Integrated statistical registers for population and housing censuses
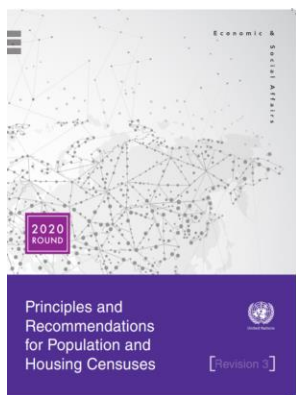
Meryem Demirci
UN Statistics Division

Content

- Overview of population and housing census methodologies
- Types of administrative registers used for censuses-Base and specialized registers
- Transforming administrative registers into statistical registers
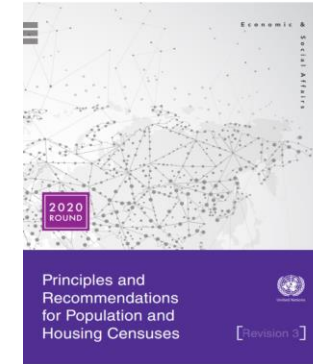- Linking of different types of registers

Key features of population and housing censuses

Essential features
- Individual enumeration
- Universality
- Simultaneity
- Defined periodicity
- Capacity to produce small-area statistics

Principles and Recommendations for Population and Housing Censuses

[Revision 3]

2020 ROUND

Main information collected through population and housing censuses

- ❑ Population count
- ❑ Characteristics of population
  - o Age, sex, marital status
  - o fertility, mortality
  - o International and internal migration
  - o Disability
  - o Education
  - o Employment/unemployment
  - o Occupation (ISCO) /Industry (ISIC)

- ❑ Number of buildings and housing units (inc. occupied and vacant)
- ❑ Characteristics of
  - o Buildings- types of building, construction year and materials, farm building, availability of elevator, etc.
  - o Housing units- conventional/non-conventional dwellings, types of housing unit, rooms, electricity, water supply system, fuel used for cooking, etc.

Principles and Recommendations for Population and Housing Censuses [Revision 3]
2020 ROUND

Census methodologies

- Traditional census – whereby every household/institutional places in the country is approached with a request for information

- **Combined census** – combination of field-based data collection and administrative data sources

- **Register-based census-** whole census data is generated from administrative data sources

Gradually increase in the use of administrative data sources

UNSD Methodological framework on population and housing censuses

Principles and Recommendations for Population and Registration, Revision 3 (2015)	Handbook on Measuring International Migration through censuses (2017) New
	Guidelines on the Use of Electronic Data Collection Technologies in PHC (2019) New
	Handbook on Editing for Population and Housing Censuses Revision 2 (2019) -Revised
Handbook on Management of Population and Housing Censuses Revision 2 (2016)	Technical report on Measuring SDG Indicators through PHC and CRVS Data (2021) New
	Technical Report on Post Enumeration Surveys (2010
	Handbook on Registers-Based Population and Housing Censuses (Draft) New

https://unstats.un.org/unsd/demographic-social/census/index.cshtml#methods

Other related UNSD programmes

This model represents a holistic approach to civil registration, vital statistics and identity management recommended by the United Nations, adapted from the United Nations *Principles and Recommendations for a Vital Statistics System, Revision 3.*; it can be adjusted to national circumstances and governing structures as necessary.

Ministry of Health
Public health reports
Statistics – morbidity
Health Inf. System

