Population and housing censuses

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Harald Utne, Statistics Norway

harald.utne@ssb.no

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Use of administrative data in production of census statistics

- Register-based census
  - Direct use of register data

- Combined census
  - Data from registers <u>and</u> other sources
    - Existing (sample) surveys (no field data collection)
    - Field data collection for census

- Traditional census
  - All data collected for census (field data collection)
  - Options: Register data used as a supplement
    - Sampling frames
    - Editing, coding and imputation for non-response
    - Additional information from registers
    - Reducing response burden and costs
    - More accurate data (income)

UNECE REGION

Traditional census (full field enumeration without using data from registers; includes the rolling census)
Combined census (data from registers + field data collection)
Register-based census (data from registers only)

Census methodology. UNECE countries

	Traditional	Combined	Register-based	No census/ information
2000 round	40	5	3	7
2010 round	34	10	9	3
2020 round (planned)	22	12	14	8

Necessary for conducting a register-based census

Most important

- Existence of base registers
  - Establish and update populations (persons, dwellings)
  - Existent of population register crucial
- Existence of other relevant and reliable registers
  - Possible to use data from sample surveys for some variables
- Unified identification system

Norwegian Censuses
Historical back-ground

- 1960: Last fully traditional census

- 1964: Central Population Register (CPR) established
  - Based on Census 1960

- 1970 Census: Mainly traditional, but CPR used in data collection and editing

  Census used to
  - Check and update CPR
  - Establish Register of Education (in SN)

- 1980 Census: Questionnaires shortened and sent by mail
  - Registers used to rationalise data collection and processing
    - No enumerators
  - Demographic variables collected from CPR
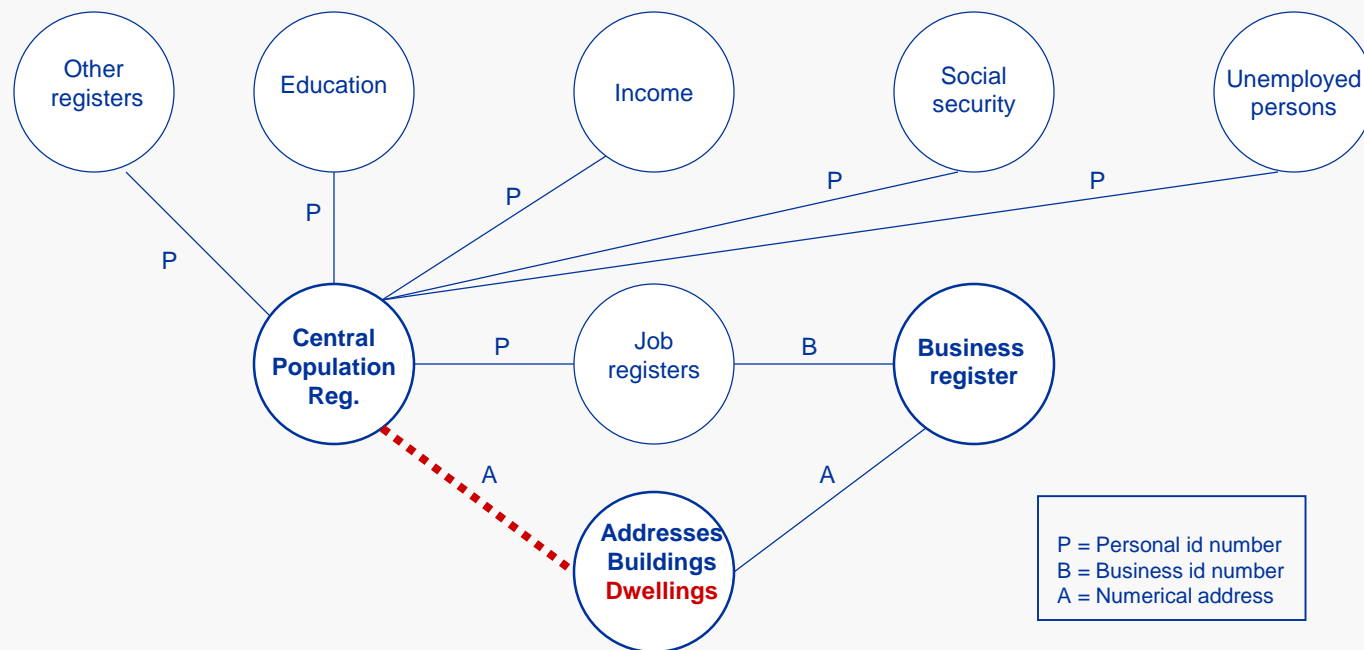
Historical background (cont.)

