groups, or local leaders who have established relationships with these communities can facilitate communication and build trust.

230. Effective outreach can take many forms, from direct engagement with community leaders and forums to broader communication through media platforms, posters, and informational materials. The choice of approach should be guided by careful consideration of the specific community context and cultural factors that may affect participation.

### **After data collection**

231. Following data collection, communication efforts shift towards dissemination and engagement with data users. However, maintaining communication with the communities from whom data was collected remains important. Sharing accessible summaries of key findings with the communities involved can demonstrate respect and appreciation for their participation. It also helps them understand how their contributions are being used. Soliciting feedback on the data collection process and communication strategies can provide valuable insights for future efforts.

232. Statistical offices must be transparent not only about the migration statistics they disseminate, but also about gaps in migration data and their limitations. Clear explanations of why certain migration data is unavailable – whether due to technical constraints, ethical considerations around vulnerable populations, or resource limitations – helps build trust with users and supports appropriate interpretation of available migration statistics.

233. When changes are made to established migration datasets, statistical offices should communicate these changes transparently to stakeholders well in advance. This includes explaining the rationale for modifications and their potential impact on migration data continuity and analysis. Such openness helps maintain user confidence and prevents disruption to migration research and policy work that relies on these statistics.

234. NSOs should employ a variety of dissemination methods tailored to the needs of different audiences identified earlier. This includes publishing detailed reports, executive summaries, interactive data visualizations, and raw datasets. Utilizing multiple channels – such as official websites, social media platforms, press releases, webinars, and workshops – can enhance reach and accessibility.

235. During dissemination, statistical offices should anticipate potential misinterpretations or misuse of migration statistics. By providing contextual information, highlighting key messages, and addressing common misconceptions, they can guide users towards accurate understanding. This might involve presenting statistics alongside historical trends, comparisons with other countries, or proportionate scales to help audiences understand the significance of the numbers, as well as clarifying definitions of key terms (e.g., "migrant," "refugee") to mitigate confusion and misrepresentation.

236. Statistical offices should monitor how migration statistics are used in media and public discussions. If inaccuracies or misinterpretations are identified, timely responses can correct the record and provide clarifications. Engaging in public dialogue through social media or other platforms can help address questions and contribute to informed debates.

237. By integrating communication throughout the statistical lifecycle and focusing on the specific needs of various audiences, NSOs can enhance the effectiveness of their migration statistics and contribute positively to public understanding and policy development. An end-to-end communication approach ensures that data collection is aligned with user needs, respondent participation is maximized, data is presented effectively, and trust and credibility are strengthened.

### c. A “whole-of-government” approach

238. On top of this end-to-end process, it is also critical to apply a comprehensive or “whole of government” approach to communicating about migration statistics. This means NSOs should coordinate with other government agencies and stakeholders in collecting, analysing and sharing migration data, using consistent terminology and complementary approaches.

239. Such coordination is particularly important for maintaining trust with migrant communities. When different government agencies use inconsistent or inappropriate terminology to describe migrant populations, it can undermine trust-building efforts and reduce willingness to participate in data collection. NSOs should therefore work to harmonize communication approaches across government departments.

240. Since administrative data is key for the production of migration statistics, NSOs need strong working relationships with all government departments holding migration-relevant data, including those responsible for economic affairs, international development, health, employment, immigration, security, education and social services.

241. The coordinated approach should extend beyond the national government. International collaboration – with other national statistical offices (such as for the production and sharing of mirror statistics), international organizations, and regional data networks – can help contextualise data, share best practices and help develop skills and knowledge.

#### d. The centrality of ethics

242. Ethics, and the understanding that migration data is not just numbers – it is about people, should be at the heart of any endeavour in communicating migration statistics. This human rights-based approach must guide all interactions with respondents, across agencies, and when disseminating migration statistics to public audiences.

243. The ethics of communicating migration statistics are inseparable from the ethics of collecting and processing data. This includes ensuring proper consent, protecting personal information, and maintaining data confidentiality. These considerations are particularly critical given the increasing use of alternative data sources, such as from private sector data providers, which may not adhere to the same ethical standards. NSOs must carefully evaluate how such data were collected and whether appropriate privacy safeguards are in place.