Live birth

Death

Fetal death

Health services
Certification of cause of death
Relatives, midwifes

Civil Registration

1. Compulsory
2. Universal
3. Continuous/ Permanent
4. Confidential

Confers legal identity

CR DB

NSO - Vital Statistics

Compilation
Processing
Validation
Quality control
Dissemination

Vital St. DB

Complementary and Interim sources
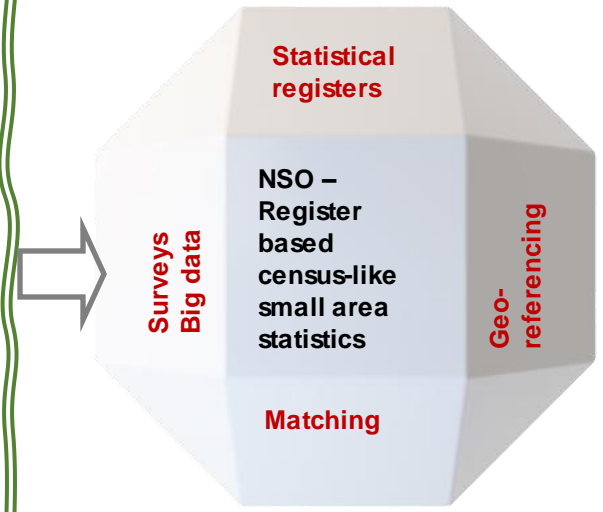• Population census
• Surveys

Vital Statistics

Informants

Civil Registration

Simplified flow

Pop. Register ID Mgmt.

Marriage

Authorized institutions

Additional Sources
• Coronary
• Police

Divorce

Annulments

Judicial separation

Adoption

Legitimation

Recognition

Courts

Judicial institutions

Informants

Population Register
• **Unique ID**
• **Access protocols**

PR DB

Administrative/Functional registers
• **Education**
• **Employment**
• **Tax**
• **Social assistance**
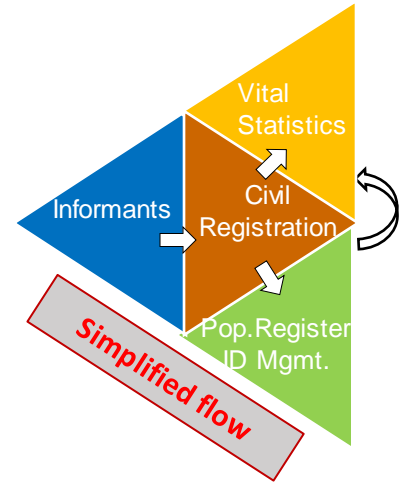• **Pensions**
• **Voters**
• **....**

Identity Management Agency and Services
• **Biometric ID, passports**
• **Capture (enrolment)**
• **Identification**
• **Verification**
• **Online and e-services**

Statistical registers

NSO – Register based census-like small area statistics

Surveys Big data

Geo-referencing

Matching

Civil Registration, Vital Statistics and Identity Management System

Types of administrative data sources used for population and housing censuses

Base registers

- Population register (PIN)

- Address/dwelling/building register (Address ID)

- Establishment/business register (Enterprise ID, farm ID)

