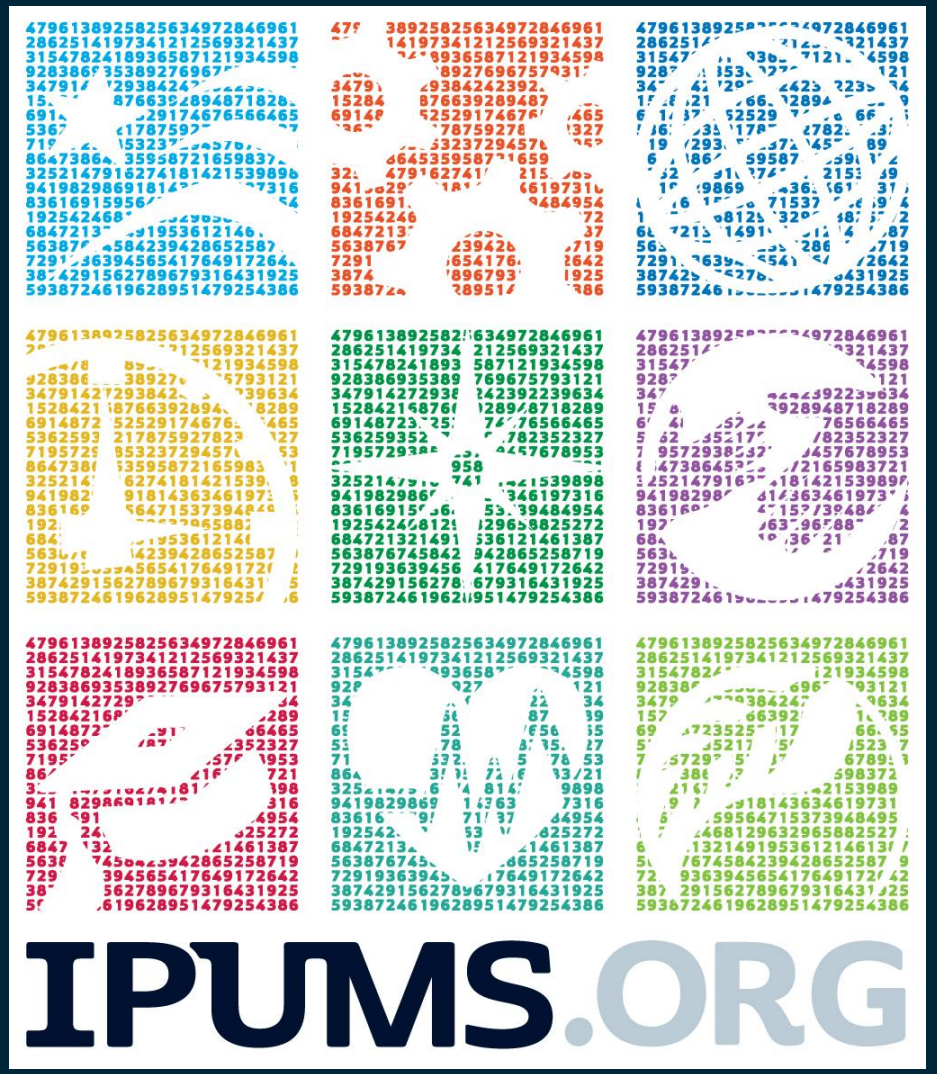


CENSUS DATA:

A Crucial Resource for Population Research and Policy

Sula Sarkar, PhD
IPUMS Center for Data Integration
University of Minnesota

The 31st Population Census Conference
Hosted by the Association of National Census and Statistics Directors of America, Asia and the Pacific (ANCSDAAP) and the Statistics Bureau of Japan (SBJ)

UNIVERSITY OF MINNESOTA

NSO OBJECTIVES and uses

- Governmental role
- Official purpose

Census DISSEMINATION via IPUMS

Long-term UTILITY of census microdata

Census: Foundational Population Information

Governmental role and responsibility

- Count everyone in the population
- According to scientific principles

- Collect and report a baseline set of population characteristics
- Make data open and available for a wide range of uses

People illustrations by Storyset

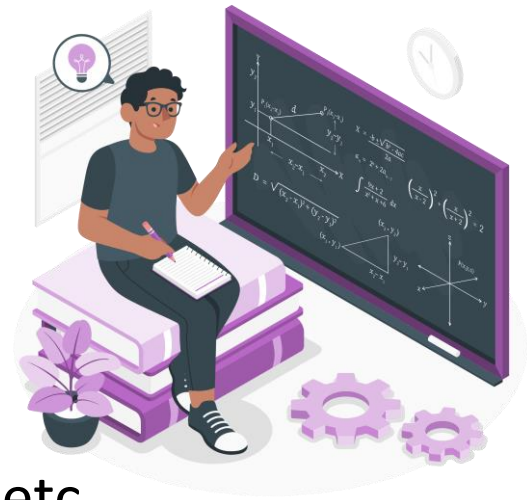
IPUMS

Census: Official purposes

- Count everyone in the population
- According to scientific principles

FOR

- Representative governance
- Federal funding allocation
- Planning purposes at all levels
  Schools, transportation, health facilities, etc.
- Data-driven research



People illustrations by Storyset

IPUMS

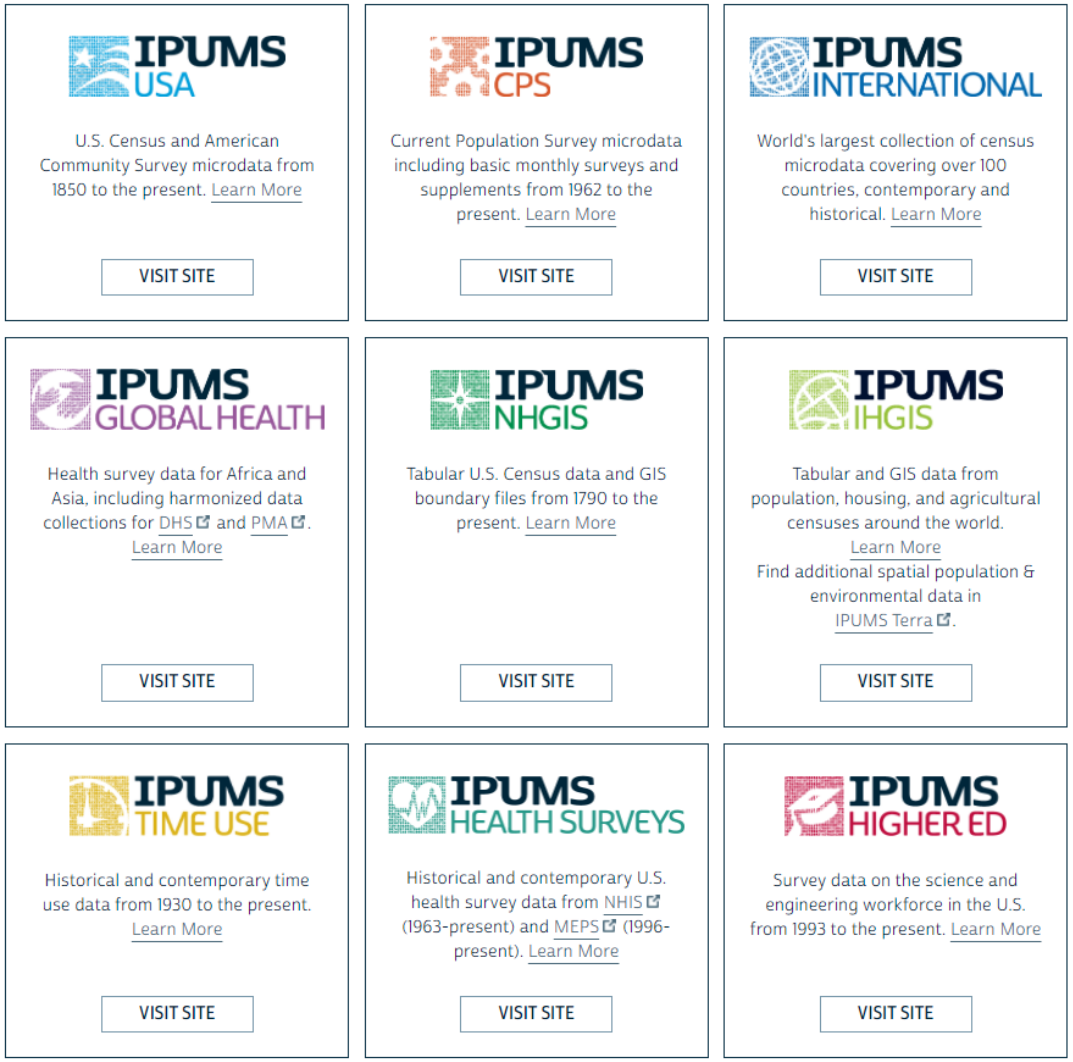
NSO OBJECTIVES and uses

Census DISSEMINATION via IPUMS

- What is IPUMS?
- IPUMS International and mission statement
- Tabular data versus microdata in censuses
- IPUMS metadata
- IPUMS value added: microdata harmonization, spatial harmonization, family interrelationships…
- IPUMS Data users and usage

Long-term UTILITY of census microdata

IPUMS: Encouraging Scholarly use of Census Data



Integrated - consistent codes, labels, documentation

Public **U**se - free, anonymized, downloadable

Microdata - individual-level

Series - pooled data over time and place

Collect and preserve census and survey data and documentation

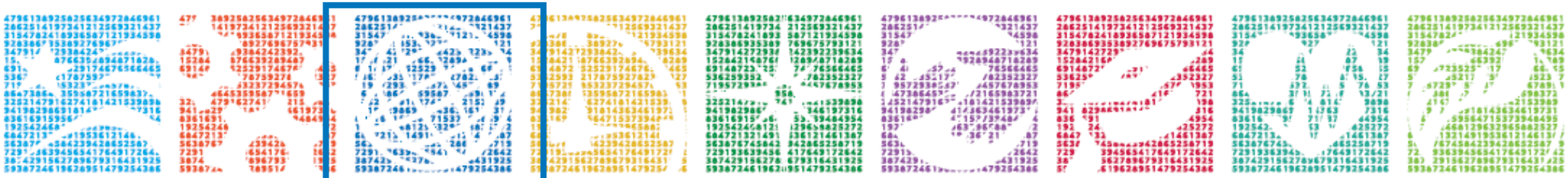
Harmonize data across time and space

Data and associated code files **disseminated FREE** of charge through **IPUMS.ORG**

Data used by researchers for **evidence-based** decision making

IPUMS

IPUMS DATA PROJECTS



FEATURES	USA	CPS	INTERNATIONAL	TIME USE	NHGIS	PMA	DHS	HIGHER ED	MEPS	NHIS	IHGIS
Microdata	■	■	■	■		■	■	■	■	■	
International			■	■		■	■				■
Earliest Year of Data	1790	1962	1960s	1965	1790	2013		1993	1996	1963	1960s
Geographic Detail	Sub-state	Sub-state	2nd or 3rd Sub-national	Sub-state	Census Block	Region	Region	None	Census Region	Census Region	Varies
Households & Families	■	■	■	■	■		■		■	■	■
All Ages	■	■	■	■	■				■	■	■
	Census	Survey	Census	Survey		Survey		Survey	Survey		

Large sample sizes - Population representative - Long time spans

IPUMS INTERNATIONAL

HOME | SELECT DATA | MY DATA | SUPPORT

IPUMS INTERNATIONAL
ABOUT
INTERNATIONAL PARTNERS
REGISTER
DONATE TO IPUMS

DATA
BROWSE AND SELECT DATA
ANALYZE DATA ONLINE
DOWNLOAD OR REVISE MY DATA

SUPPLEMENTAL DATA
GEOGRAPHY & GIS
FERTILITY, MORTALITY, MIGRATION
RESEARCH DATA ENCLAVE
LINKED HISTORICAL CENSUSES

DOCUMENTATION
REVISION HISTORY
SAMPLE DESCRIPTIONS
QUESTIONNAIRES
NAPP PROJECT
WORLD CENSUS FORMS

SUPPORT
FAQ
VIDEO TUTORIALS
USER FORUM
TEACHING WITH IPUMS

RESEARCH
CITING IPUMS INTERNATIONAL
IPUMS BIBLIOGRAPHY

HARMONIZED INTERNATIONAL CENSUS DATA FOR SOCIAL SCIENCE AND HEALTH RESEARCH

IPUMS International is dedicated to collecting and distributing census microdata from around the world. The project goals are to collect and preserve data and documentation, harmonize data, and disseminate the harmonized data free of charge.

103 COUNTRIES – 547 CENSUSES AND SURVEYS – OVER 1 BILLION PERSON RECORDS

SOURCE DATA FOR IPUMS INTERNATIONAL ARE GENEROUSLY PROVIDED BY PARTICIPATING NATIONAL STATISTICAL OFFICES

CREATE AN EXTRACT

Browse Data

CREATE AN ACCOUNT

Register

What is IPUMS?

IPUMS provides census and survey data from around the world integrated across time and space. IPUMS integration and documentation makes it easy to study change, conduct comparative research, merge information across data types, and analyze individuals within family and community context. Data and services available free of charge.

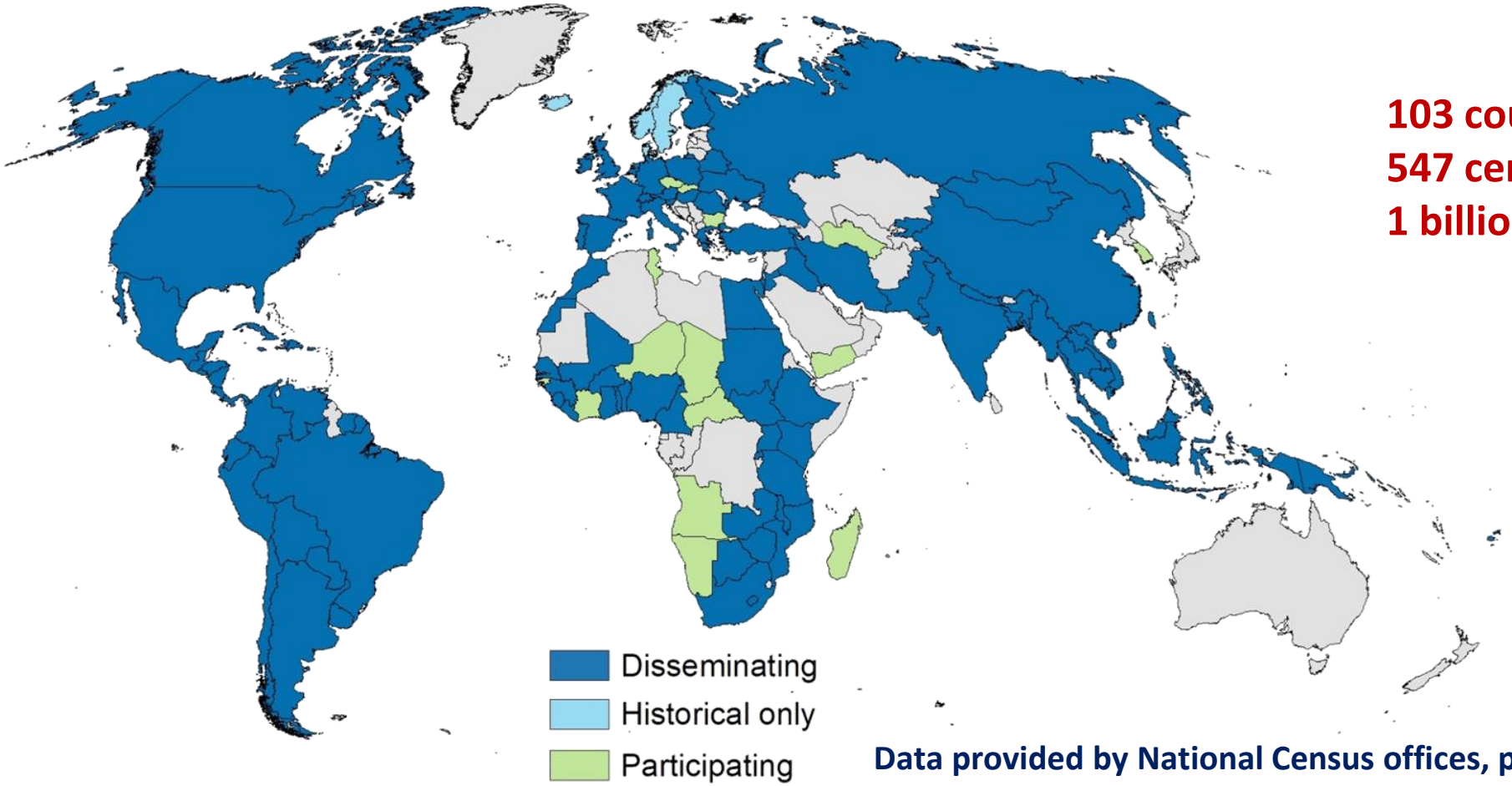
IPUMS

Data Collection and Preservation

Dhaka, BBS-Bangladesh

IPUMS

Microdata in IPUMS International

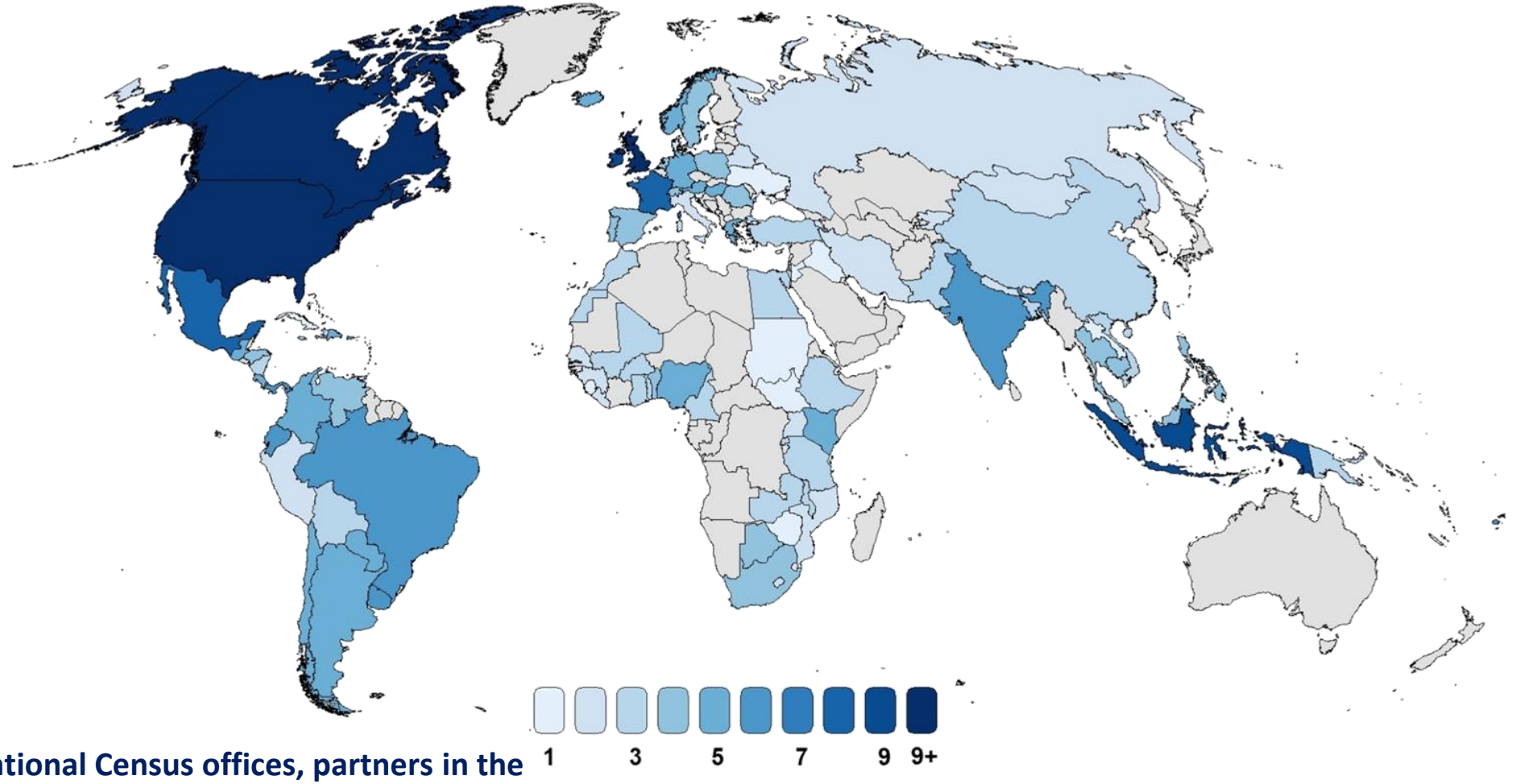


103 countries
547 censuses and surveys
1 billion+ person records

Data provided by National Census offices, partners in the census integration and dissemination project