244. Language choices in communicating migration statistics have both legal and ethical implications. Terms that imply criminality (“illegal migrant”) should not be used, and language that could stigmatize communities should be avoided. While terminology may vary across countries and contexts, the overarching principle should be to use neutral, fact-based language that maintains accuracy while respecting human dignity. IOM’s Glossary on Migration<sup>73</sup> consolidates existing terms and definitions from key international migration law and framework instruments. Several other international organizations provide further thematic or regional guidelines to support accurate use of language, including from UNHCR<sup>74</sup>, ILO<sup>75</sup>, the EU’s European Migration Network<sup>76</sup>. These glossaries all differ slightly in their areas of focus and audience, but they share a common broad underpinning theme – that words should be used carefully.

#### e. Developing a communication strategy

245. The Global Compact for Migration emphasizes that the collection, analysis and dissemination of disaggregated migration data is crucial for strengthening the global evidence base on migration. For NSOs, taking a strategic approach to communicating about migration statistics is key to ensure that the most user-relevant and complete data is collected and that statistics produced effectively reach and inform different audiences. By thoughtfully planning how to communicate within the existing policy and media landscapes, NSOs can address ethical and contextual factors, engage effectively with users, and contribute meaningfully to public discourse and policy development. Crafting a comprehensive communication strategy enables NSOs to systematically consider all necessary factors, ensuring a coordinated and effective approach rather than relying on ad hoc methods.

246. There are a variety of resources available to guide the process of developing a communication strategy. NSOs that already have an overall strategy for their broader statistical

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<sup>73</sup> IOM, Glossary on Migration, [https://publications.iom.int/system/files/pdf/iml\\_34\\_glossary.pdf](https://publications.iom.int/system/files/pdf/iml_34_glossary.pdf)

<sup>74</sup> United Nations High Commissioner for Refugees, Glossary of Terms, <https://www.unhcr.org/glossary>

<sup>75</sup> International Labour Organization, ASEAN Media-friendly glossary on migration (2020), <https://www.ilo.org/media/390286/download>

<sup>76</sup> European Commission, EMN Asylum and Migration Glossary, [https://home-affairs.ec.europa.eu/networks/european-migration-network-emn/emn-asylum-and-migration-glossary\\_en](https://home-affairs.ec.europa.eu/networks/european-migration-network-emn/emn-asylum-and-migration-glossary_en)

production may choose to develop an extension specific to the migration context. While their particular elements may differ, each strategy should ideally consider the following:

### **Plan**

1. **Rationale:** Clearly define why this communications work is necessary. Understand the purpose behind the initiative.
2. **Aims:** Establish specific, realistic objectives for your communications activities. Determine what the organization hopes to achieve.
3. **Context:** Analyze the external environment in which communications will occur. Consider the political, social, and media landscape, public concerns, potential misinformation, and prevailing attitudes toward migration.

### **Audience and Messaging**

4. **Messages:** Determine the key points that the audience should understand after engaging with the communications materials.
5. **Audience Analysis:** Identify who has the influence or authority to help achieve the desired outcomes. Understand their needs and how best to reach them.
6. **Channels:** Select the communication tools and media that will effectively reach the target audience. This could range from localized efforts like community posters or webinars to broader initiatives like press releases or social media campaigns.

### **Outputs and Delivery**

7. **Approach:** Develop a strategic plan for disseminating the content. Outline the specific actions required to ensure the messages reach the right people in the right places.
8. **Resources Required:** Identify all materials and resources needed to execute the strategy, such as online platforms, printed materials, press releases, images, and videos.
9. **Timeline:** Create a detailed schedule that outlines when each action will occur. Include deadlines and allow for contingencies to address potential issues.
10. **Risk Analysis:** Anticipate possible challenges and plan how to mitigate them. Consider what could go wrong and how to respond.
11. **Spokespeople:** Choose credible and persuasive individuals to represent the organization. Ensure they are well-prepared to communicate the messages effectively.
12. **Approval Process:** Establish clear procedures for approving the strategy and its components. Determine who needs to sign off on actions and materials to avoid delays.