Specialized registers

- Social security/pension
- Tax
- Employment, unemployment/jobseeker
- Education and student
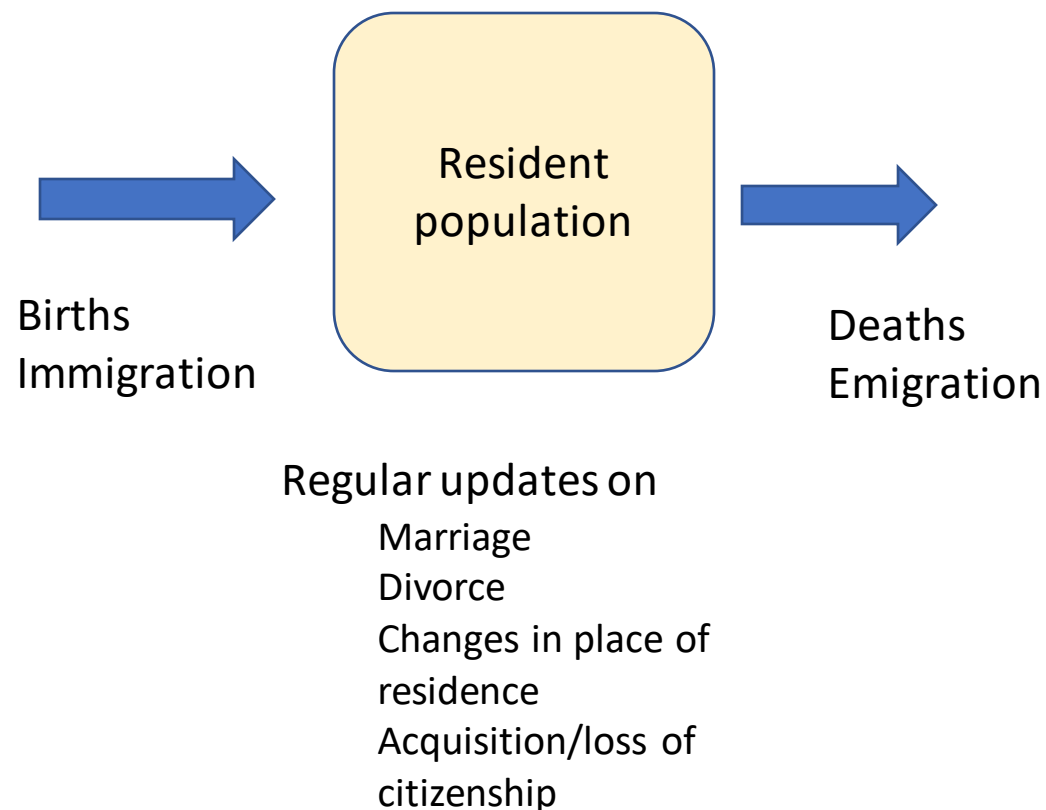- Health
- Border control
- Foreigners, residence permits
- ….

Statistical units are different **"Person, Address and Establishment"**

Statistical UNIT is identical throughout data sources, **"person"**

Base registers for censuses

Population Register

Births
Immigration

Resident population

Deaths
Emigration

Regular updates on
   Marriage
   Divorce
   Changes in place of residence
   Acquisition/loss of citizenship

Variables include name, sex, date of birth, place of birth, marital status, PIN, citizenship, residence address, date of arrival at or departure from that address

Administrative purposes

- Establishing personal identification

- The administration of pensions, health, educational and other services

- Establishing ownership of a residence or the right to work

Base registers for censuses

Building and dwelling registers

- The location of building, usually as a **formal address** (maybe also geocoordinates)

- The type and purpose of each building
  – used wholly or partially for **residential purposes** and whether they are occupied or vacancy or
  - are used for **non-residential purposes,**

- Characteristics of buildings (construction year, size, water/gas/electricity installations, etc.)

- Characteristics of dwellings (size, floor level, ownership/tenure, etc.)

Regularly updates for new buildings, expanded or demolished old buildings

Base registers for censuses

Address registers

- Address register, covering all units
  - Residential buildings/dwellings –households and institutional places
  - If non-residential places, types of buildings
    - Such as school, health center, hospital, government offices, establishments

  - Country practices show different types of relations between address and building/dwelling
    - the address as an attribute in building and dwelling registers
    - the building or register as an attribute of addresses in the address register
    - separate database

No international agreed definition of an address register

It is necessary to have a list of places where people might live, to be able to assign a location and link the place to the population register

Base registers for censuses

(Statistical) Business Register

- A list of enterprises with information about their characteristics could be used for the purpose of the census, especially for producing information on
  - Place of work
  - Industry –activity of the establishment in which the job of the employed person (or unemployed person) is located
  - Industrial sector of employment
  - The size of the workforce in terms of numbers of persons employed and employees