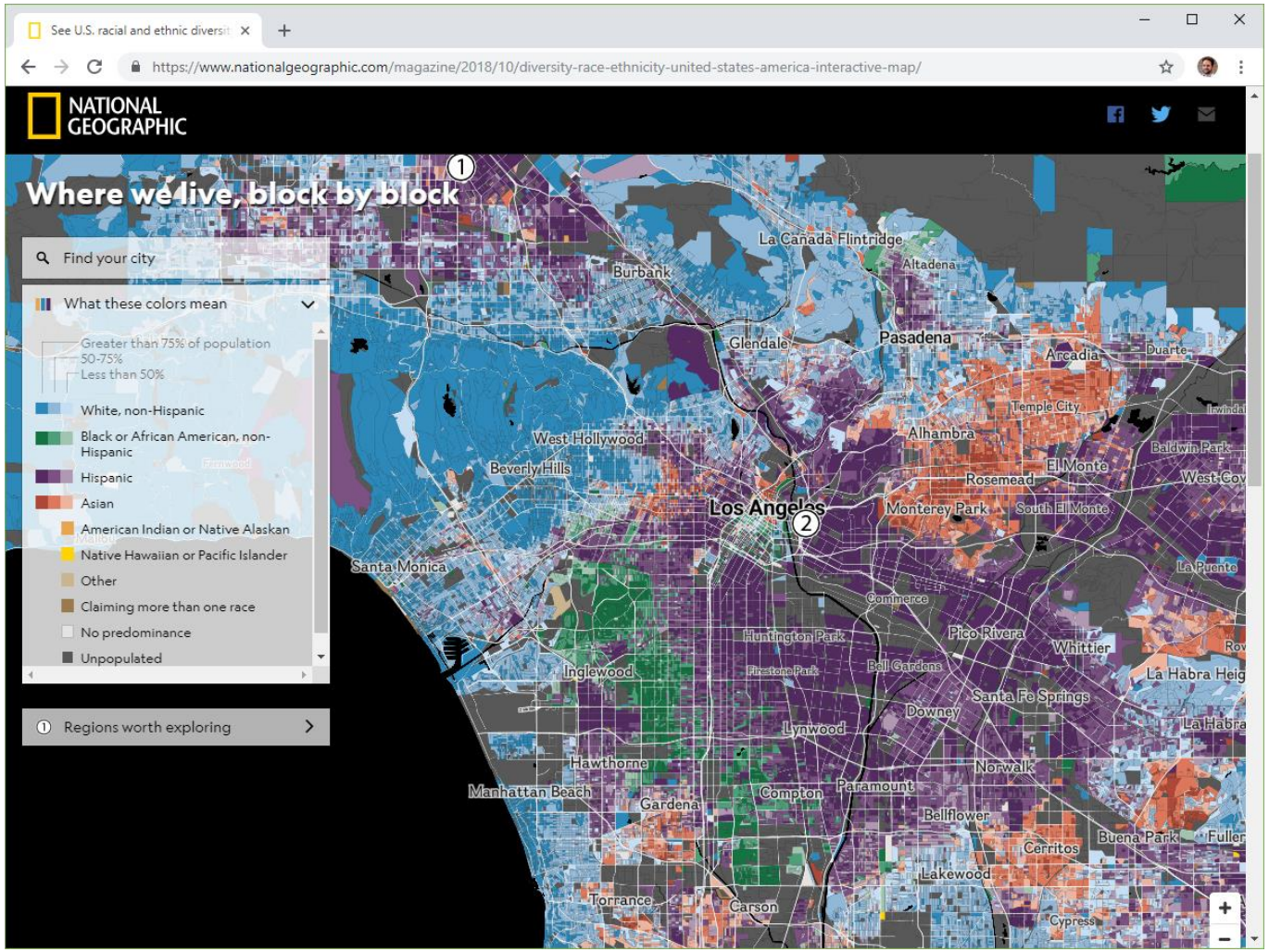
IPUMS

IPUMS Samples per Country



Data provided by National Census offices, partners in the census integration and dissemination project

Summary Data



Age	Both sexes	Male	Female
Total population	281,421,906	138,053,563	143,368,343
Under 5 years	19,175,798	9,810,733	9,365,065
5 to 9 years	20,549,505	10,523,277	10,026,228
10 to 14 years	20,528,072	10,520,197	10,007,875
15 to 19 years	20,219,890	10,391,004	9,828,886
20 to 24 years	18,964,001	9,687,814	9,276,187
25 to 29 years	19,381,336	9,798,760	9,582,576
30 to 34 years	20,510,388	10,321,769	10,188,619
35 to 39 years	22,706,664	11,318,696	11,387,968
40 to 44 years	22,441,863	11,129,102	11,312,761
45 to 49 years	20,092,404	9,889,506	10,202,898
50 to 54 years	17,585,548	8,607,724	8,977,824
55 to 59 years	13,469,237	6,508,729	6,960,508
60 to 64 years	10,805,447	5,136,627	5,668,820
65 to 69 years	9,533,545	4,400,362	5,133,183
70 to 74 years	8,857,441	3,902,912	4,954,529
75 to 79 years	7,415,813	3,044,456	4,371,357
80 to 84 years	4,945,367	1,834,897	3,110,470
85 to 89 years	2,789,818	876,505	1,913,317
90 years and over	1,449,769	350,497	1,099,272

IPUMS

Microdata

Relation to head

Marital status

Education

Occupation

```
0000980001001002100007912202208021120390099900990000000001
0000980001002001200006422202208022120310099900990000000002
0000980001003000410002311002208022120100083200269000001202
0000980001004000410001321002208012120330099900990000000002
0000988001001002100003512102208022311230072300527000000302
0000988001002001200004122102208022120310099900990000000002
0000988001003000300001721002208022212230099800990000000002
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0000988001007000410000021002208000000000099900990999999992
0000988001008000491002211002208022311100061100011000002801
0001005001001002100004512102208012212100061100011000002002
0001005001002001200003422102208012221310099900990000000002
0001005001003000300001221002208012212330099900990000000002
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0001013001003000300003323502208022221310099900990000000002
0001013001004000410001521002208012221330099900990000000002
0001013001005000410001321002208012212330099900990000000002
0001013001006000410000211002208000000000099900990999999992
```
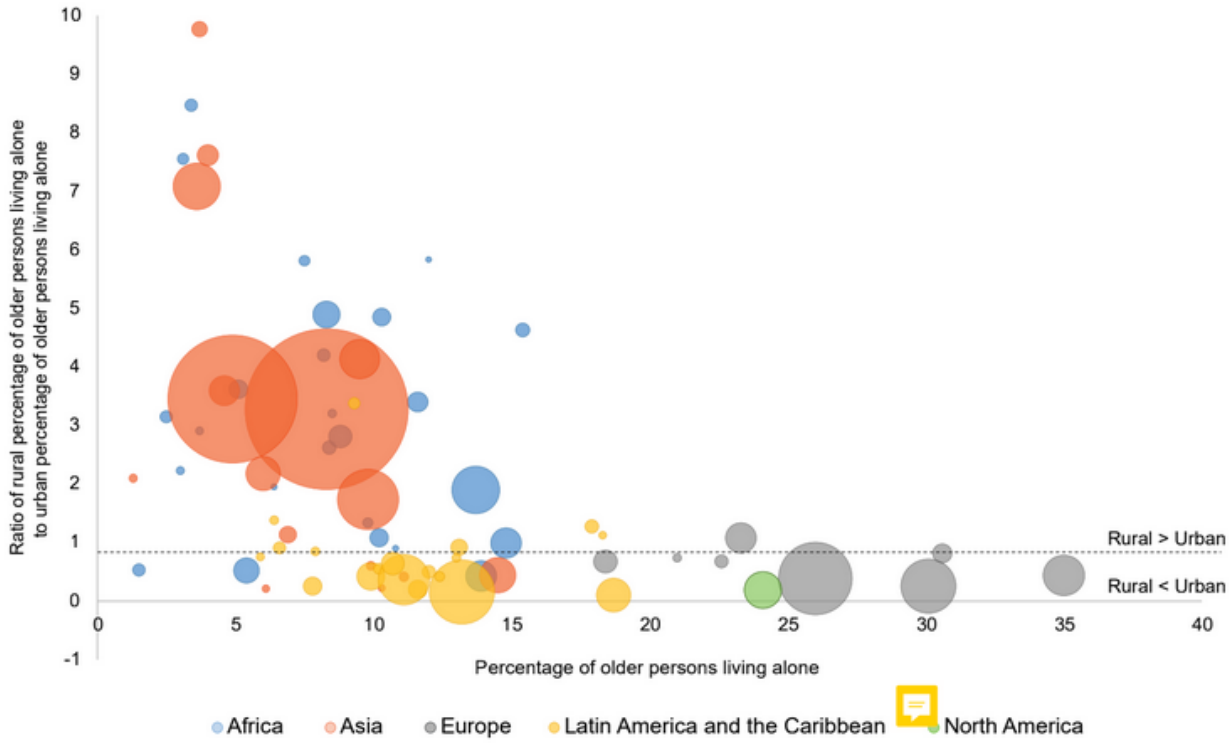

Figure 10. Proportion of older persons living alone by place of residence, based on countries with available data, 2000–2017

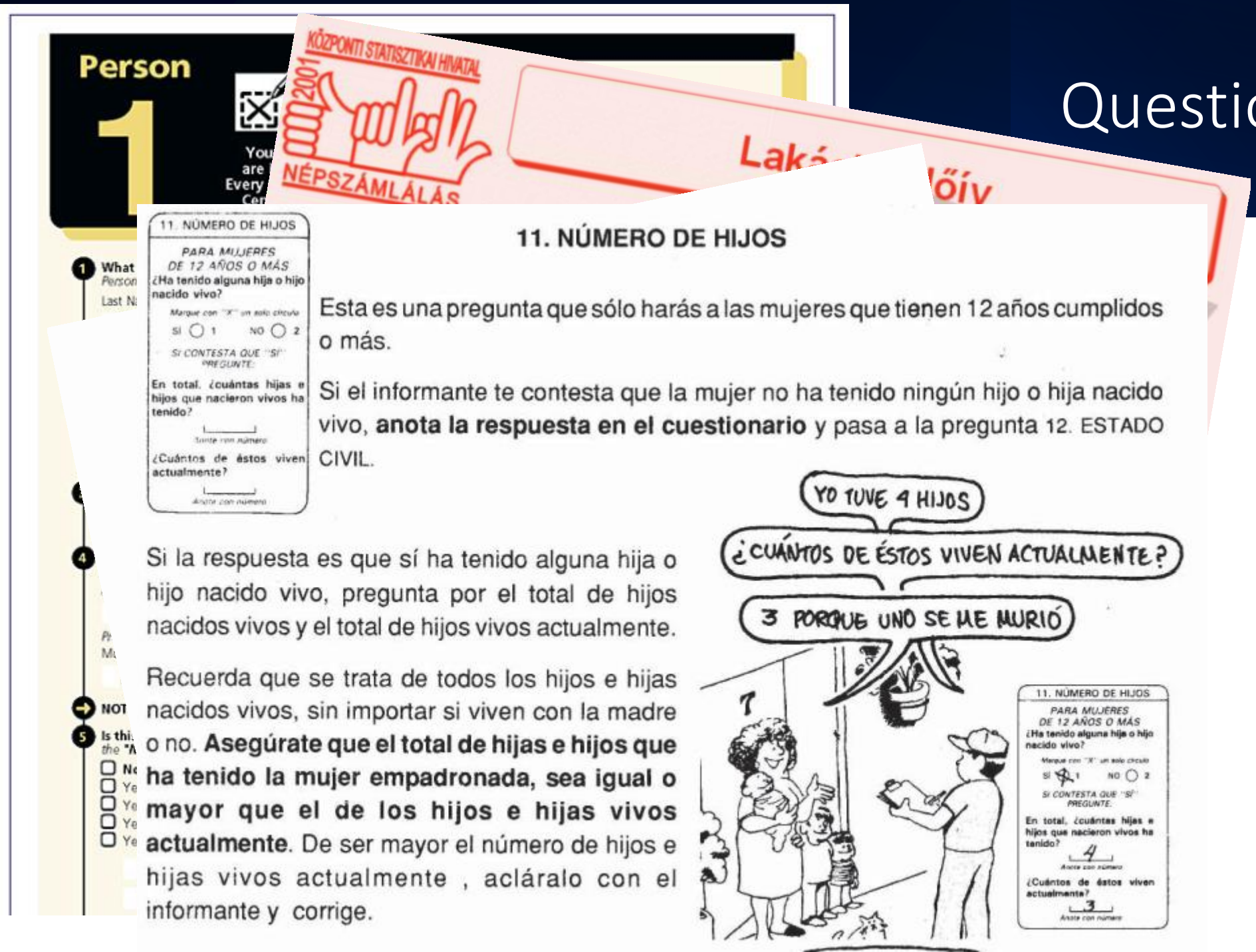


IPUMS

IPUMS Value Added

- Integration and harmonization
- Create and download custom extracts
- Comprehensive online documentation
- Online data analysis tools
- Data enhancements
- Spatial harmonization and GIS files
- User support (IPUMS@UMN.EDU)

Questionnaires



Codebooks

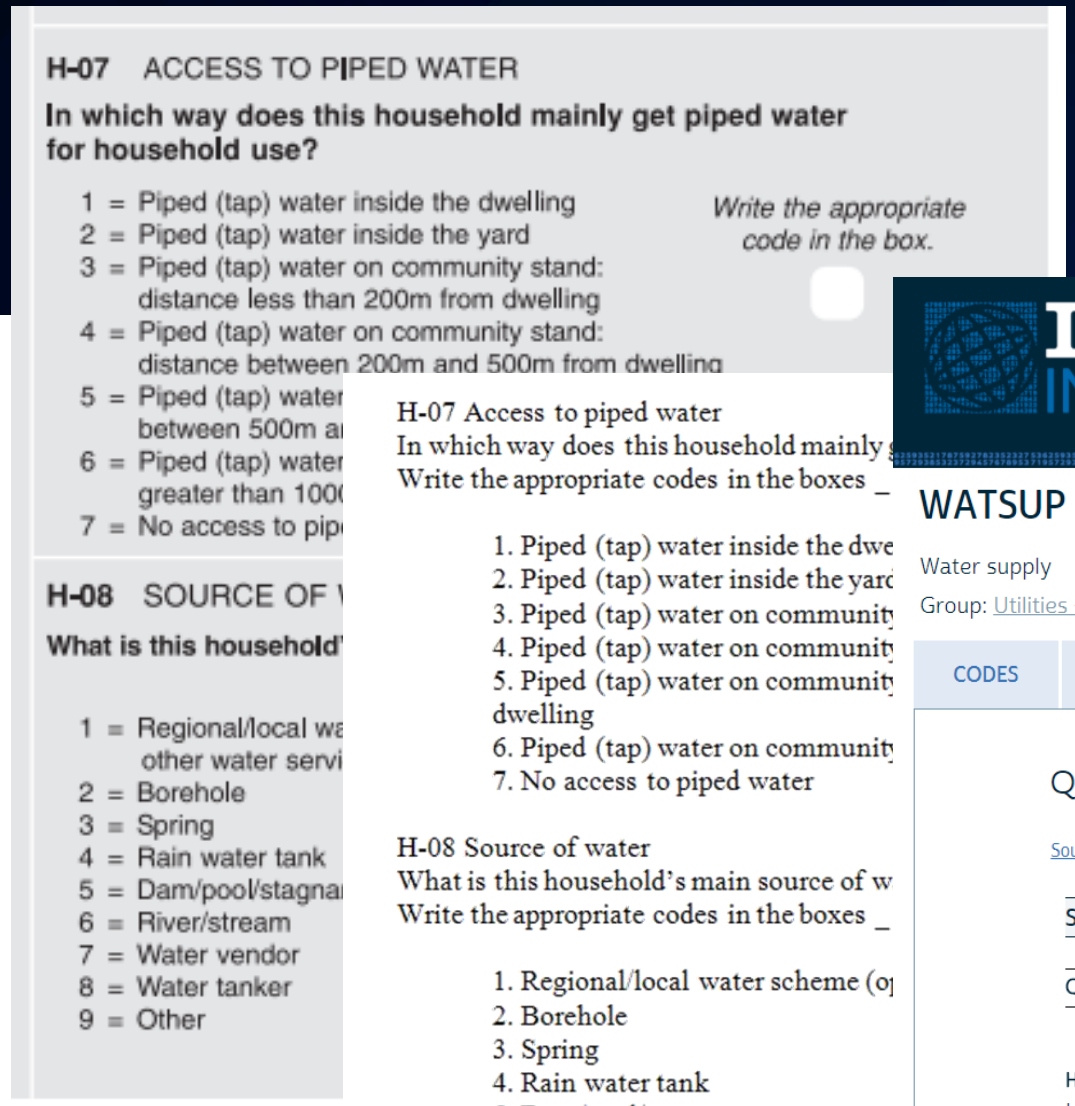
```
. C006-EA-TYPE
```

```
=====================================
year: 1982, sample: 1%, record: individual, variable: age
        Length: 3       Start: 7
        Age in years
              0..99
=====================================
```

EAU	Point d'eau potable à l'intérieur du logement (DOM)	1 : Eau froide seulement 2 : Eau froide et chaude 3 : Aucun point d'eau à l'intérieur du logement X : Hors logement ordinaire (DOM et France métropolitaine) Z : Logement ordinaire France métropolitaine
EGOUL	Mode d'évacuation des eaux usées (DOM)	1 : Raccordement au réseau d'égouts 2 : Raccordement à une fosse septique 3 : Raccordement à un puisard 4 : Evacuation des eaux usées à même le sol X : Hors logement ordinaire (DOM et France métropolitaine) Z : Logement ordinaire France métropolitaine
ELEC	Électricité dans le logement (DOM)	1 : Avec électricité 2 : Sans électricité X : Hors logement ordinaire (DOM et France métropolitaine) Z : Logement ordinaire France métropolitaine
EMPL	Condition d'emploi	11 : En contrat d'apprentissage 12 : Placés par une agence d'intérim 13 : Emplois-jeunes, CES, contrats de qualification 14 : Stagiaires rémunérés en entreprise 15 : Autres emplois à durée limitée, CDD, contrat court, vacataire... 16 : Emplois sans limite de durée, CDI, titulaire de la fonction publique 21 : Non salariés : Indépendants 22 : Non salariés : Employeurs 23 : Non salariés : Aides familiaux ZZ : Sans objet

```
=====================================
```

Census Forms and Instructions



H-07 ACCESS TO PIPED WATER

In which way does this household mainly get piped water for household use?