### **Evaluation**

13. **Defining Success:** Before implementation, specify the outcomes that will indicate the communications activities have been successful. Set measurable goals.
14. **Post-Campaign Assessment:** After execution, evaluate the effectiveness of the strategy. Determine whether the objectives were achieved, using predefined metrics to assess performance.

247. By adopting a strategic approach to communication, NSOs can enhance the effectiveness of their migration statistics and ensure that their efforts contribute positively to public understanding and policy development. A well-crafted communication strategy aligns objectives with audience needs, utilizes appropriate channels, and includes mechanisms for evaluation and adaptation. This enables NSOs to navigate the complex landscape of migration discourse proactively and responsibly.

## 7. Conclusion

248. The *Recommendations on Statistics of International Migration and Temporary Mobility* represent a significant step towards improving the accuracy, comparability, and comprehensiveness of migration statistics globally. By addressing the evolving nature of international migration and temporary mobility, these recommendations provide a robust framework that enables countries to align their data systems with contemporary realities and policy needs.

249. One of the key contributions of the new recommendations is the introduction of revised concepts and definitions, which differentiate between international migration – defined by a change of residence for most of or more than a year – and temporary mobility, which involves movements that do not result in a change of residence. This distinction is critical for measuring migration flows and stocks more accurately, allowing countries to better capture the full spectrum of international mobility. Additionally, the recommendations introduce four key sub-population groups, which enable the alignment of migration data with the demographic accounting equation and the integration of migration flows into national population statistics. This facilitates consistency in migration data both within national population data systems and promotes comparability across countries.

250. Migration statistics play a critical role in informing sound policymaking, particularly in the context of the Sustainable Development Goals and the Global Compact for Safe, Orderly and Regular Migration. By offering guidance on definitions, data sources, and methodologies, the recommendations aim to achieve consistency in the measurement of international migration stocks and flows within countries, while ensuring that the nuances of temporary mobility are also captured.

251. Countries are encouraged to adapt these recommendations based on their unique national contexts, leveraging the most relevant existing data sources and working toward the development of comprehensive migration data systems that are capable of providing timely, accurate and relevant insights for decision-makers. Thus, the recommendations also aim to improve the availability and comparability of statistics on international migration and migrants, elevating their policy relevance.

252. Moving forward, the successful implementation of these recommendations will require sustained collaboration between national statistical offices, administrative data producers within national statistical systems, regional and international organizations and other stakeholders. This collective effort will enhance global data quality, support the development of evidence-based policies, and ultimately contribute to more inclusive and informed approaches to managing international migration and mobility in the years to come.

## Annexes

- A. Main differences with the previous recommendations in terms of concepts and definitions
- B. Recommended tabulations for international migration statistics
- C. Checklist for transitioning to or improving a combined migration data system
- D. Glossary of terms
- E. References

## Annex A: Main conceptual differences between the revised recommendations and the 1998 *Recommendations on International Migration*

	<i>1998 Recommendations</i>	<i>Revised recommendations</i>
Definition of “country of residence”	<p>“Country of usual residence” is defined as the country in which a person lives, that is to say, the country in which he or she has a place to live where he or she normally spends the daily period of rest.</p>	<p>“Country of residence” is defined based on duration-of-stay criteria as recommended in the <i>Principles and Recommendations for Population and Housing Censuses, Revision 4</i>, using one of the following criteria:</p> <p>(a) The place at which the person has lived continuously for most of the preceding 12 months (that is, for at least 6 months and one day), not including temporary absences for holiday or work assignments, or intends to live for at least 6 months and a day;</p> <p>(b) The place at which the person has lived continuously for at least the preceding 12 months, not including temporary absences for holiday or work assignments, or intends to live for at least 12 months.</p>
Definition of “international migrants”	<p>Two types of migrants are defined:</p> <p>(a) Long-term migrant – a person who moves to his/her usual residence for a period of at least 12 months</p> <p>(b) Short-term migrant – a person who moves to his/her usual residence for at least 3 months but less than 12 months, except for holiday, visits, business, and so on.</p>	<p>An international migrant is defined as a person who has changed her/his country of residence and established a new residence in another country within a given year.</p>

Distinguishing international migration from other types of mobility

Temporary population mobility is not included.