- 1990 Census
  - Register data on demography, education, income, geographical characteristics
  - Questionnaires for data on labour marked, households and housing
  - Sample survey
- 2001 Census
  - All data on persons from registers
  - Questionnaires for data on households and housing
  - Census used to establish dwelling register
- 2011 Census
  - Totally register based

Development of register-based censuses in Norway

Two main trends:

1. Extensive use of census data in establishing registers

2. Step-by-step development

- Subject matter statistics tested and published in different areas

- Register data introduced in censuses when quality was sufficient

- Time from register established to data used in census may vary

- Census is an integrated part of a register-based statistical system

Census data system 2001

A diagram showing circles connected by lines. Top row of circles: "Other registers", "Education", "Income", "Social security", "Unemployed persons". Links labeled P connect these to "Central Population Reg." Middle row: "Central Population Reg." connects via P to "Job registers", which connects via B to "Business register". A red dotted line labeled A connects "Central Population Reg." to "Addresses Buildings Dwellings". A line labeled A connects "Business register" to "Addresses Buildings Dwellings".

Legend:
P = Personal id number
B = Business id number
A = Numerical address

Goals for 2001 Census
Prepare for totally register-based census in next round
- **Establish register on dwellings**
- **Establish link person- dwelling, that is produce household data**
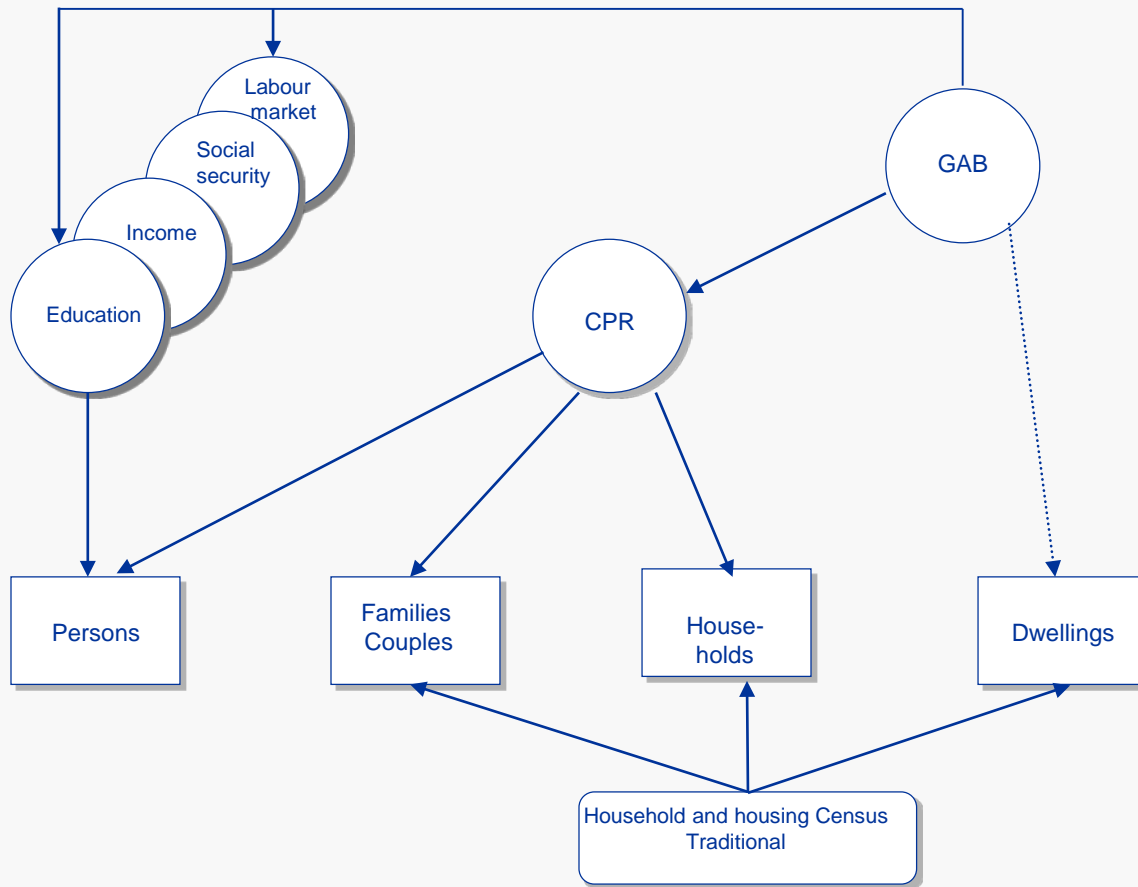
Organization of 2001 Census