Transforming administrative registers into statistical registers

Main steps

1. **Constructing a statistical population register**

2. Linking administrative data sources

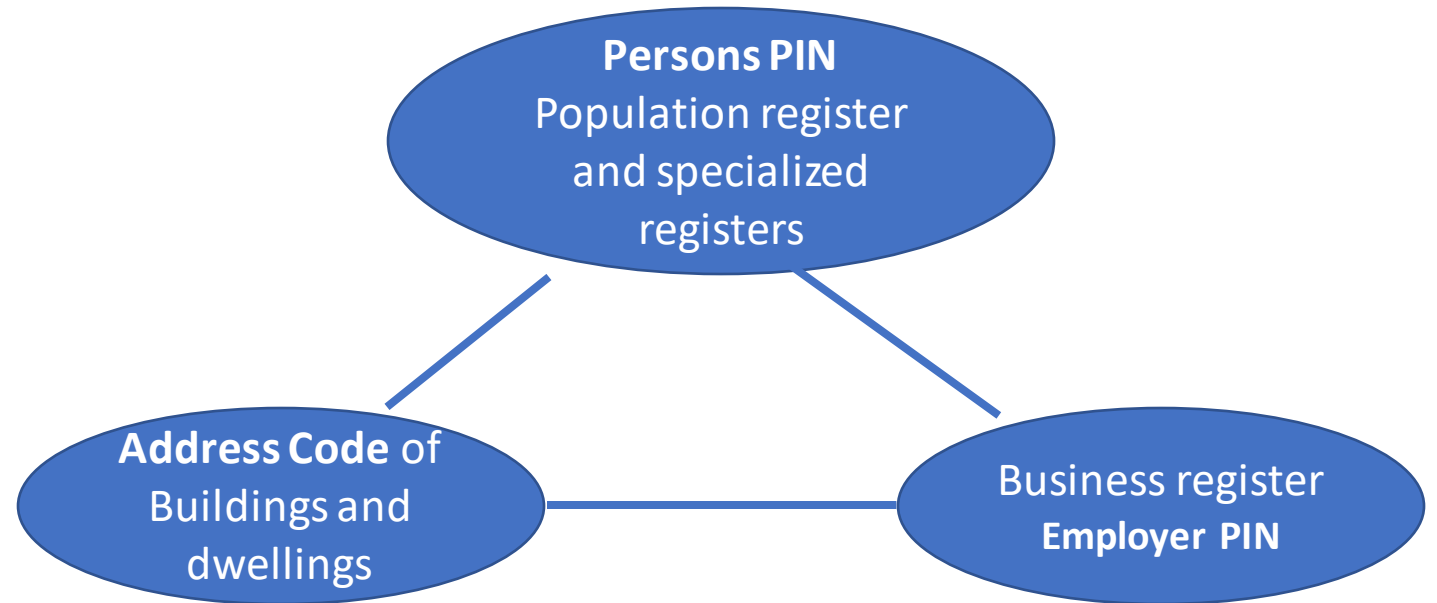3. Data processing-editing, imputation and validation

- Includes persons who meet the requirements of being residents of the country, both for national and foreign citizens
- Data on demographic characteristics of the population, such as sex, date of birth, nationality, place of residence, marital status
- Usually established based on population registers used for administrative purposes
    - could be established based on full-field enumeration

Transforming administrative registers into statistical registers

Main steps

1. Constructing a statistical population register

2. **Linking administrative data sources**

3. Data processing-editing, imputation and validation

Persons PIN
Population register and specialized registers

Address Code of Buildings and dwellings

Business register
Employer PIN

Linking administrative data sources

Linking persons to dwellings (residence address)

Linking of persons through a common identifier

Linking of persons to the business register

- Building and dwelling register through address code is linked with people registered in the central population register
- Linking with buildings is more successful than linking with dwellings due to missing door numbers

Linking administrative data sources

Linking persons to dwellings (residence address)

Linking of persons through a common identifier

Linking of persons to the business register

- Each person in the statistical population register is linked with other registers by PIN
- When combining administrative data to create statistical registers there may be **inconsistencies** in the values of key variables across different sources

- If a person is only found in the population register but not in other registers, a special procedure **"sign of life"** methodology is used to decide whether this person will be included in statistical population register or not

Linking administrative data sources

Linking persons to dwellings (residence address)

Record-linking of persons

Linking of persons to the business register

- Each record of an employee in the social security register includes a PIN for the employer
- This employer PIN can be used to link the records of employees with the business register