A clear distinction is made between international migration and other, related, international temporary mobility, which includes all international border crossings, except those related to changes in the resident population. Temporary population movements may also have a significant impact on the economic and social situation of a country and should be measured.

	<i>1998 Recommendations</i>	<i>Revised recommendations</i>
Alignment of the measurement of resident populations with the measurement of international migration flows	Misalignment occurs when a country does not use the same duration criteria (12 months) for measuring the usual resident population and international migration flows.	Alignment of the measurement of resident populations with measurement of international migration flows within a country's statistical system. This implies that the same criteria should be used for measuring resident populations and international migration flows. It ensures consistency in the production of national statistics, particularly since migration is a key component of population change and data on it are necessary for the production of population estimates and projections.
The coherence between international migration (flows) and immigrant population (stocks)	There is no recommendation.	The importance is emphasized of achieving coherence between international migration (flows) and immigrant populations (stocks) by reconciling the demographic components of change for the following key subpopulations: native-born citizens, foreign-born citizens, native-born foreign citizens, foreign-born foreign citizens.
Base populations for purposes of measuring migration and temporary mobility	The base population is the usual resident population of, respectively, long-term and short-term migrants. "Long-term migrants" are defined as those whose duration of stay is at least 12 months, "short-term migrants" as those whose duration of stay is less than 12 months and more than 3 months.	Base populations include: <ul style="list-style-type: none"> <li>(a) Resident population, to measure international migration</li> <li>(b) Temporary (non-resident) population, to measure temporary population mobility</li> </ul>

## Annex B: Recommended tabulations for international migration statistics

### 1.1 Migrant population stocks

- Native and foreign-born population by age and sex
- Foreign-born population by country of birth, age and sex
- Foreign-born population by country of citizenship, age and sex
- Population by citizenship status (native or foreign citizen), age and sex
- Foreign citizen population by country of citizenship, age and sex
- Foreign citizen population by country of birth, age and sex

### 1.2 Acquisition of citizenship

- Annual number of immigrants who obtained citizenship by age, sex and native birth status
- Annual number of immigrants who obtained citizenship by native birth status, sex and country of previous citizenship
- Annual number of immigrants who obtained citizenship by age, sex and country of birth

### 1.3 Immigrant flows

- Annual number of immigrants by citizenship status, age and sex
- Annual number of citizen immigrants by native birth status, age and sex
- Annual number of citizen immigrants by country of birth and sex
- Annual number of foreign citizen immigrants by native birth status, age and sex
- Annual number of foreign citizen immigrants by sex and country of citizenship

### 1.4 Emigrant flows

- Annual number of emigrants by citizenship status, age and sex
- Annual number of citizen emigrants by native birth status, age and sex
- Annual number of citizen emigrants by country of birth and sex
- Annual number of foreign citizen emigrants by native birth status, age and sex
- Annual number of foreign citizen emigrants by country of citizenship and sex

## Annex C: Checklist for transitioning to or improving a combined migration data system

This checklist provides a structured approach for transitioning to a system of migration statistics, which integrates field-based data (censuses and surveys) with administrative data (population registers, permits, border records, etc.). It also outlines steps to improve an existing combined system by enhancing data quality, integration, and usability.

### **Prerequisite: Define the overall strategic direction**

Before proceeding with the technical and operational steps below, it is critical to clarify the broader objectives of the country's migration and temporary mobility statistical system. This involves:

- Identifying key policy priorities and long-term objectives for migration management.
- Assessing national migration trends and patterns (including humanitarian and development needs) to pinpoint the areas of greatest importance for the country.
- Aligning with regional and international frameworks and reporting requirements, ensuring that data systems are set up to serve both domestic policy needs and broader global commitments.