- Organized as a separate unit in Statistics Norway
- Total costs 14,6 mill euro
- Staff: 10-15 permanent, 35-40 extra for data collection

The Dwelling Address Project

- Major goals
  - Extend the Cadastre to comprise dwellings, not only buildings
    - Before Census
    - Labelling dwellings
  - Establish a link between dwellings and resident persons (in CPR)
    - Using data from Census
  - Update dwelling information in Cadastre
    - Using data from Census

- Participants
  - Statistics Norway (Census 2001)
  - Directorate of taxes (CPR)
  - Norwegian Mapping Authorities (Cadastre)
    - Municipalities (local authorities)

- Use "census data" for administrative purposes
  - Multiple legal base for Census 2001
    - Statistics Act, CPR, Cadastre

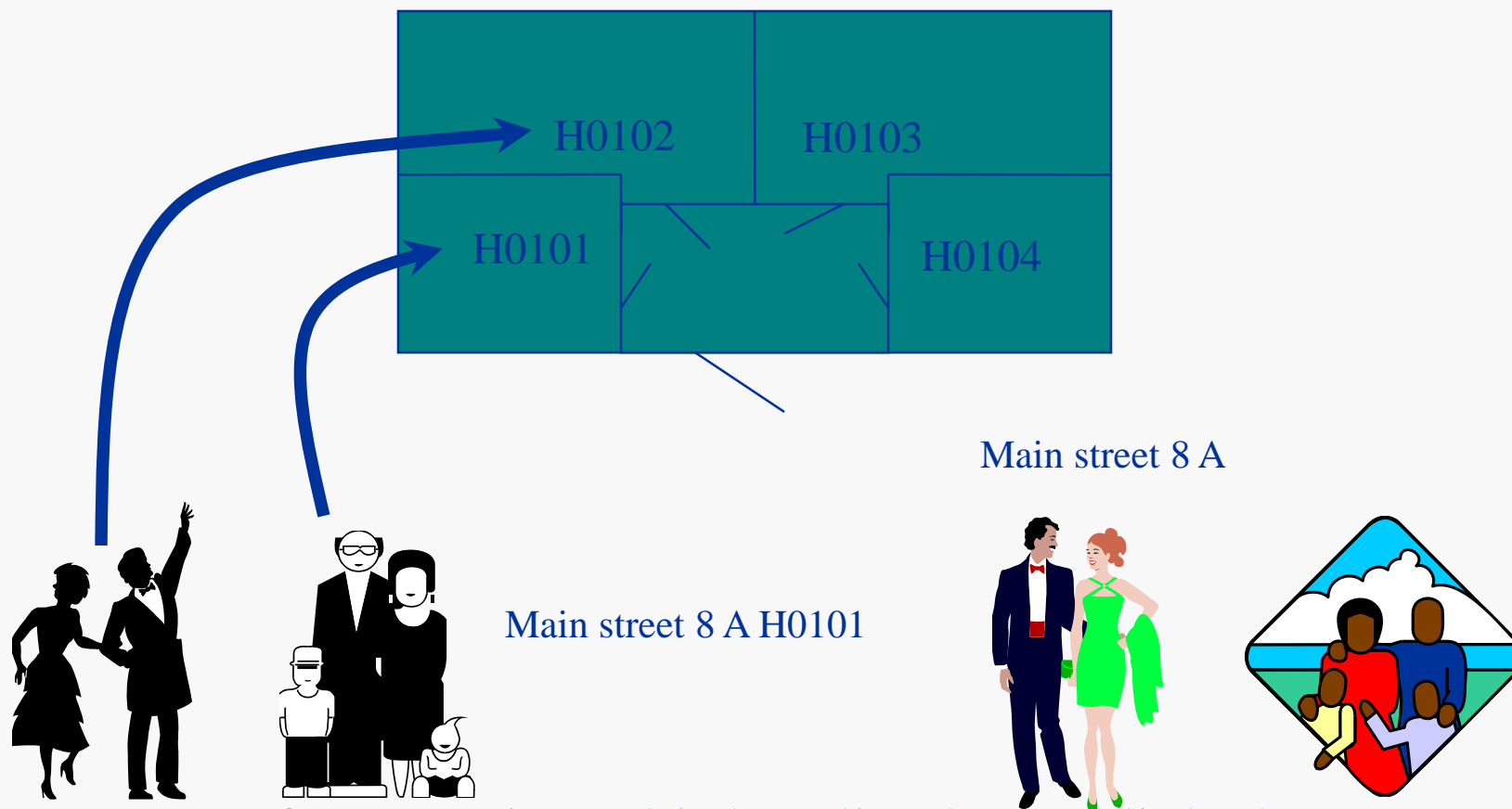# Multi-dwelling buildings before Census 2001