Write the appropriate code in the box.

1 = Piped (tap) water inside the dwelling
2 = Piped (tap) water inside the yard
3 = Piped (tap) water on community stand: distance less than 200m from dwelling
4 = Piped (tap) water on community stand: distance between 200m and 500m from dwelling
5 = Piped (tap) water
between 500m a
6 = Piped (tap) water
greater than 100
7 = No access to pip

H-08 SOURCE OF

What is this household'

1 = Regional/local wa
other water servi
2 = Borehole
3 = Spring
4 = Rain water tank
5 = Dam/pool/stagna
6 = River/stream
7 = Water vendor
8 = Water tanker
9 = Other

H-07 Access to piped water
In which way does this household mainly
Write the appropriate codes in the boxes _

1. Piped (tap) water inside the dwe
2. Piped (tap) water inside the yard
3. Piped (tap) water on community
4. Piped (tap) water on community
5. Piped (tap) water on community dwelling
6. Piped (tap) water on community
7. No access to piped water

H-08 Source of water
What is this household's main source of w
Write the appropriate codes in the boxes _

1. Regional/local water scheme (o
2. Borehole
3. Spring
4. Rain water tank
5. Dam/pool/stagnant water
6. River/stream
7. Water vendor
8. Water tanker
9. Other

If 2-9, Go to H-10

IPUMS INTERNATIONAL

IPUMS.ORG | SELECT DATA | FAQ | HELP | LOGIN

DATA CART
YOUR DATA EXTRACT
0 VARIABLES
1 SAMPLE
VIEW CART

WATSUP

ADD TO CART | CHANGE SAMPLES

Water supply

Group: Utilities — HOUSEHOLD

CODES | DESCRIPTION | COMPARABILITY | UNIVERSE | AVAILABILITY | QUESTIONNAIRE TEXT | SOURCE VARIABLES

Questionnaire Text

South Africa 2011

South Africa 2011 — source variable ZA2011A_0037 — Water supply top

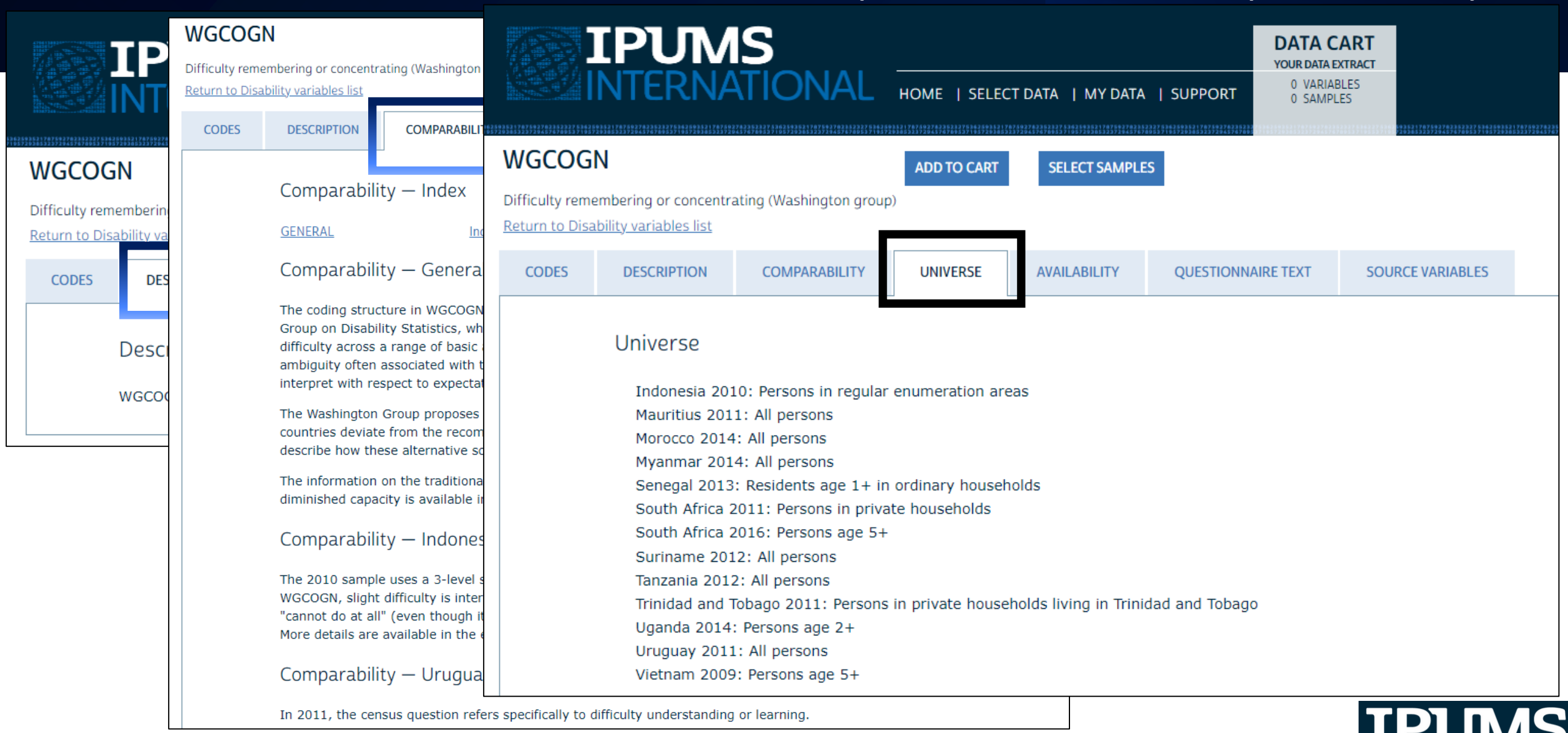
Questionnaire form view entire document: text image

H-07 Access to piped water
In which way does this household mainly get piped water for household use?
Write the appropriate codes in the boxes _

1. Piped (tap) water inside the dwelling
2. Piped (tap) water inside the yard
3. Piped (tap) water on community stand: distance less than 200m from dwelling

IPUMS

Description and Comparability



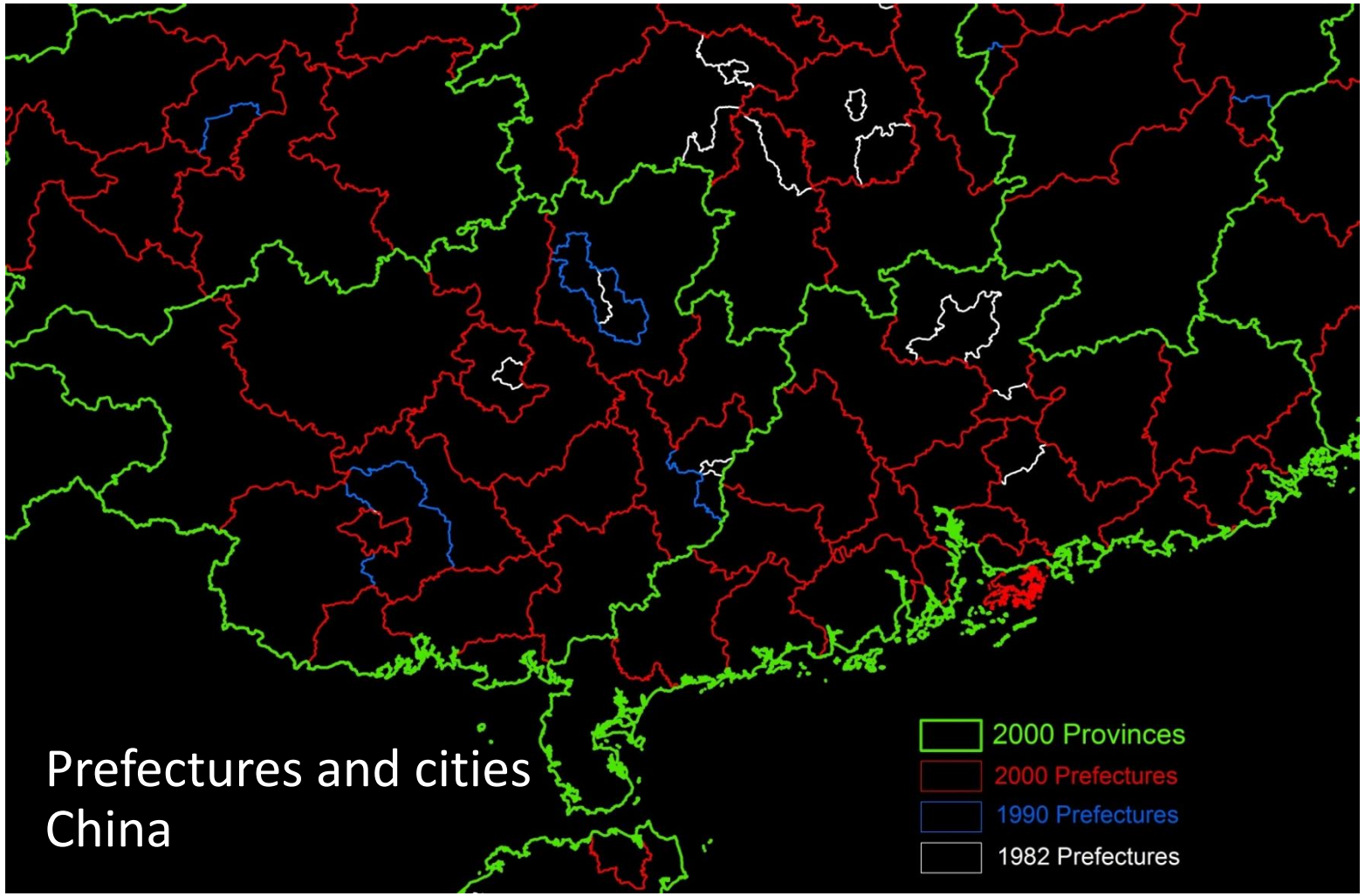
Microdata Harmonization

- A single, consistent data series from datasets collected in different times and places
- Codes group broadly comparable categories while retaining sample-specific detail
- Denote potential comparability issues

IPUMS

Harmonization: Marital Status

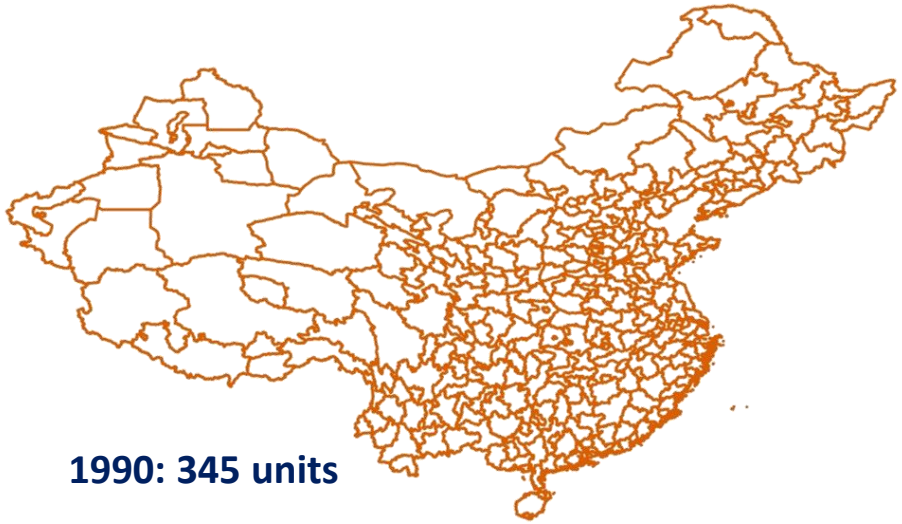
Spatial Harmonization



Prefectures and cities
China

Integrated and Sample Specific Geography and GIS

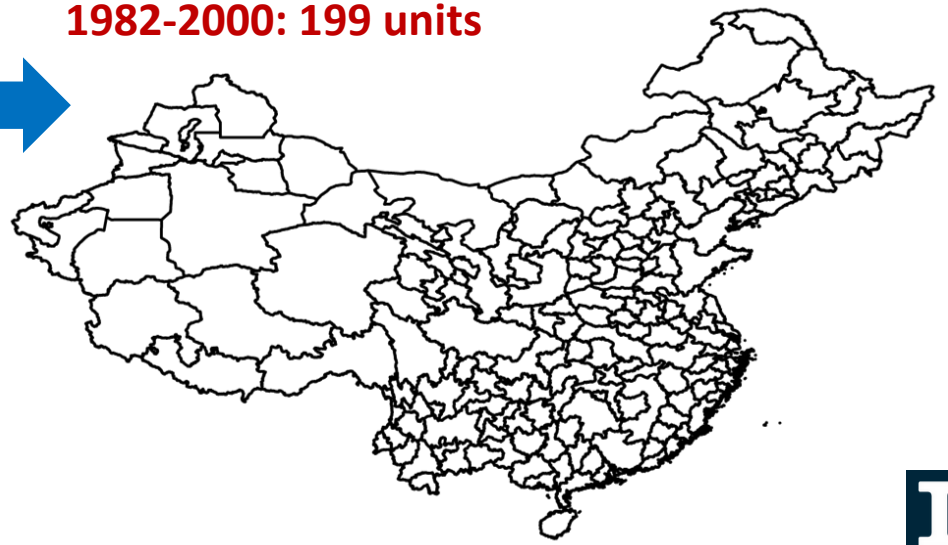
1982: 317 units



1990: 345 units

2000: 344 units

1982-2000: 199 units

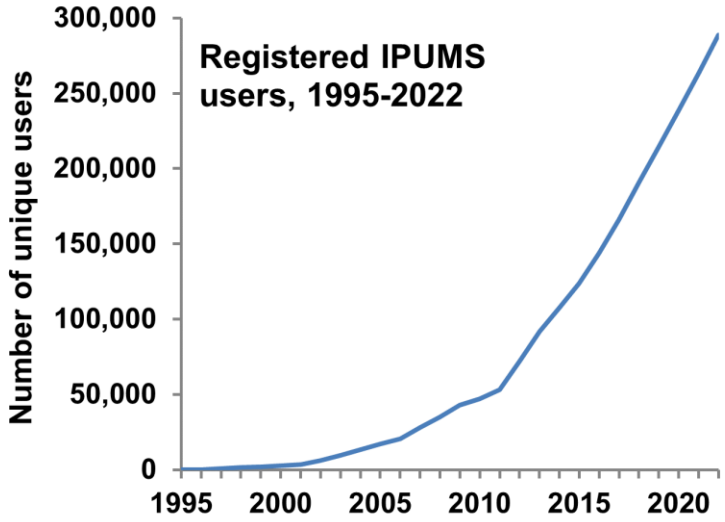


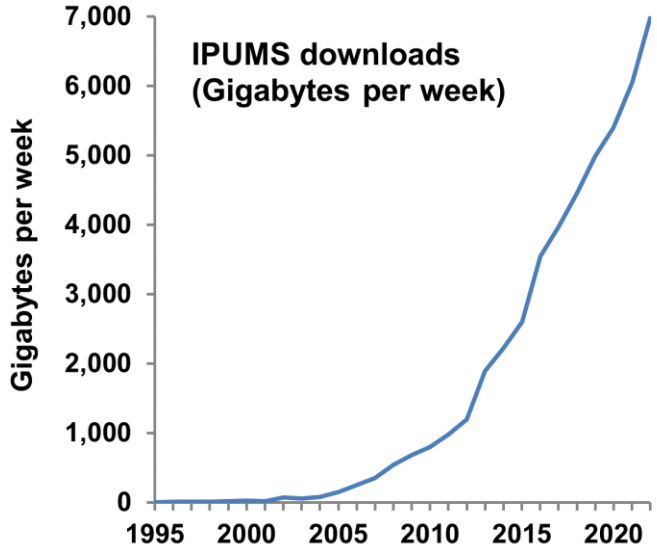
Family Interrelationship Variables

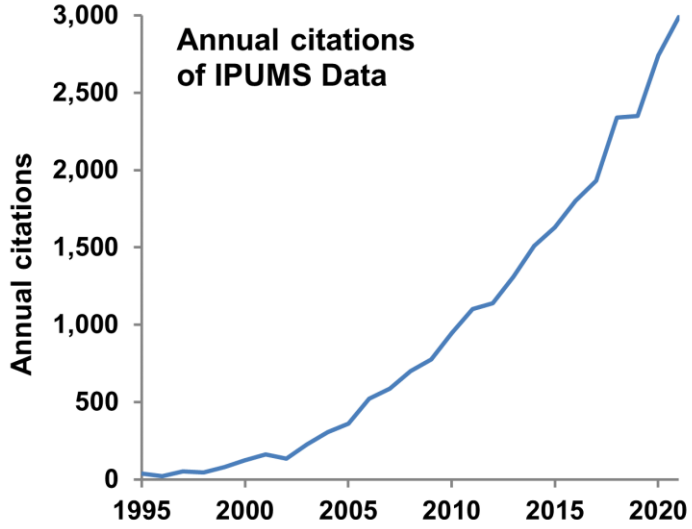
Pernum	Relate	Age	Sex	Marst	Chborn	Location
1	head	46	male	married	n/a	2
2	spouse	44	female	married	3	1
3	aunt	77	female	widow	7	0
4	child	15	female	single	0	0
5	child	13	female	single	n/a	0
6	child	11	male	single	n/a	0