By establishing this strategic foundation early on, countries can tailor their data collection and integration efforts to support well-defined goals and ensure that new or enhanced data systems remain relevant in the long run.

### **1. Map and evaluate current data sources**

- **Map existing data sources:** Identify and evaluate current field-based and administrative data relevant to migration statistics, assessing their coverage, quality, accuracy, and timeliness.
- **Harmonize concepts and definitions:** Standardize definitions of key concepts like "country of residence," "international migrant," and "migration flow" across all data sources.
- **Identify data gaps:** Determine which hard to count migration-related populations (e.g., undocumented migrants, highly mobile individuals) are underrepresented or missing.

### **2. Establish or strengthen legal and technical frameworks**

- **Strengthen legal frameworks for data sharing:** Develop or enhance legal agreements and protocols between agencies to facilitate data sharing, addressing privacy concerns, data protection, and ethical considerations, with an overall objective of aligning with international and regional standards and practices.

- **Develop technical framework for data integration:** Building on existing international recommendations and practices, set up centralized systems or data repositories to integrate data from multiple sources, using a regularly updated "spine" dataset (e.g., population register) that captures key variables.

### 3. Link field-based and administrative data sources

- **Implement data linking mechanisms:** In strict compliance with data governance and protection standards, develop methods to link individual records from censuses, surveys, and administrative databases using unique identifiers.
- **Ensure data quality and consistency:** Apply quality control processes to validate integrated data, cross-check for inconsistencies, and address missing information.
- **Enhance coverage of underrepresented groups:** Adjust sampling methods or enhance registration processes to improve data on groups like undocumented migrants or returnees.

### 4. Expand data collection and analysis capabilities

- **Expand data collection efforts:** Incorporate migration-related questions into existing household surveys and increase sample sizes in areas with high migrant populations. Enhance administrative systems to collect data on previously excluded groups (e.g., seasonal workers, undocumented migrants).
- **Collect detailed migrant characteristics:** Gather information on education, employment, social integration, and other relevant attributes.
- **Utilize innovative data sources:** Explore and pilot the use of big data (e.g., mobile phone data, social media) to track mobility and improve understanding of temporary mobility flows.

### 5. Build capacity and foster collaboration

- **Invest in infrastructure and training:** Enhance IT infrastructure and provide training for data linking and integration techniques.
- **Establish collaborative mechanisms:** Create inter-ministerial working groups or task forces to coordinate data collection and integration efforts among relevant agencies.
- **Promote regional and international collaboration:** Engage in harmonizing definitions, sharing best practices, producing mirror statistics, and improving data comparability across countries.

## 6. Monitor progress and adapt strategies

- **Set targets and milestones:** Establish clear goals and timelines for transitioning to an integrated migration data system.
- **Identify progress indicators:** Use metrics like reduced data gaps, improved timeliness, or increased accuracy in migration estimates to measure progress.
- **Evaluate and adjust:** Conduct periodic reviews to assess progress, identify areas for improvement, and adapt methodologies to respond to changing migration patterns or policy needs.

## Annex D: Glossary of Terms

### Population Bases for the production of statistics on international migration and mobility

*Resident population* consists of individuals who either (a) have lived most of the last 12 months within a given year or have intentions to stay (or granted to stay) for at least 6 months; or (b) have lived at least 12 months within a given year or intentions to stay (or granted to stay) for at least 12 months, not including temporary absence for holidays or work assignments (UN, Principles and Recommendations for Population and Housing Censuses, Rev.4, 2025).

*Present population* refers to all persons who were present in the country at a specific reference moment (census reference moment); present population includes residents who were present in the country but excludes residents who were not present at the reference moment (UN, Principles and Recommendations for Population and Housing Censuses, Rev.4, 2025)

*Temporary (non-resident) population* refers to all persons who stayed or intend to stay (or granted to stay) in the country for less than minimum duration required for residency in a particular year.

### International mobility and migration

*International mobility* includes all movements that cross international borders within a given year.