H0102   H0103

H0101   H0104

?
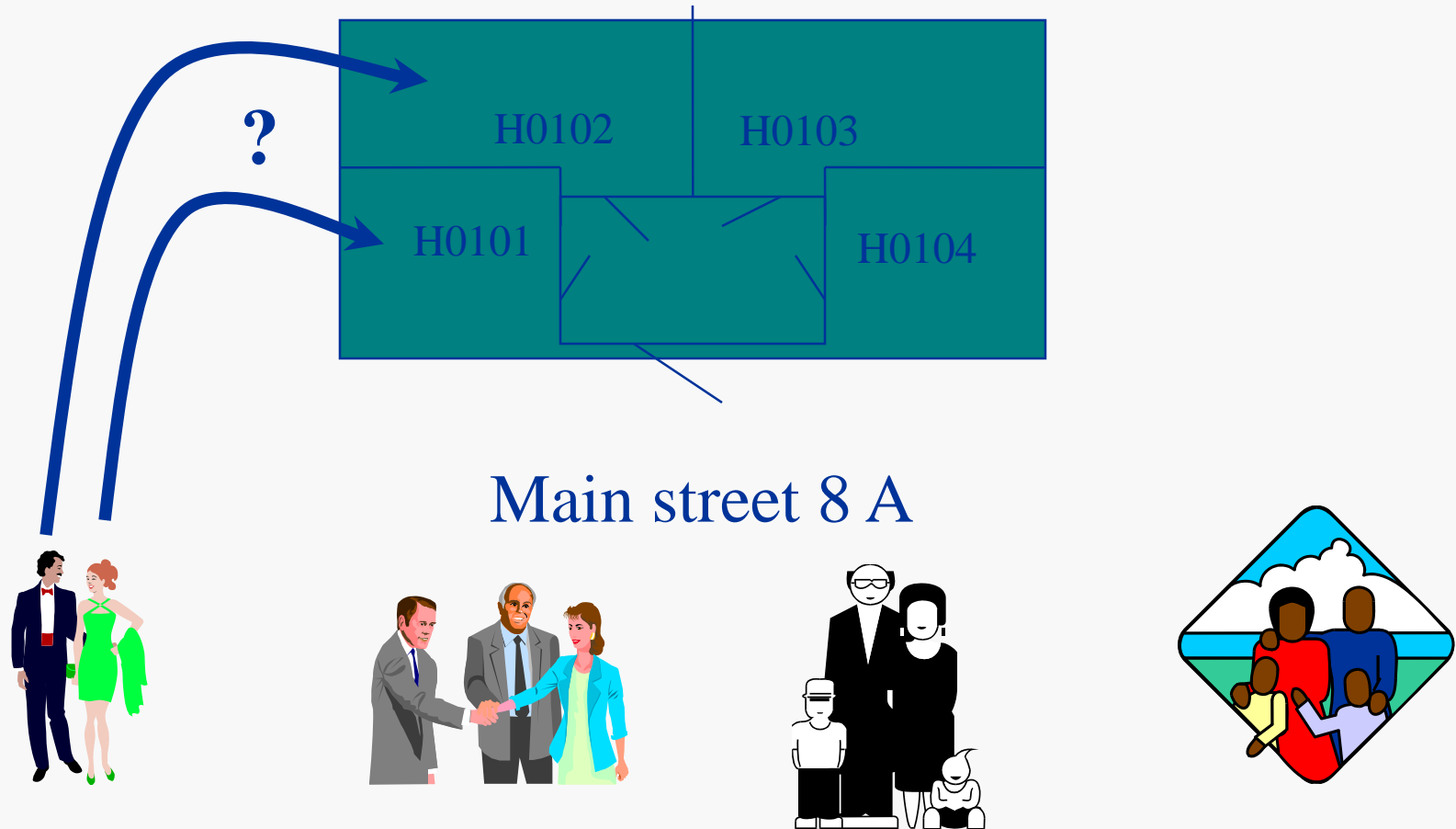
Main street 8 A

Multi-dwelling buildings after Census 2001, planned

H0102   H0103

H0101   H0104
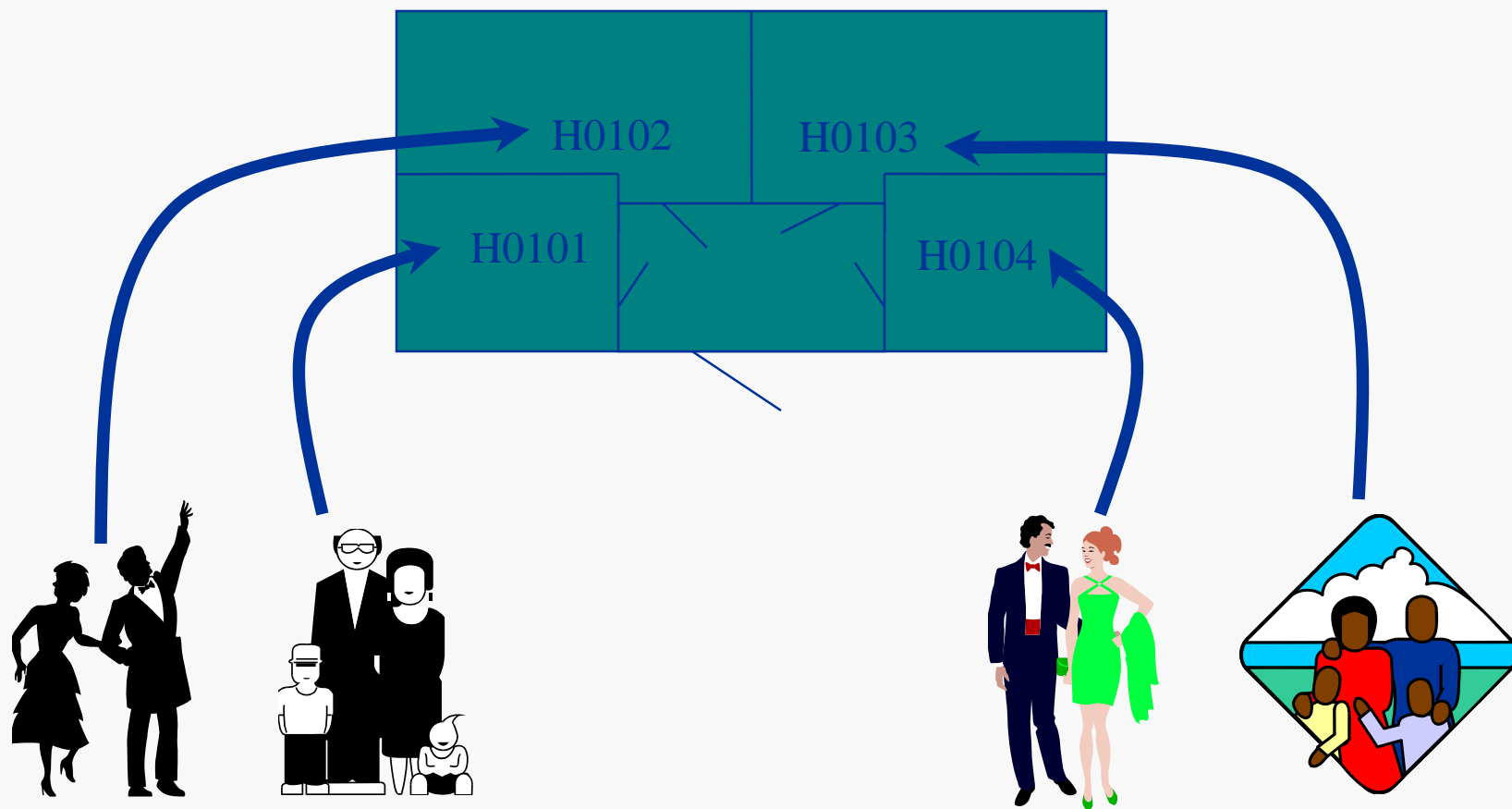
Main street 8 A H0101

BUT----------

Multi-dwelling buildings after Census 2001, result

H0102

H0103

H0101

H0104

Main street 8 A

Main street 8 A H0101

55 % of persons in multi-dweeling houses linked to a unique dwelling address.