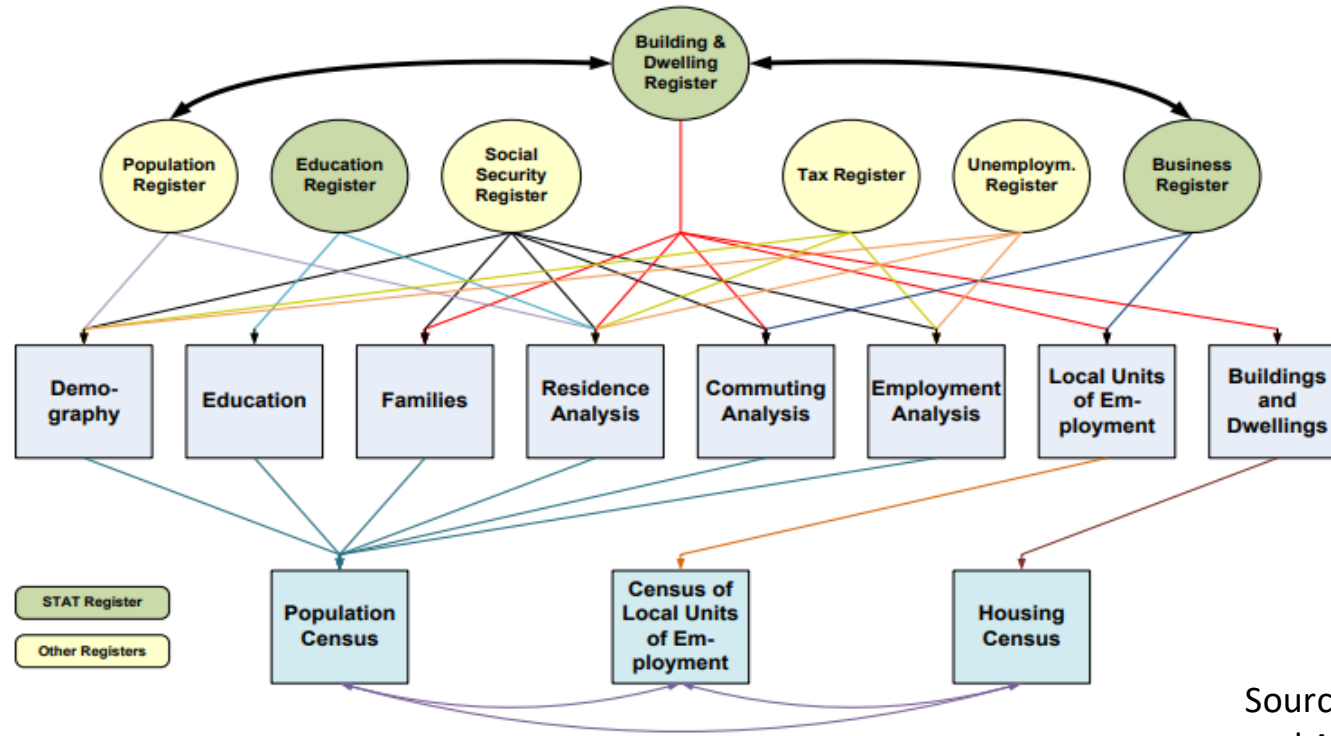# Transforming administrative registers into statistical registers

Main steps

- Constructing a statistical population register

- Linkage of data through a common identifier

- **Data processing-editing, imputation and validation**

- Dealing with duplications
- Conflict resolution
- Updating and **Signs of life** method for improving the quality of coverage of statistical population register
- Editing and imputation
- Validation of census outputs

Austria case study

Figure D.1 The register model for the census, base registers* and the principle of redundancy

*The Education Register represents both the registers of educational attainment and enrolled pupils and students.

The new Register-based Census Act defines **eight base registers** which also has the function of a register that is used to assure the quality of a variable