Pernum	Relate	Age	Sex	Marst	Chborn	Mother's Location	Father's Location
1	head	46	male	married	n/a	0	0
2	spouse	44	female	married	3	0	0
3	aunt	77	female	widow	7	0	0
4	child	15	female	single	0	2	1
5	child	13	female	single	n/a	2	1
6	child	11	male	single	n/a	2	1

IPUMS Users and Usage







Discipline	
Economics	50%
Demography	15%
Sociology	10%
Statistics	5%
Public Policy	5%
Geography	3.5%
History	1.5%
Other	10%

Since 2005
> 22,000 approved data users
> 90,000 data download requests

IPUMS

Indirect Benefit and Support to NSOs

Long-term data preservation

Facilitate high-impact research

- Standardization and harmonization work
- Provide extensive metadata
- User-friendly web dissemination

Alleviate NSO support burden

- Provide data user support and training
- Publicity for data usage

IPUMS

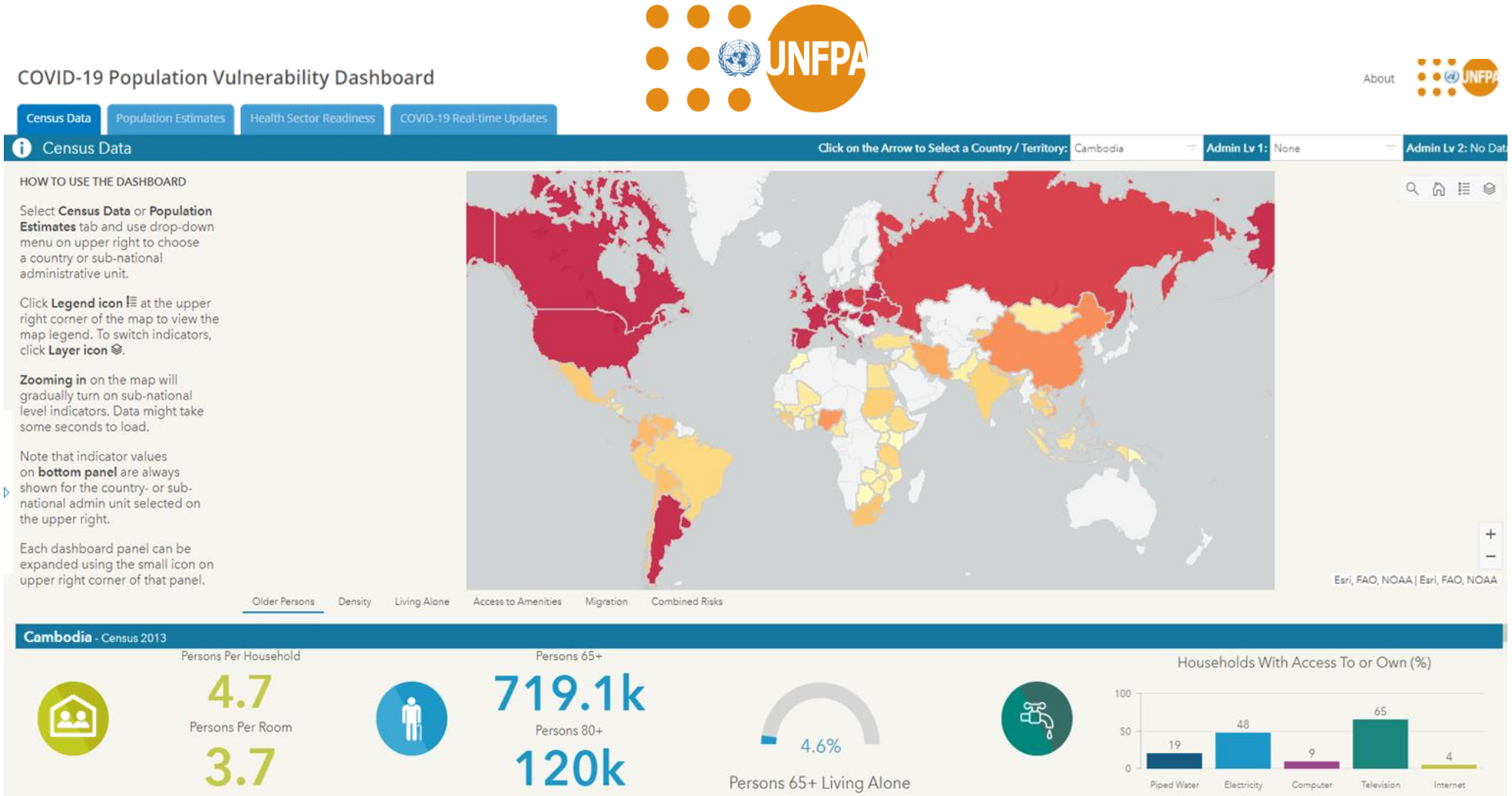
NSO OBJECTIVES and uses

Census DISSEMINATION via IPUMS

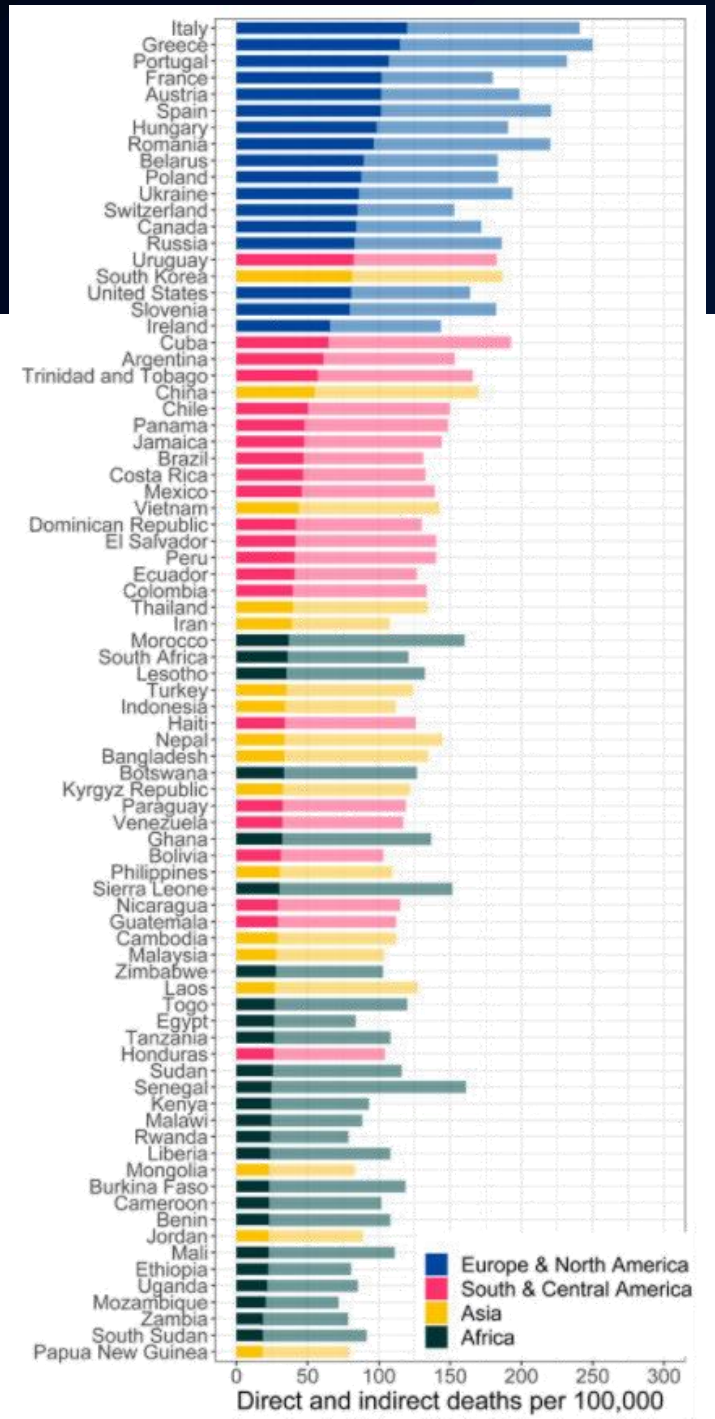
Long-term UTILITY of census microdata

- Adapting to COVID responses
- Responding to emergencies and vulnerability – WHO workforce
- Research and policies on ageing
- Disaggregation and study of small population
- Crosstabulation and investigation – SDGs
- Extending the power of other data and surveys
- Small Area Estimation (SAE)
- and more …….

Adapting to COVID Responses



Scholarly Research on COVID-19



National age and coresidence patterns shape COVID-19 vulnerability

Albert Esteve[a,b,1], Iñaki Permanyer[a], Diederik Boertien[a], and James W. Vaupel[c]

[a]Center for Demographic Studies, Centres de Recerca de Catalunya, 08193 Bellaterra, Spain; [b]Geography Department, Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain; and [c]Interdisciplinary Centre on Population Dynamics, University of Southern Denmark, 5000 Odense, Denmark

Edited by Douglas S. Massey, Princeton University, Princeton, NJ, and approved June 8, 2020 (received for review May 8, 2020)

Based on harmonized census data from 81 countries, we estimate how age and coresidence patterns shape the vulnerability of countries' populations to outbreaks of coronavirus disease 2019 (COVID-19). We estimate variation in deaths arising due to a simulated random infection of 10% of the population living in private households and subsequent within-household transmission of the virus. The age structures of European and North American countries increase their vulnerability to COVID-related deaths in general. The coresidence patterns of elderly persons in Africa and parts of Asia increase these countries' vulnerability to deaths induced by within-household transmission of COVID-19. Southern European countries, which have aged populations and relatively high levels of intergenerational coresidence, are, all else equal, the most vulnerable to outbreaks of COVID-19. In a second step, we estimate to what extent avoiding primary infections for specific age groups would prevent subsequent deaths due to within-household transmission of the virus. Preventing primary infections among the elderly is the most effective in countries with small households and little intergenerational coresidence, such as France, whereas confining younger age groups can have a greater impact in countries with large and intergenerational households, such as Bangladesh.

demography | households | COVID-19 | aging | global

The coronavirus disease 2019 (COVID-19) pandemic currently confronts nearly all of the world's countries. A growing number of governments are enforcing or recommending home quarantines to contain the spread of the virus. As the virus can be transmitted outside and within households, the effects of such measures will depend on the number of transmissions that take place outside and

infections). Lower rates of household transmission would reduce this number of indirect deaths proportionally. The direct effect depends on the age structure of the population; the indirect effect hinges on the size and age structure of households. Combined, they show how, all else equal, national age and coresidence patterns alter the vulnerability of a country to COVID-19 outbreaks.

The expected direct death rates per 100,000 individuals range from 19 in South Sudan to 120 in Italy. Together with Italy, three southern European countries—Greece, Portugal, and Spain—rank among the top six, followed by the rest of Europe and North America. Latin American countries form a homogenous cluster lower than the European and North American cluster. Asian countries spread all over the range, with estimates as high as 81 in South Korea and as low as 23 in Jordan. African countries tend to experience the lowest direct death rates. Where the elderly comprise a large portion of the population, the direct effect is high, whereas direct deaths are much lower where the elderly are vastly outnumbered by younger people.

Mortality due to intrahousehold contagion (right-hand segment of a bar in Fig. 1) does not follow the same order, because coresidence patterns differ widely across countries, even among those countries with similar age structures (4–7). The ratio between indirect and direct effects is a simple indicator of the importance of coresidence patterns, in particular, of the elderly, the most vulnerable group. For European and North American countries, direct and indirect deaths are roughly equal. In Latin America, indirect deaths could approximately double the number of direct deaths. The ratio between potential indirect and direct deaths in Asia ranges from 1.3 (South Korea) to 3.7 (Laos). In Africa, indirect deaths would be 3 to 4 times the number of direct

Emergencies & Understanding Vulnerabilities:
WHO example - Measuring Health Workforce

National Health Workforce Accounts (NHWA): Definition

A system by which countries progressively improve the availability, quality, and use of data on health workforce through monitoring of a set of indicators to support achievement of Universal Health Coverage, SDGs and other health objectives.

Documentation and tools available here:
www.who.int/hrh/statistics/nhwa/

WHO examples shared courtesy of Dr. Mathieu Boniol
Presentation for IPUMS International Pre-conference Workshop
ISI World Statistics Congress, Kuala Lumpur
August 18, 2019

Who Example: Measuring Health workforce

Group code			Occupational title
Sub	Minor	Unit	
22			**Health professionals**
	221		**Medical doctors**
		2211	Generalist medical practiti
		2212	Specialist medical practitio
	222		**Nursing and midwifery pr**
		2221	Nursing professionals
		2222	Midwifery professionals
	223		**Traditional and compleme**
		2230	Traditional and compleme
	224		**Paramedical practitioners**
		2240	Paramedical practitioners
	226		**Other health professionals**
		2261	Dentists
		2262	Pharmacists
		2263	Environmental and occupa
		2264	Physiotherapists
		2265	Dieticians and nutritionists
		2266	Audiologists and speech th
		2267	Optometrists and ophthalr
		2269	Health professionals not el

Group code			Occupational title
Sub	Minor	Unit	
32			**Health associate professionals**
	321		**Medical and pharmaceutical technicians**
		3211	Medical imaging and therapeutic equipment technicians
		3212	Medical and pathology laboratory technicians
		3213	Pharmaceutical technicians and assistants
		3214	Medical and dental prosthetic and related technicians
	322		**Nursing and midwifery associate professionals**
		3221	Nursing associate professionals
		3222	Midwifery associate
	323		**Traditional and con**
		3230	Traditional and com
	325		**Other health associ**
		3251	Dental assistants an
		3252	Medical records and
		3253	Community health v
		3254	Dispensing opticians
		3255	Physiotherapy techn
		3256	Medical assistants
		3257	Environmental and
		3258	Ambulance workers
		3259	Health associate pro

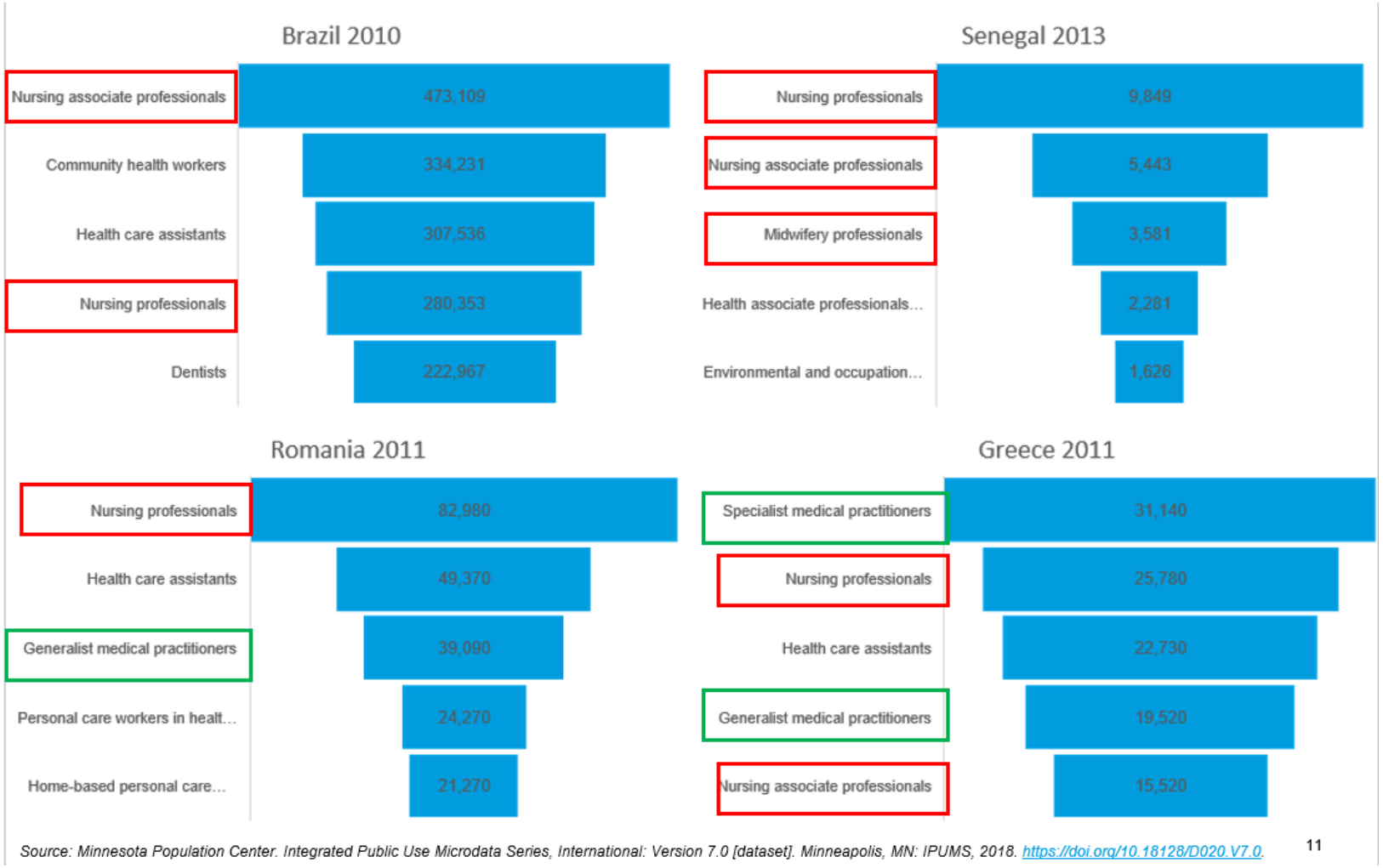
Group code			Occupational title
Sub	Minor	Unit	
53			**Personal care workers**
	532		Personal care workers in health services
		5321	Health care assistants
		5322	Home-based personal care workers
		5329	Personal care workers in health services not elsewhere classified
			Additional health-related unit groups
		1342	Health service managers
		1343	Aged care service managers
		2634	Psychologists
		2635	Social work and counselling professionals
		3344	Medical secretaries

Occupational information
ISCO International Classification
at 3-digit or 4-digit level
from IPUMS

Some info for 35 countries
but detail at preferred level
for only 14 countries

IPUMS

Who Example: Measuring Health workforce



Source: Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.0 [dataset]. Minneapolis, MN: IPUMS, 2018. https://doi.org/10.18128/D020.V7.0.