Following up the Dwelling Address Project

- Improving administrative routines

- Produce quality indicators
  - Per cent residents in multi-dwelling houses with a dwelling number
  - 2006: 82 per cent
  - 2010: 94 per cent
  - 2011: 95 per cent (goal)

- Statistics Norway was active by
  - Taking initiatives to improve quality
  - Monitoring quality
  - Encourage use of dwelling numbers

2011 Census

- Totally register-based
- Comply with the EU Regulation

Register-based population and housing census system 2011

P = Personal id number
B = Business id number
A = Numerical address
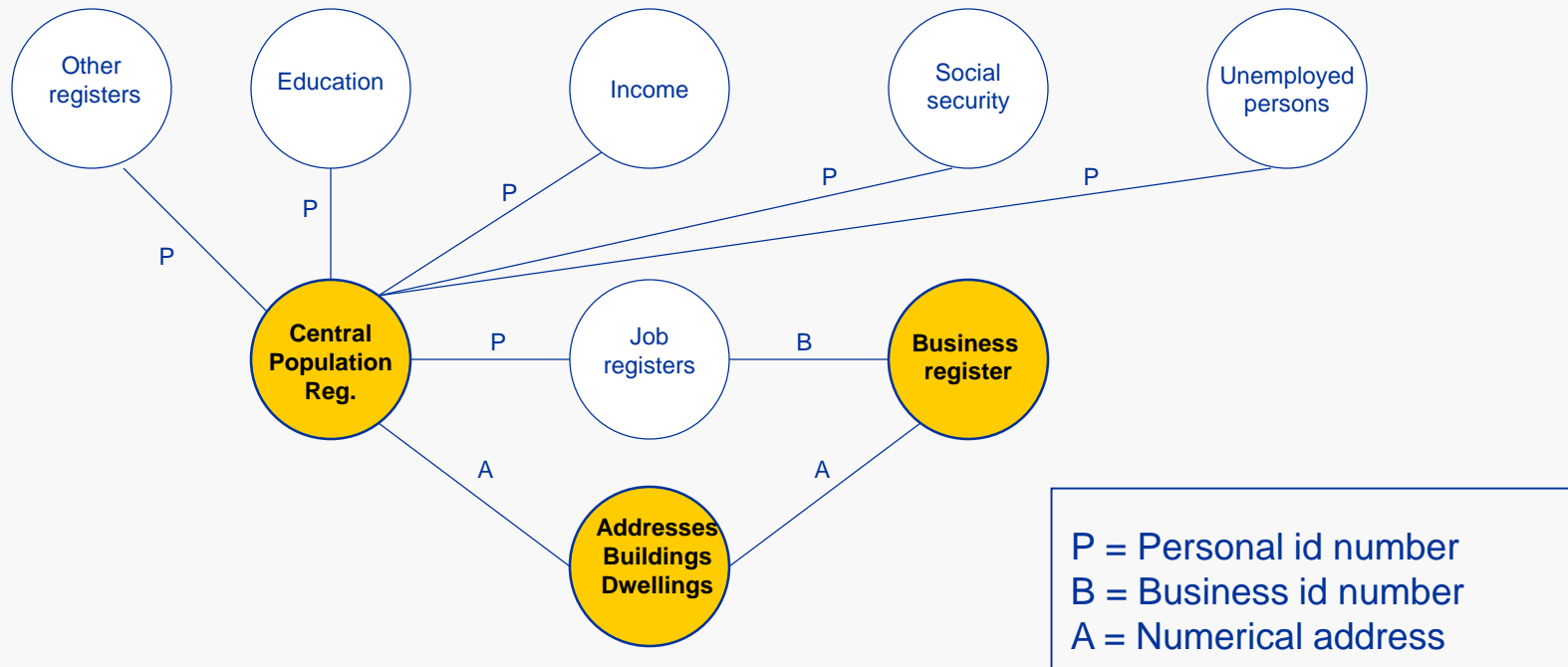
Statistical base register