*International migration* includes all movements resulting in a change in the country of residence (a subset of international mobility) within a given year.

*International migrant* is a person who has changed his or her country of residence and established new residence in the country within a given year (see above definition of resident population). International migrant can be either 'immigrant' or 'emigrant' and include those with national or foreign citizenships or stateless persons.

*Immigration (flow)* includes all persons entering the country and becoming part of the resident population within a given year, including persons with national or foreign citizenships or stateless persons.

*Emigration (flow)* includes all persons leaving the country to become a part of another country's resident population within a given year, including persons with national or foreign citizenships or stateless persons.

*Returning citizens (flow)* includes all national citizens who previously resided in another country and become residents of the country in a given year.

*Returning native-born population (flow)* includes all native-born persons who previously resided in another country and become residents of the country in a given year.

*Foreign-born population (stock)* includes all persons who reside in the country at a particular time who were born in another country.

*Native-born population (stock)* includes all persons who reside in the country at a particular time who were born in the same country.

*Foreign citizen population (stock)* includes all persons who reside in the country at a particular time who do not hold national citizenship, including those without citizenship (stateless).

*National citizen population (stock)* includes all persons who reside in the country at a particular time who have national citizenship.

*Immigrant population (stock)* includes all persons who reside in the country who are either born in another country or who do not hold national citizenship, including stateless persons, at a given point in time. Persons who are born in the country and have national citizenship are not considered part of the immigrant population, although they can be considered (recent) immigrants or part of the immigration flow if they returned and changed their country of residence.

*Emigrant population (stock)* includes all national citizens or persons who were born in the country and are residing in another country at a given point in time.

*Returned migrants (stock)* refer to persons who previously resided in the country of measurement who emigrated and subsequently came back to live in the country and stayed or intended to stay for the minimum duration required for residence.

*Returned native-born migrants (stock)* refer to native-born persons who previously resided in the country of measurement who emigrated and subsequently came back to live in the country and stayed or intended to stay for the minimum duration required for residence.

*Irregular migration* refers to movement of persons that takes place outside the laws, regulations, or international agreements governing the entry into or exit from the country of origin, transit or destination (IOM Glossary on Migration, 2019).

### Temporary population mobility

*International temporary mobility* refers to all movements that cross international border that do not result in a change in the country of residence.

*Non-resident* is a person who is present in a country (part of the temporary population) but has not established new residence in the country (see above definition of resident population). Non-residents include all those who have not met the duration of stay / intended stay criteria for residence in the country and are considered residents of another country.

*Cross border workers* include all persons who are not residents of the country of measurement but have been engaged in economic activities on a repeated basis (more than once in a year) in that country provided they depart at regular and short intervals (daily or weekly) from the country (ILO Guidelines concerning statistics of international labour migration, 2018)

*Seasonal workers* include all persons who are not residents of the country of employment, whose work by its character is dependent on seasonal conditions and is

performed during part of the year (ILO, Guidelines concerning statistics of international labour migration, 2018)

*Other types of temporary workers* include all persons who are not residents of the country of measurement but travel to the country for short periods (less than the minimum duration requirement for residence) for work-related reasons, such as itinerant workers and project-tied workers (For detailed categories of workers included in this group, see the ILO Guidelines concerning statistics of international labour migration 2018);

*Training-related mobility* includes all persons who are not residents of the country but travel to the country to attend a short-term training programme for less than the minimum duration required for residence;

*Health-related mobility* includes all persons who are not residents of the country but travel to the country to access health care services for less than the minimum duration required for residence;

*Asylum seekers in transit* are persons who travel to the country in transit, with the intention to travel to another country to file an asylum application;

*Circular movement* includes persons who are not residents of the country and travelled to the same country more than once during a particular year (UNECE, Defining and Measuring Circular Migration, 2016)

*Transit country* is a country through which a person passes on any journey to the country of destination, and in which the person does not intend to establish residence, but where they are part of the non-resident (temporary) population.

*Country of final destination* (in the context of temporary mobility outflows) is the country for which a resident departs for a temporary stay abroad.

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