11

Top 5 health occupations for selected countries

Medical doctors

Nursing and midwifery personnel

Wide variability in medical professional availability and distribution

IPUMS

Who Example: Measuring Health workforce

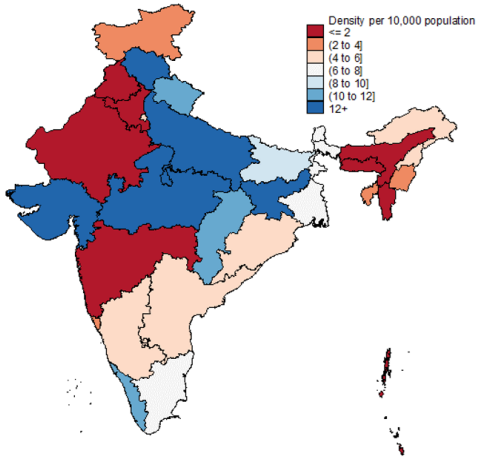
Use of census data

Subnational densities of nursing and midwifery personnel in India 2004-2009

World Health Organization

Density of Nursing and Midwifery personnel* in India 2004

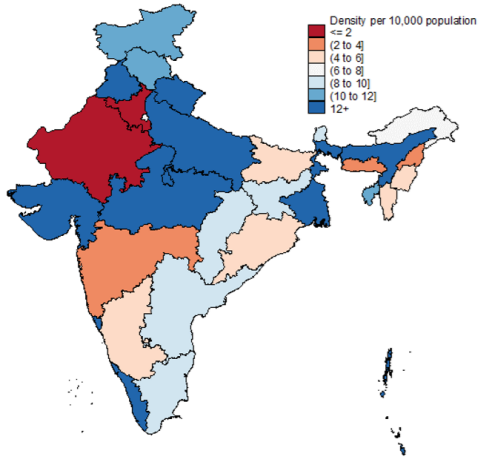
Employment survey, sample size 602,833



* Nurses, Midwives and health visitors

Density of Nursing and Midwifery personnel* in India 2009

Census socio economomic survey, sample size 560,741



* Professionals and associates

Source: Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.0 [dataset]. Minneapolis, MN: IPUMS, 2018. https://doi.org/10.18128/D020.V7.0. Data from the Ministry of Statistics and Programme Implementation, India

Use of census data

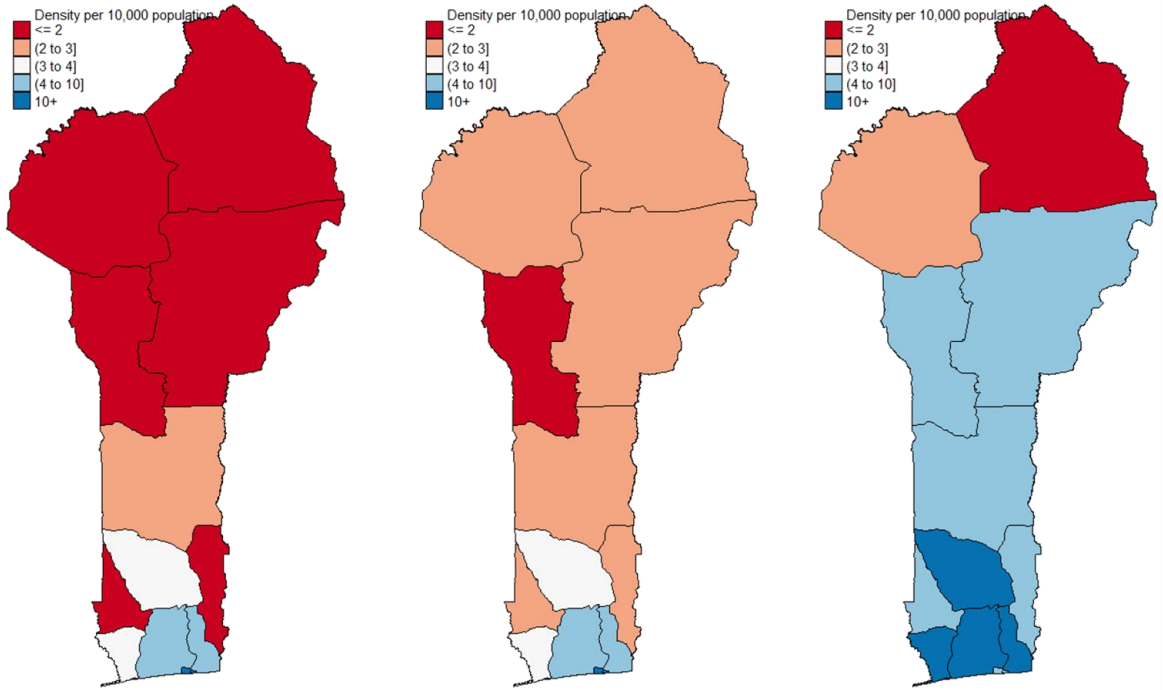
Subnational densities of selected occupation in Benin 2013

World Health Organization

Physicians

Nursing and Midwifery personnel

Traditional medicine

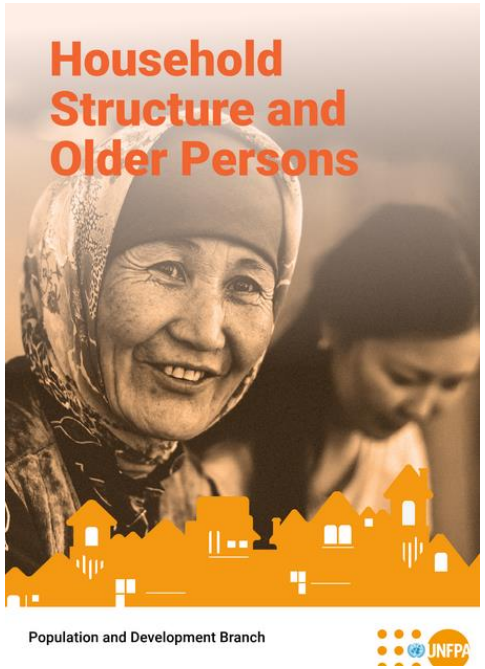


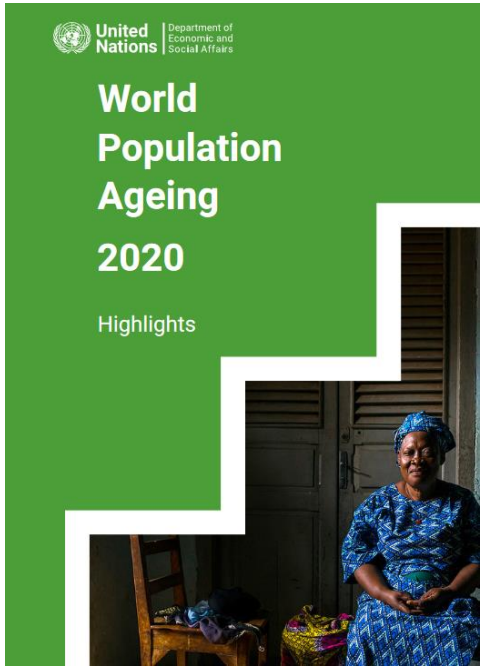
Source: Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.0 [dataset]. Minneapolis, MN: IPUMS, 2018.

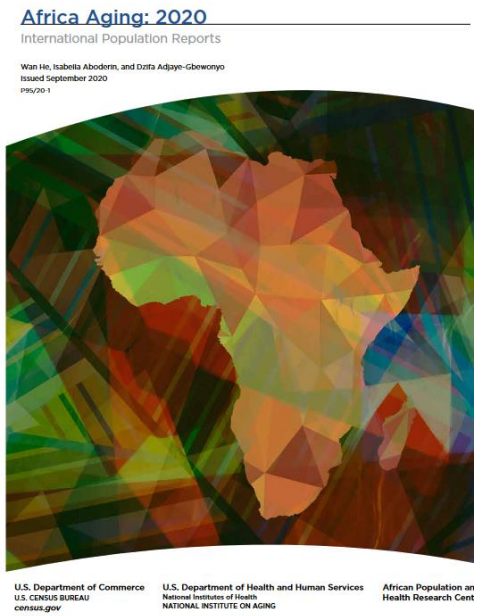
Source: Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.0 [dataset]. Minneapolis, MN: IPUMS, 2018. https://doi.org/10.18128/D020.V7.0. Data from the National Institute for Statistics and Economic Analysis, Benin

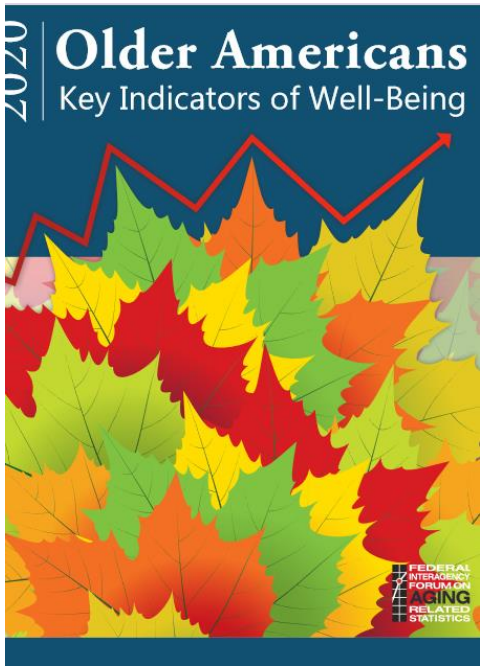
IPUMS

Research on Ageing





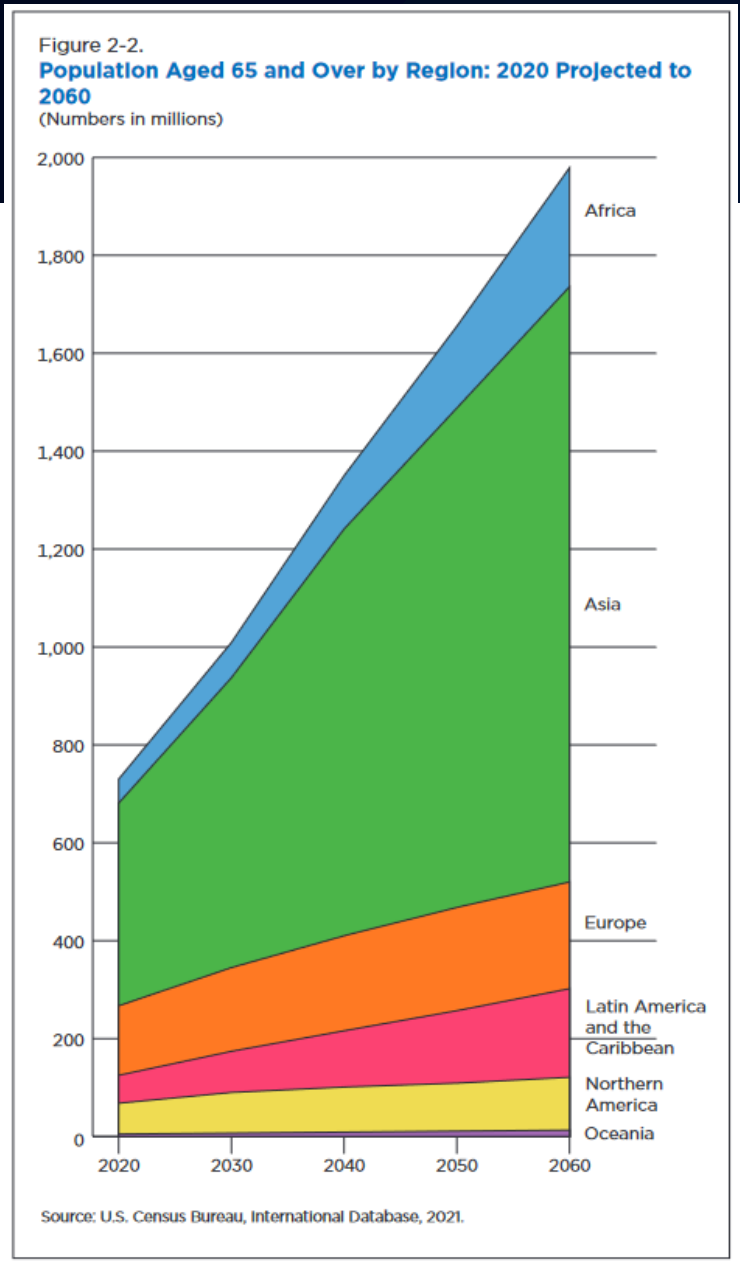


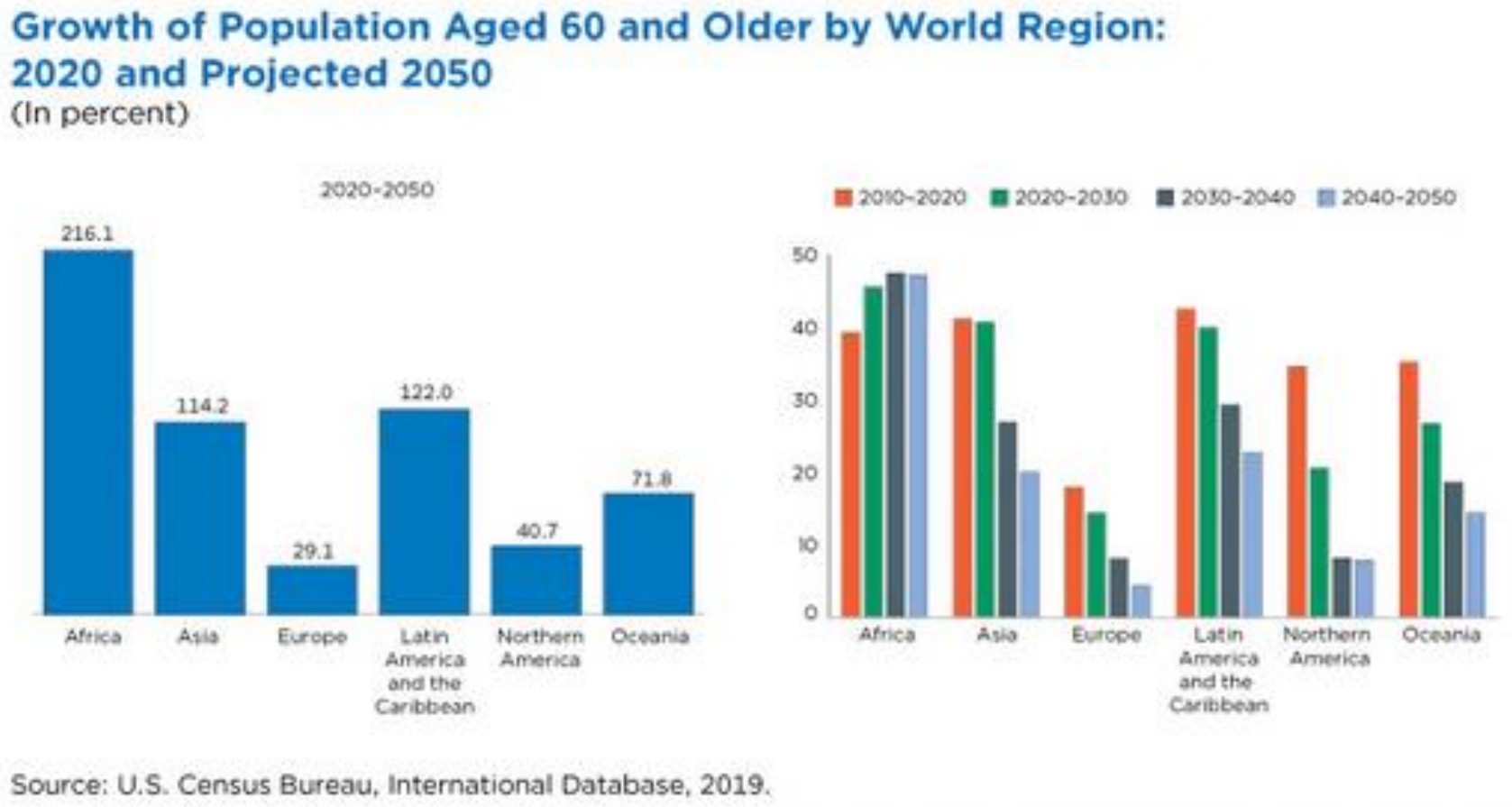


Publications by the United Nations, U. S. Census Bureau, and U.S. Federal Agencies on Global Aging Trends