Statistical specialized register

Registers/register systems used in Census 2011

- Population register (B)
  - Place of living, demography, migration, families, households
- Cadastre, register of addresses, buildings and dwellings (B)
  - Housing, geographical characteristics
- Business register (B)
  - Self-employment, place of work, industry
- Labour market register (S)
  - Current activity status (employment, unemployment), occupation, status in employment
- Register of education (S)
  - Educational attainment, current activity status (students)
- Registers on national insurance (S)
  - Current activity status (pensions)
- Income register (S)
  - Income, current activity status (self-employed, capital income)

Organisation of 2011 Census

- Project in Division for Population Statistics
  - Not a separate unit
- Small project group (2-3 persons)
- Cooperation with other units in SN
  - Important part of the project
- Total budget 1,5 mill euros
  - These are the <u>additional</u> costs
  - 10 per cent of costs in 2001

Census data from registers – example

Adm. registers

Statistical registers in Statistics Norway
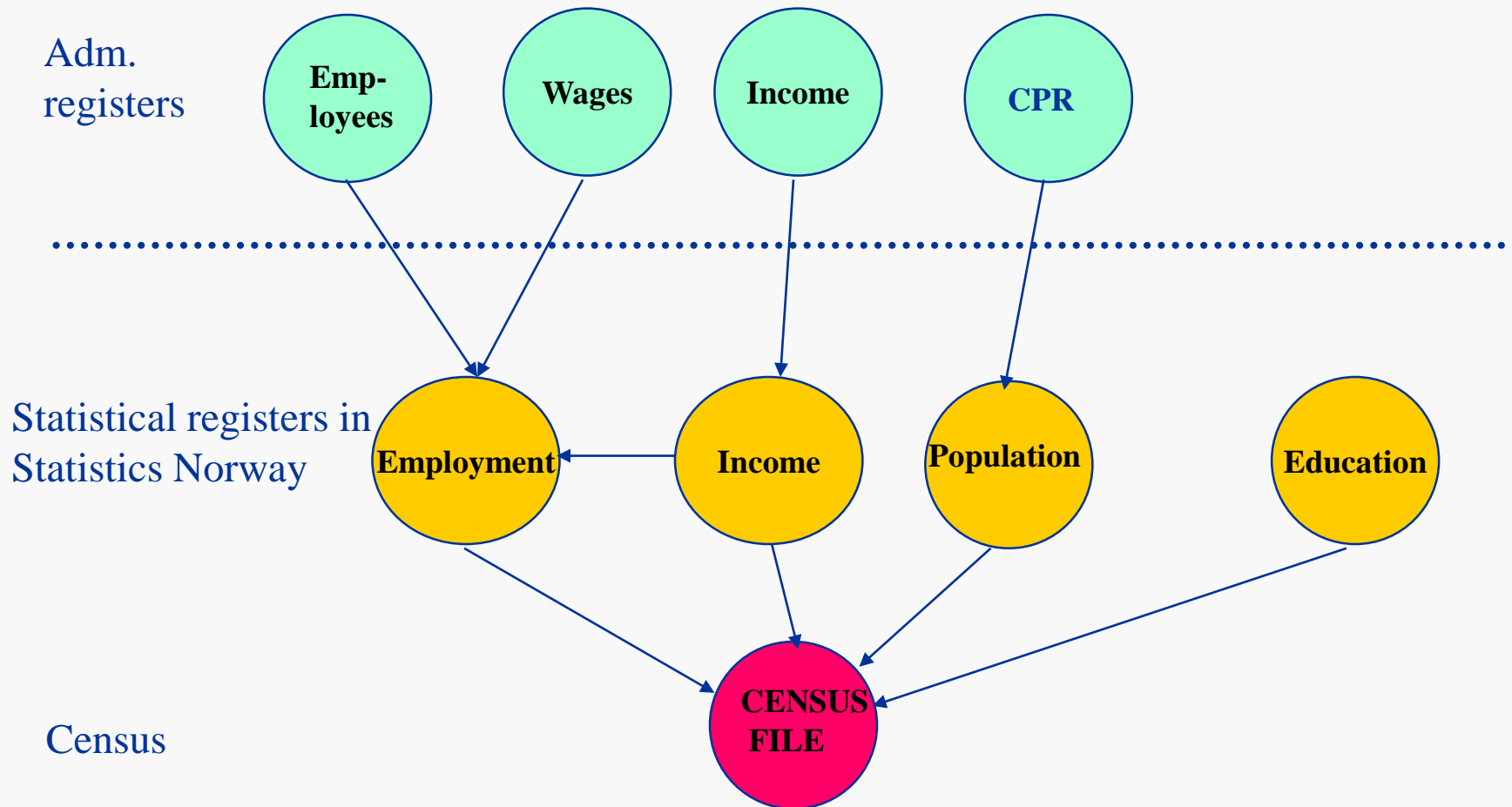
Census

Census - Tertiary use

Use of data from administrative registers

- Primary use: Administrative use

- Secondary use: Re-use of administrative data for statistical purposes, annual subject matter statistics

- Tertiary use: Re-use of data from annual statistics for Census purposes

Types of census information difficult to obtain from registers

- Data from recently established registers
  - Time elapsing from registers are established till good quality data are available differs between registers
  - Examples: Employment register, Dwelling register/dwelling address in CPR
- Data of minor importance for administrative purposes
  - Examples: Duration of employment in taxation data (in 2011), water supply system, central heating
- The never-ever problem
  - Lack of data describing the situation before the register was established: Immigration before 1964
- Data from events abroad
  - Education taken abroad
- Data on topics not relevant for administrative registration
  - Topics on emotional relationships: Cohabitation
  - Topics on behaviour or attitudes: Mode of transport to work

Quality issues

- Input quality – quality of registers
- Output quality – quality of statistics –product quality

Registers: different kinds of quality

- Quality of source/supplier
  - Reliability of register owner, updating, delivery
- Quality of metadata
  - Clarity, data treatment
- Quality of data
  - Technical checks, accuracy, completeness

Quality assessment for decision about register-based census

- Comparing with data from latest (traditional) census
- Comparing with data from sample surveys
- Internal consistency

Normal development: Traditional – combined – register-based

- Step by step development in Norway – long period

Product quality

- Most important quality dimensions to be considered for register-based census

- Accuracy

- Relevance

- Timeliness

Accuracy

- Coverage
- Item non-response/imputation
- Correctness of information
  - Assessments for each variable

Coverage assessment

- Obtain an independent and high quality data source for comparisons with census data

- Traditional census
  - Post enumeration survey
  - Data from registers

- Register-based census

  Under coverage
  - Difficult to measure if all existing surveys and registers are using the same population register as a frame
  - Searching for alternative administrative data (example: electricity consumption)

  Over coverage
  - Using «signs of life», searching in all available registers

Assessment for each variable

- Assessment of quality in <u>statistical</u> register
  - After editing, imputations etc.

- Comparing with (sample survey), i.e. LFS
  - Macro and micro level
  - Challenge: Differences in definitions

Relevance

User satisfaction

- Only variables available in or derived from registers can be included in census
  - Possible to include some variables from sample surveys

- Some restrictions on definitions
  - Registered/legal place of residence (from population register) rather than usual place of residence
  - Dwelling households, not housekeeping units

Main challenges in establishing register-based census in Norway

- Data on education
  - SN had to establish register on education
  - Education taken abroad, separate surveys

- Labour market data
  - Combining data from several registers
  - Took a long time to create a complete system

- Data on households and housing
  - Establish dwelling register
  - Establish link between persons and dwellings

Register-based censuses in the national and international statistical system

In the future

National system

- Combine individual data from subject matter statistics systems
- Census fully integrated with annual statistics
- No specific census statistics published?

International system

- Participate in international census preparations
- Produce comparable census statistics according to international recommendations and regulations
- Census statistics published!

Register-based censuses – the process

Traditional

Costs   Response burden   Annual statistics

Relevant registers?   Linking?   Legal base?   Public approval?

Investigation

Relevance   Accuracy   Coverage   Timeliness

Quality

Partly register-based

Fully traditional

Traditional and Sample surveys or Yearly updates

New technologies

Registers and Traditional

Registers and Sample survey

Fully register-based

Reg. and ad hoc Sample survey

Reg. and existing Sample survey

Register-based