IPUMS

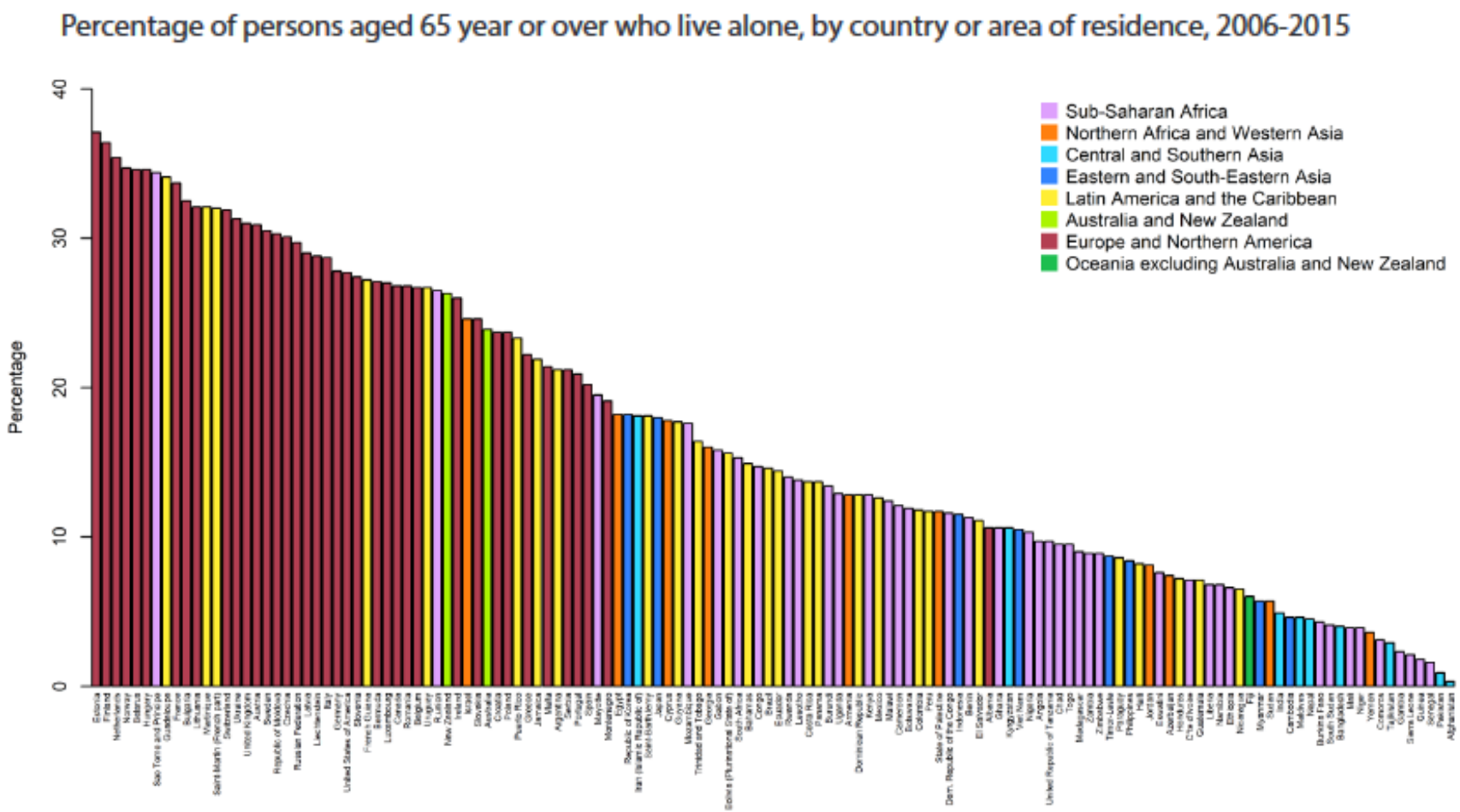
General Trends in Ageing





Africa Aging: 2020 (USCB, 2020)

Disaggregation and Study of Small Populations - Ageing

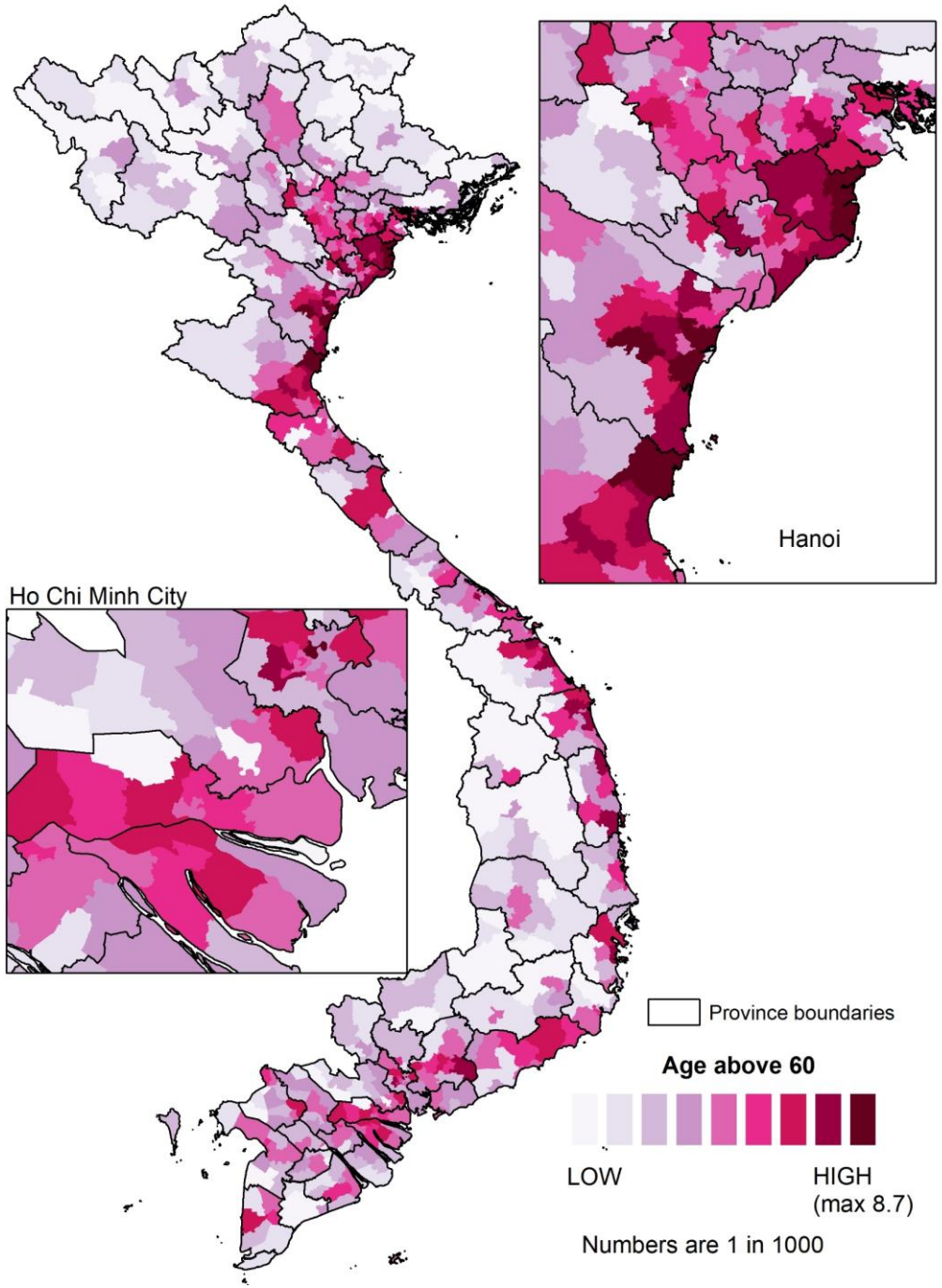


- ✓ Disaggregation
- ✓ Living arrangement
- ✓ Age (65+)
- ✓ Country

World Population Ageing, 2020. United Nations DESA, Population Division.

IPUMS

Small Populations - Ageing



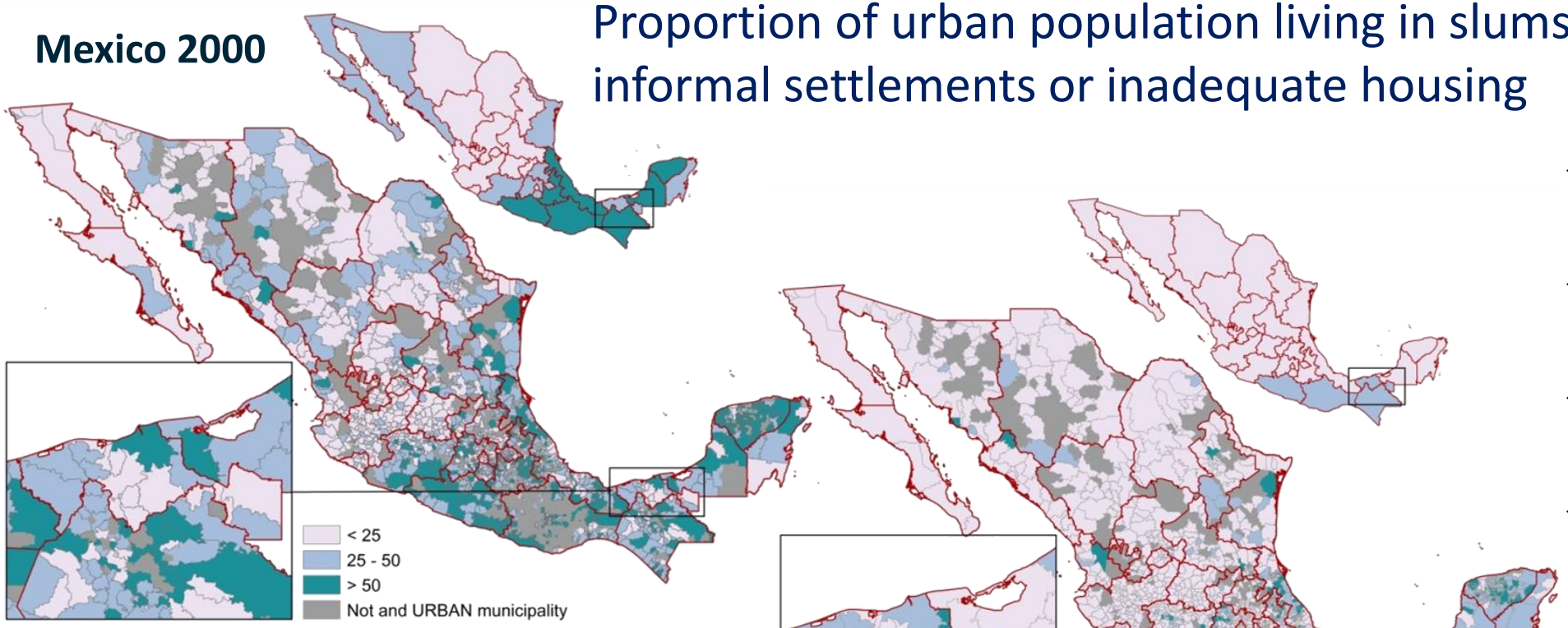
- ✓ Disaggregation
- ✓ Severe cognitive difficulty
- ✓ Age (60+)
- ✓ Districts (2nd administrative unit)

Adults 60+ who reported severe cognitive disability
Vietnam 2009

IPUMS

Disaggregation and Study of Small Populations - Slums

Mexico 2000



Proportion of urban population living in slums, informal settlements or inadequate housing

Mexico 2010

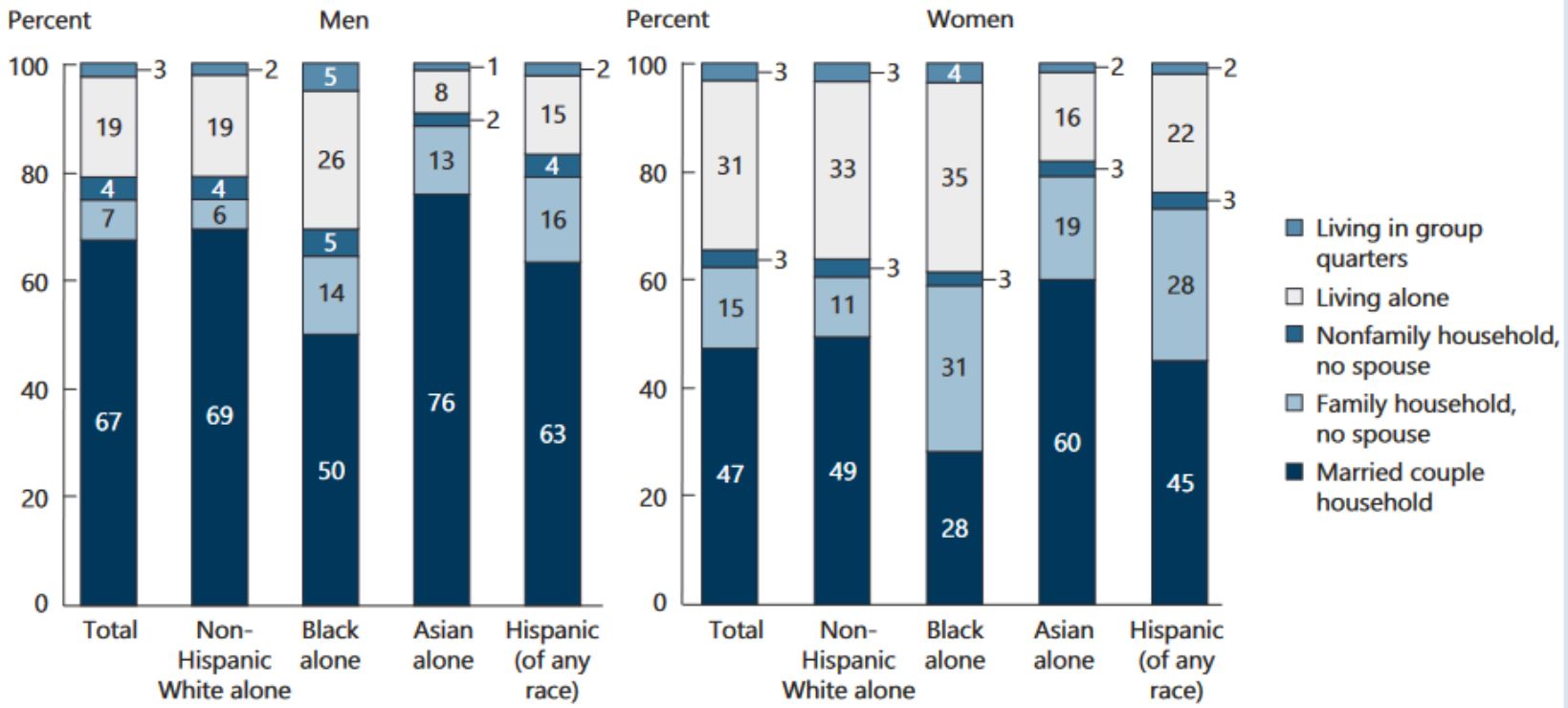
- ✓ Disaggregation
- ✓ Urban areas
- ✓ Municipalities
- ✓ Dwelling Characteristics

Slum household: Group of individuals living under the same roof lacking one or more of the following housing conditions: access to improved water, improved sanitation, durable dwelling, and sufficient living area.

IPUMS

Disaggregation and Study of Small Populations - Ageing

Living arrangements of the population age 65 and over, by sex and race and Hispanic origin, 2018



NOTE: The term "non-Hispanic White alone" is used to refer to people who reported being White and no other race and who are not Hispanic. The term "Black alone" is used to refer to people who reported being Black or African American and no other race, and the term "Asian alone" is used to refer to people who reported only Asian as their race. The use of single-race populations in this chart does not imply that this is the preferred method of presenting or analyzing data. The U.S. Census Bureau uses a variety of approaches.

Reference population: These data refer to the resident population.

SOURCE: U.S. Census Bureau, American Community Survey.

- ✓ Disaggregation
- ✓ Age (65+)
- ✓ Race
- ✓ Sex
- ✓ Ethnicity

IPUMS

Sustainable Development Goals

Census Microdata

110 of 169 Targets for 11 of the 17 Goals

Multidimentional crosstabulation and investigation

Household

- Household composition
- Dwelling ownership
- Household amenities
- Access to utilities
- Group quarters
- Subnational geography

Person

- Fertility
- Mortality
- Migration
- Education
- Labor-force participation
- Occupational structure
- Ethnicity
- Disability

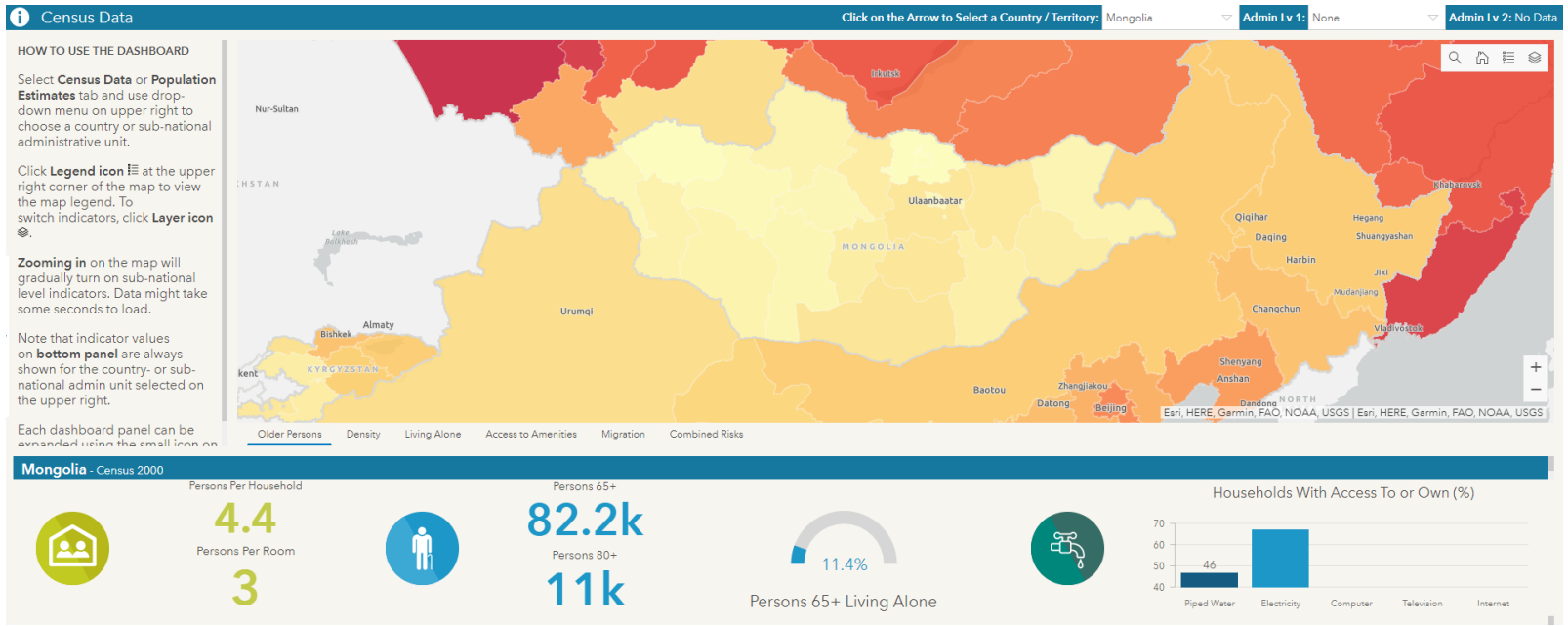
IPUMS supports the Sustainable Development Goals

IPUMS

SDG Reporting: Census Based Indicators

- Fertility
- Sex ratio
- Age composition
- Nuptiality
- Household living arrangements
- Migrant status
- Education level
- Labor force participation
- Disability status

United Nations Population Fund



IPUMS provided more than 8 million data cells (without geographic disaggregation)
Included cell suppression where appropriate
Provided statistical confidence intervals.

IPUMS INTERNATIONAL

IPUMS-International supports the Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS

SDG Indicators in IPUMS-International

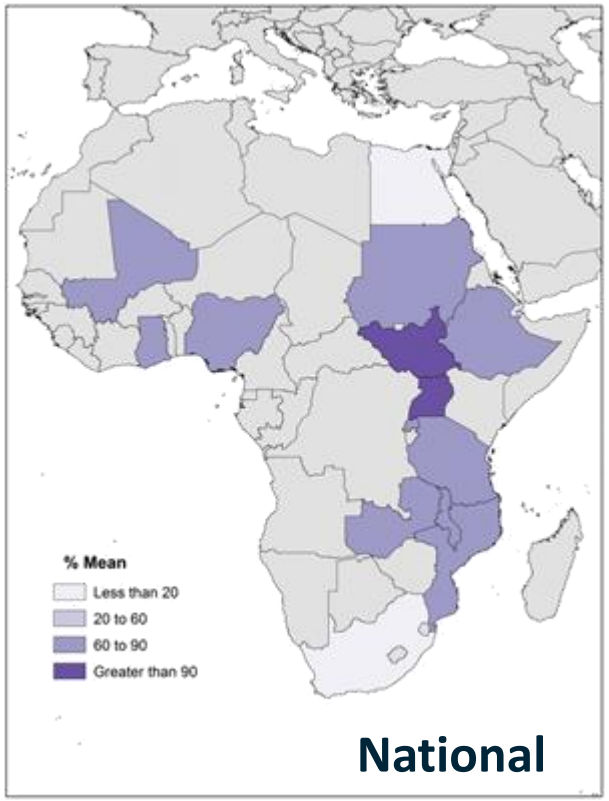
www.ipums.org

Number	Goal and Indicator
1.4.1	Proportion of population living in households with access to basic services
1.4.2*	Proportion of total adult population with secure tenure rights to land, with legally recognized documentation & who perceive their rights to land as secure, by sex and by type of tenure.
3.1.1*	Maternal mortality ratio
3.2.1*	Under-five mortality rate
3.7.1	Under-five mortality rate
3.7.2*	Adolescent birth rate (aged 10-14 yrs.; aged 15-19 yrs.) per 1,000 women in that age group
3.c.1*	Health worker density and distribution
4.1.1	Proportion of children and young people: (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
4.3.1	Participation rate of youth and adults in formal and non-formal education and training in the last 12 months, by sex
4.5.1	Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated
4.6.1	Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex
4.c.1	Percentage of teachers in: a) pre-primary; b) primary; c) lower secondary; and d) upper secondary education who have received at least the minimum organized teacher training (i.e. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country
5.3.1*	Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18
5.5.2	Proportion of women in managerial positions
5.a.1*	(a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights bearers of agricultural land, type of tenure
6.1.1*	Proportion of population using safely managed drinking water services
6.2.1*	Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water
6.3.1*	Proportion of wastewater safely treated
7.1.1*	Percentage of population with access to electricity
7.1.2*	Proportion of population with primary reliance on clean fuels and technology
8.3.1	Proportion of informal employment in non-agriculture employment, by sex
8.5.1	Average hourly earnings of female and male employees, by occupation, age and persons with disabilities
8.6.1	Proportion of youth (aged 15-24 years) not in education, employment or training
8.7.1	Proportion and number of children aged 5-17 years engaged in child labour, by sex and age
9.2.2	Manufacturing employment as a proportion of total employment
9.5.2	Researchers (in full-time equivalent) per million inhabitants
11.1.1*	Proportion of urban population living in slums, informal settlements, or inadequate housing
11.2.1*	Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

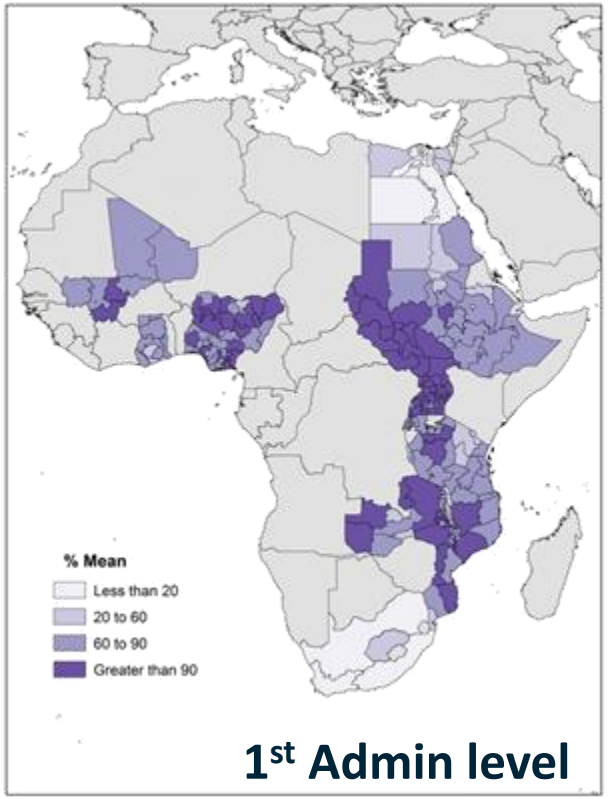
*census data mentioned explicitly in SDG metadata, otherwise censuses may be useful for reference or proxy

SDG Indicators with IPUMS

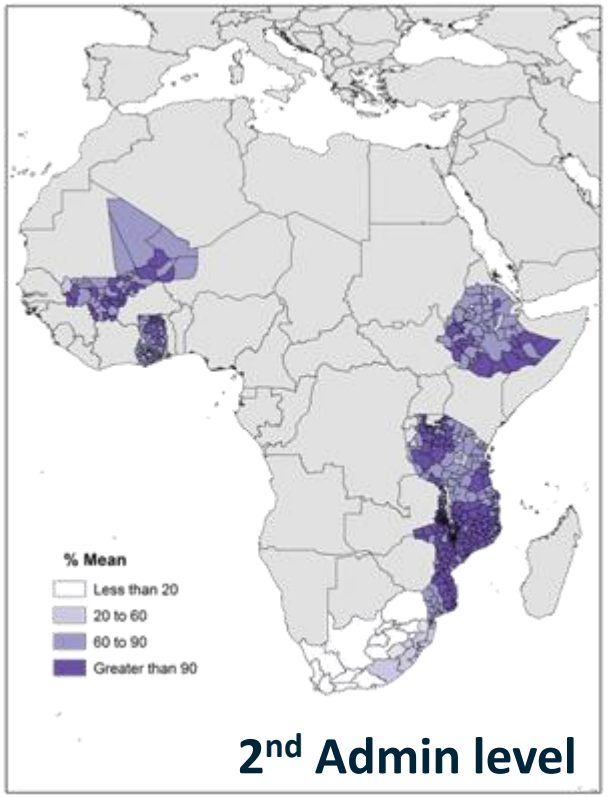
SDG: Target 1.4 Drinking Water



National



1st Admin level



2nd Admin level

Percentage of children, less than 5 years old and have no access to piped water

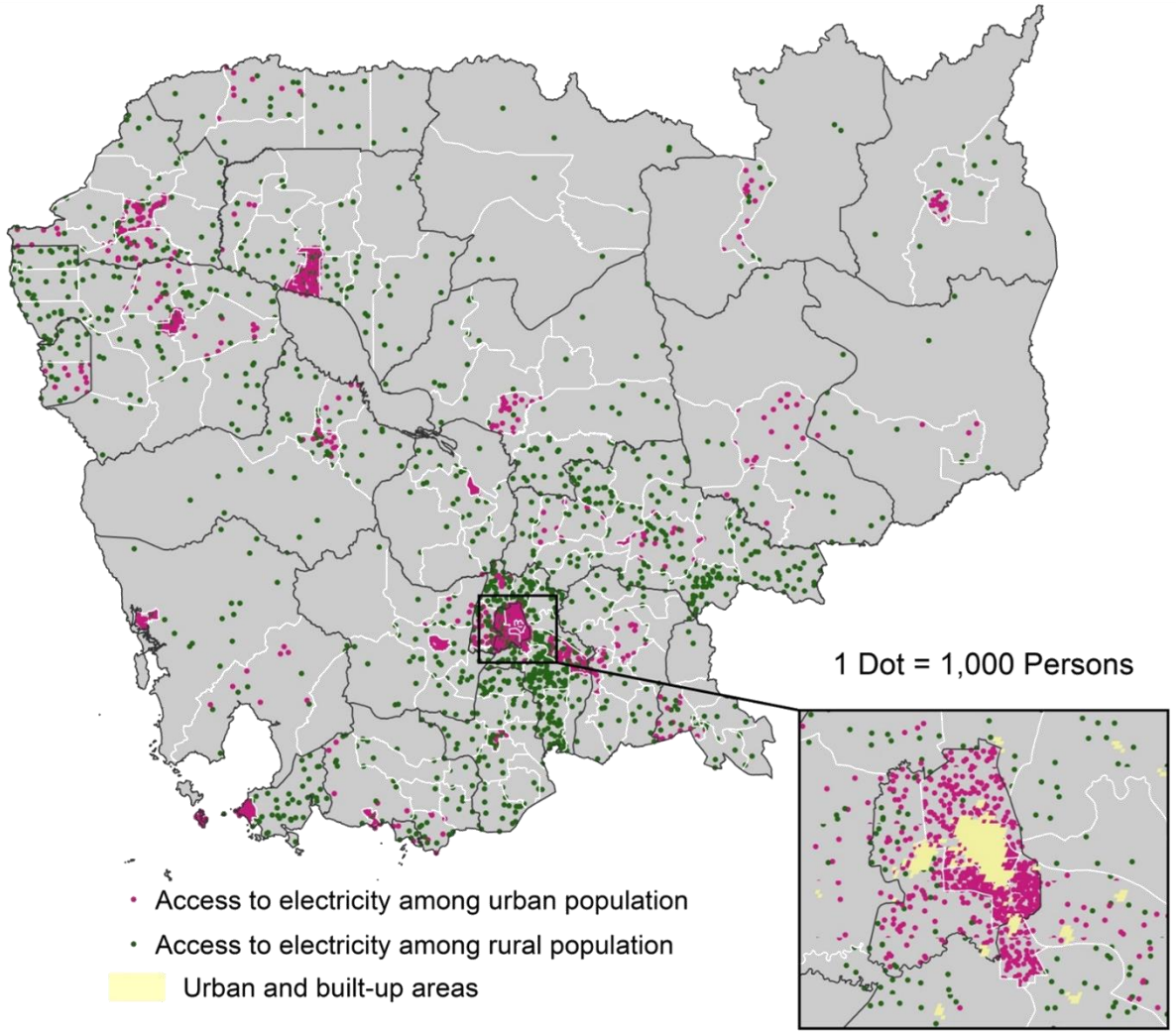
2010 Census round

"Improved" source includes, **PIPED WATER** into dwelling yard or plot; public taps or standpipes; boreholes or tubewells; protected dug wells; protected springs and rainwater

Input	IPUMS variable
Access to improved water	WATSUP
Age	AGE

IPUMS

SDG: Target 7.1.1 Electricity Access



Population with electricity access, Cambodia 2008

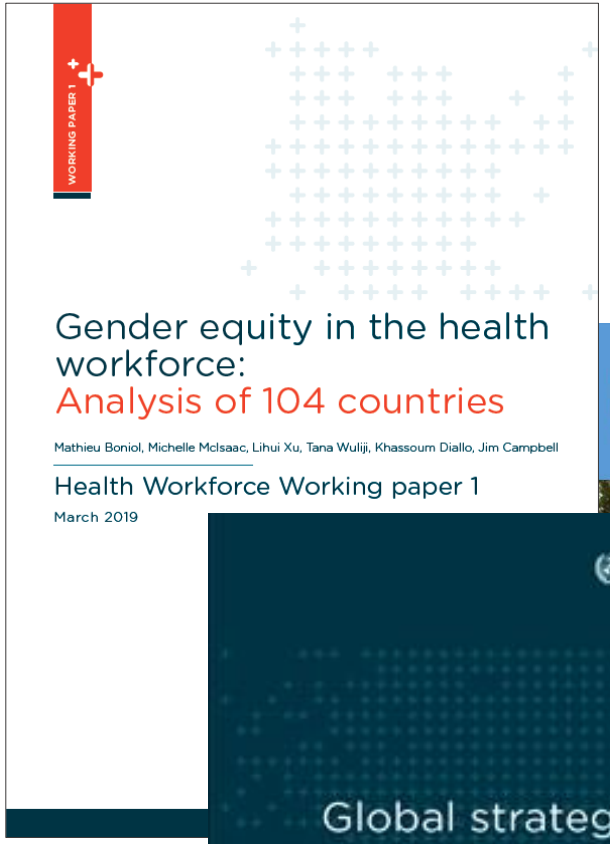
Urban	Percent	87.7
	Obs.	2,497,610
Rural	Percent	13.8
	Obs.	10,694,430

Percentage of population with access to electricity in urban and rural areas of Cambodia

Variables		IPUMS variable
	Electricity	ELECTRIC
	Urban or rural	URBAN

Cambodia, 2008

IPUMS


WORKING PAPER 1
Gender equity in the health workforce:
Analysis of 104 countries
Mathieu Boniol, Michelle McIsaac, Lihui Xu, Tana Wuliji, Khassoum Diallo, Jim Campbell
Health Workforce Working paper 1
March 2019

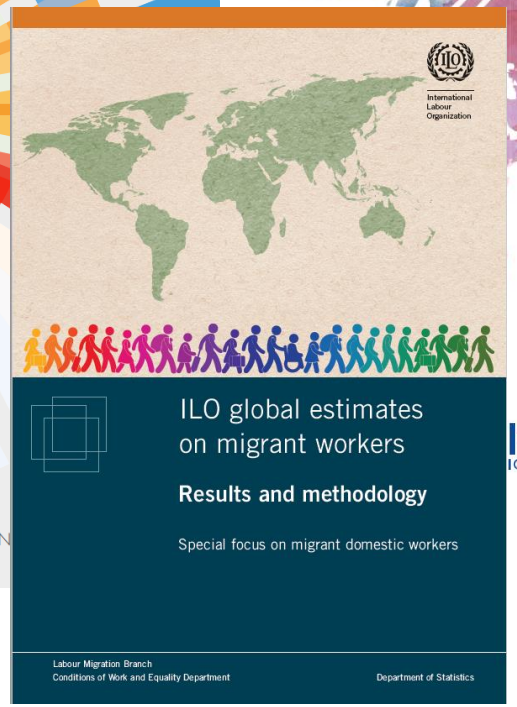

SUSTAINABLE DEVELOPMENT GOALS

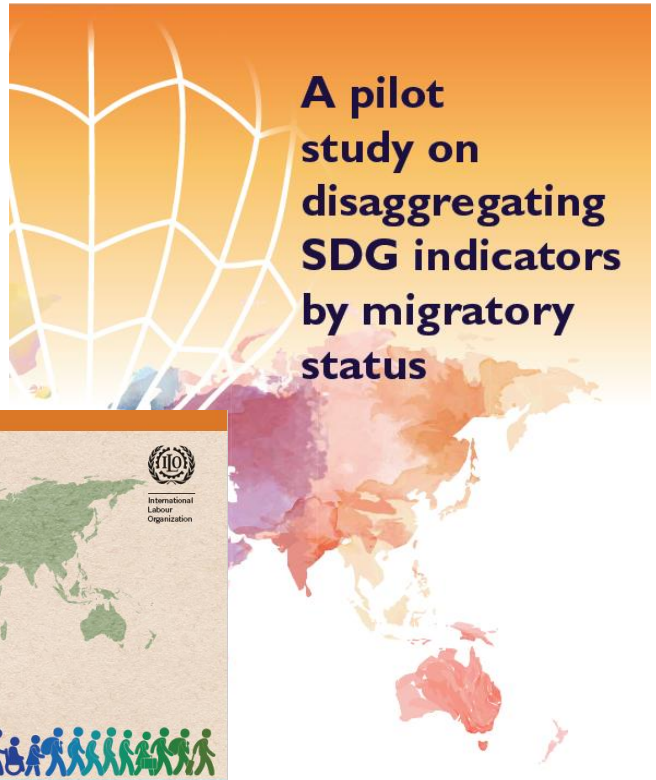

UNFPA Strategy for the 2020 Round of Population & Housing Censuses (2015-2024)
UNFPA


World Health Organization
Global strategy on human resources for health:
Workforce 2030


BECAUSE EVERYONE COUNTS

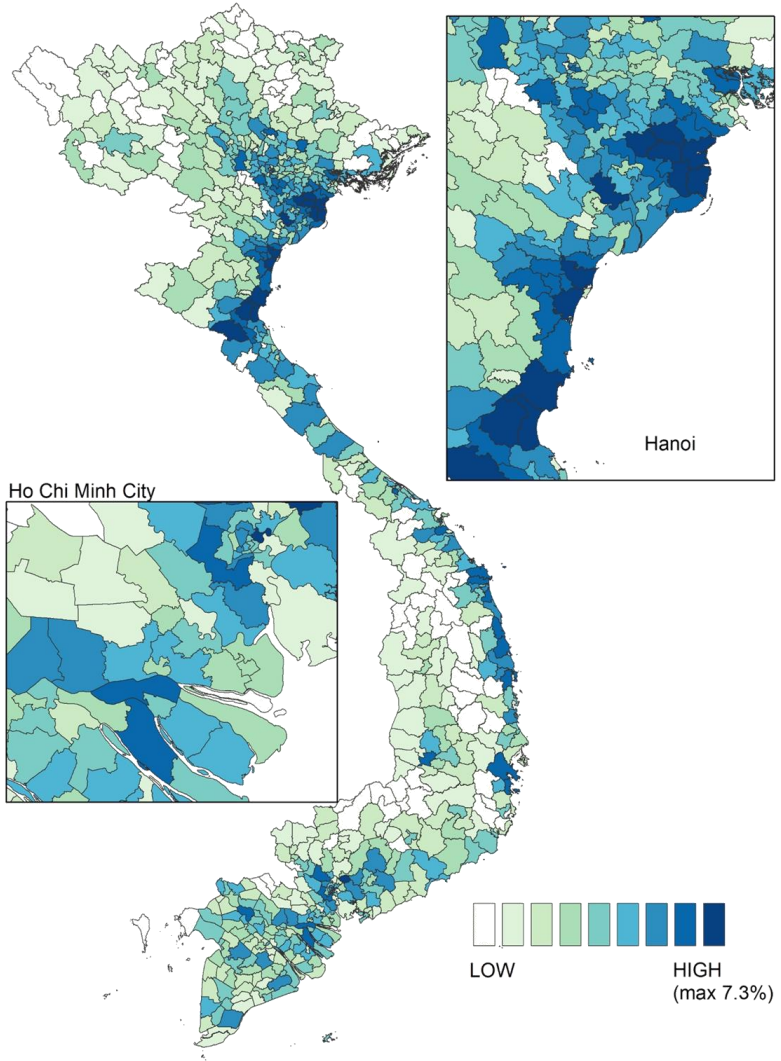

TURNING PROMISES INTO ACTION:
GENDER EQUALITY IN THE 2030 AGEN
FOR SUSTAINABLE DEVELOPMENT


International Labour Organization
ILO global estimates on migrant workers
Results and methodology
Special focus on migrant domestic workers
Labour Migration Branch
Conditions of Work and Equality Department
Department of Statistics


A pilot study on disaggregating SDG indicators by migratory status

IOM
IGRATION
IOM's Global Migration Data Analysis Centre
GMDAC

Extending the Power of Other Data Sources: Surveys



Surveys

- Rich topical coverage and detail
- Small sample sizes = limited disaggregation power

Small area Estimation

- Match survey to census on key characteristics
- Extend inference to smaller geographic areas

Adults 60+ who reported any kind of cognitive disability
Vietnam 2009

IPUMS

Small Area Estimation (SAE): Census + Surveys

Goal 1: End poverty in all its forms everywhere

Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day.

Indicator 1.1.1: Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Target 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

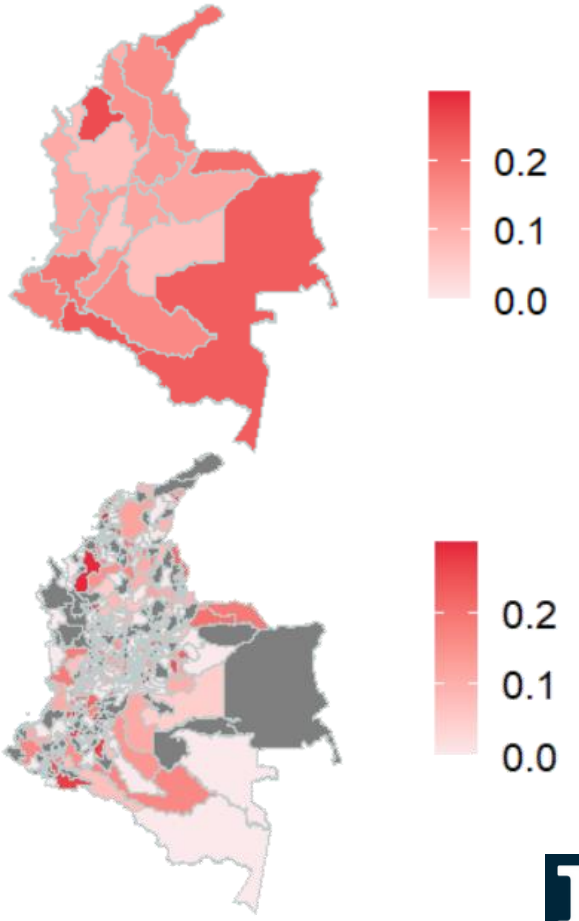
Indicator 8.5.2: Unemployment rate, by sex, age and persons with disabilities

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

Indicator 11.2.1: Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

Survey size limits direct estimation (e.g., Colombia from UN SAE Toolkit)



IPUMS

The UN Statistics SAE Toolkit

UN Statistics Wiki | Spaces | Blogs | Search | Log in

SAE4SDG

SPACE SHORTCUTS

SAE4SDG

PAGE TREE

- Why is SAE important for SDG data
- Producing SAE
- Communicating SAE methods and r
- From SAE experiment to production
- SAE practices
- Software packages
- SAE key readings
- Training materials
- SAE projects
- FAQ
- References
- Acknowledgement

Pages

SAE4SDG

Created by UNSD Clarence Lio, last modified by Haoyi Chen on Apr 08, 2022

https://unstats.un.org/wiki/display/SAE4SDG/

Inter-Agency and Expert Group on SDG Indicators

United Nations | DESA Statistics Division

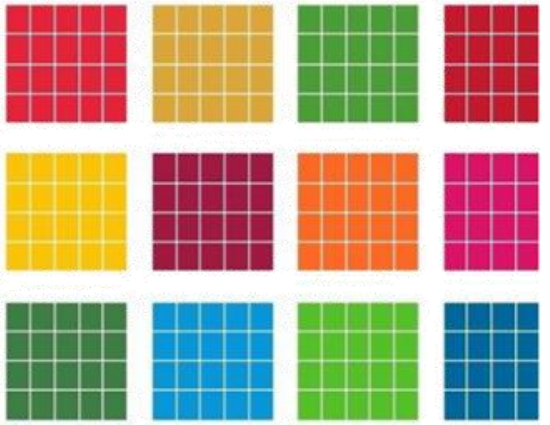
THE INTER-SECRETARIAT WORKING GROUP ON HOUSEHOLD SURVEYS

Welcome to the Toolkit on Using Small Area Estimation for SDGs!

In committing to the realization of the 2030 Agenda for Sustainable Development, Member States recognized that the dignity of the individuals is fundamental and that the Agenda's Goals and targets should be met for all nations and people and for all segments of society. Ensuring that these commitments are translated into effective action requires a precise understanding of the target populations and progress made in addressing their particular priorities.

To properly measure this, statistics need to be presented for different population groups and geographical areas. The Sustainable Development Goal (SDG) indicator framework has included an overarching principle of data disaggregation: SDG indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics.

As sound statistical methods are vital to overcome this challenge, Small Area Estimation (SAE) constitutes an important topic in the way forward. It covers a variety of methods used to produce survey based estimates for geographical areas or domains of study in which the sample sizes are too small, or even absent, to provide valid estimates. In order to obtain reliable estimates, additional datasets are generally brought to bear upon the process through a modelling procedure.



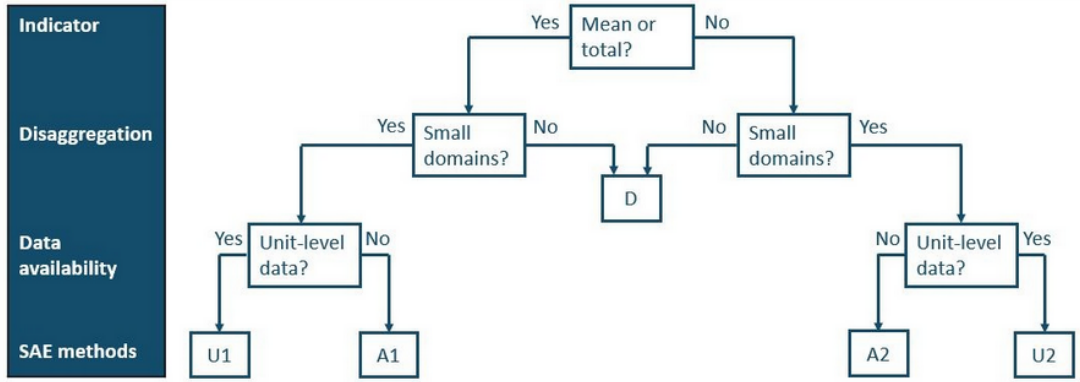
IPUMS

The UN Statistics SAE Toolkit

Many resources available

Methodology
Training materials
References
Practical exercises
Case studies

Initial specification depending on input factors



D: Direct estimation approaches.

A1: The basic area-level model and its extensions for means and totals including, e.g., the spatial-correlation and robust models.

A2: Area-level models for other indicators such as ratios. These can either use transformations or a non-linear model specification.

U1: The basic unit-level model and its extensions for means and totals, including robust models.

U2: Extended unit-level models such as the ELL and the EBP approaches.

Practical exercise

The practical exercise in these guidelines will perform the analysis of three indicators for the SDGs 1, 7 and 8 with different input factors and estimation approaches. In this part, the analysis and potential adaptations are described. The examples are chosen such that the application can be transferred to a wide range of SDG indicators.

1.1.1/1.2.1 Proportion of the population living below the international/national poverty line

R Code

› User needs
› Data availability
› Specification

Analysis & Adaptation

To estimate the regional distribution of the proportion of the population living below a poverty line, the specification based on the input factors leads to the EBP. To implement the analysis, a software package needs to be chosen. For this example, the R packages *emdi* and *maptools* are used. Please note that the proportion of the population living below a poverty line is defined as the head count ratio (HCR) in the package *emdi*. Thus, the proportion will be named as HCR in the following.

Goal 1. End poverty in all its forms everywhere

Case studies

Poverty mapping is one of most common applications in small area estimation. Many examples are ava
national poverty line (indicators 1.1.1 and 1.2.1).

World Bank applications

The World Bank proposed a poverty mapping process that was conducted in several countries. Based o
estimates such as the Foster-Greer-Thorbecke poverty estimates and the Gini coefficient were derived.

The report More than a pretty picture - Using poverty maps to design better policies and interventions
Bolivia, Bulgaria, Cambodia, Yunnan Province (China), Ecuador, Indonesia, Mexico, Morocco, Sri
and also lessons learned. Hence this can be a good starting point for a new poverty mapping study.

In 2005, the World Bank provided technical assistance to the **Philippine** national statistical system to le
and city-level poverty statistics. The Philippine Statistics Authority conducts the Family Income and Exp
statistics in the country, every three years. The small area estimation technique used in the Philippines i

https://unstats.un.org/wiki/display/SAE4SDG/

IPUMS

Extending the Power of Other Data

Vol. 125, No. 9 | Research

Changes in Transportation-Related Air Pollution Exposures by Race-Ethnicity and Socioeconomic Status: Outdoor Nitrogen Dioxide in the United States in 2000 and 2010

Lara P. Clark, Dylan B. Millet, and Julian D. Marshall

Published: 14 September 2017 | CID: 097012 | https://doi.org/10.1289/EHP959 | Cited by: 8

Estimated Changes in NO_2 Environmental Injustice Metrics

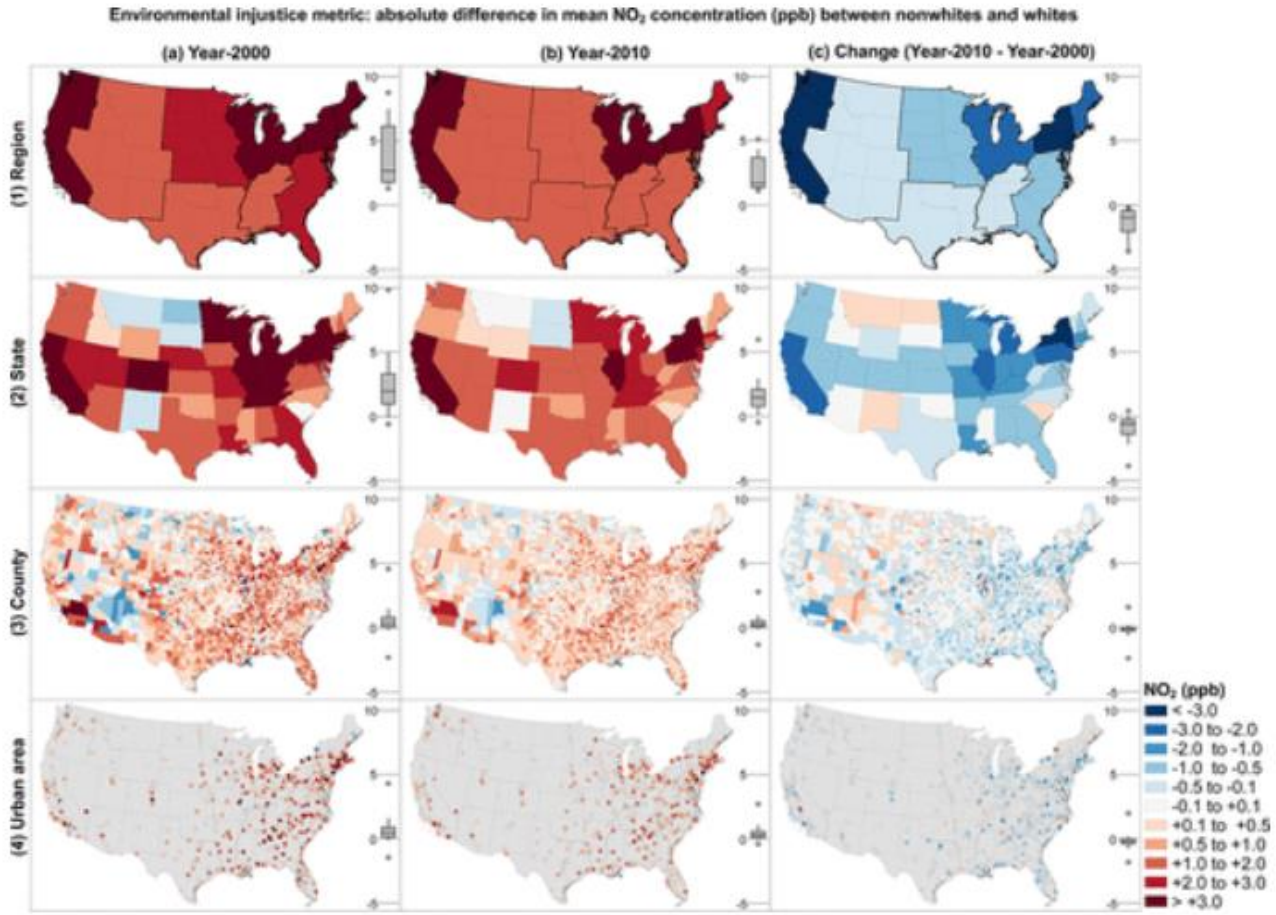
Nationally, on an absolute basis, environmental injustice declined from 2000 to 2010. The nonwhite–white NO_2 disparity decreased from 5.0 ppb in 2000 to 2.9 ppb in 2010 (−2.1 ppb [−42%]; Table 2). However, nationally, on a relative basis, environmental injustice persisted. Nonwhites remained more exposed to outdoor NO_2 air pollution than whites on average in 2010, and there was little change in the relative NO_2 difference between nonwhites and whites between 2000 and 2010: The nonwhite–white NO_2 difference was 33% in 2000 (nonwhites were 40% more exposed than whites) and 31% in 2010 (nonwhites were 37% more exposed than whites).

Table 2 Estimated population-weighted mean NO_2 concentrations (ppb) for nonwhites and whites: year 2000, year 2010, and change over time (year 2010–year 2000).

Race-ethnicity	2000	2010	Change: 2010–2000
Nonwhites[a]	17.6	10.7	−6.9 (−39%)
Whites[b]	12.6	7.8	−4.7 (−38%)
Difference: nonwhites–whites	5.0 (33%)	2.9 (31%)	−2.1 (−42%)

[a]Nonwhites includes all race-ethnicity minority groups (i.e., people who reported any race-ethnicity other than white alone, non-Hispanic).

[b]Whites includes people who reported white alone, non-Hispanic race-ethnicity.



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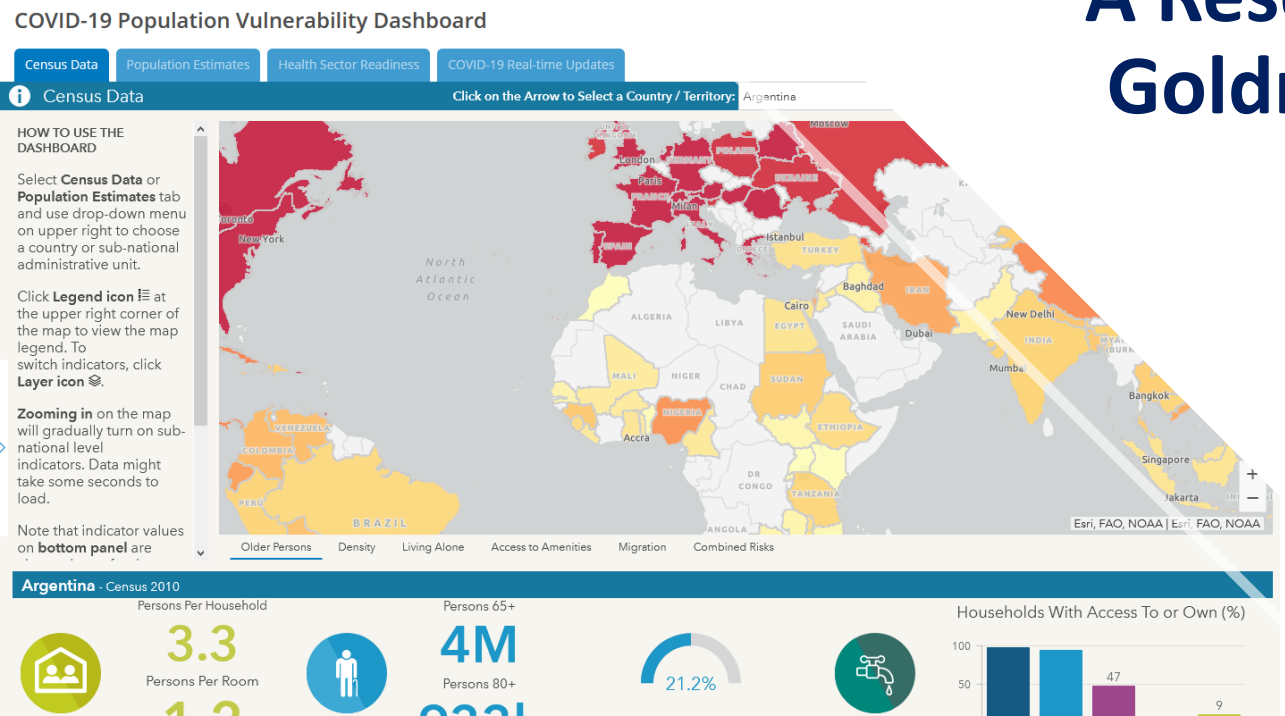

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The 2020 Census Round: 2015-2024 (1)

- Some countries already conducted a population census as part of the 2020 round:
  - 2015: Japan, Kiribati, Republic of Korea, Lao PDR, Timor Leste
  - 2016: Australia, Iran, Samoa, Tonga
  - 2017: Bhutan, Fiji, Pakistan
  - 2018: New Zealand
  - 2019: Azerbaijan, Cambodia, DPR Korea, Solomon Islands, Vietnam
  - 2020: Mongolia

-- 2020: Philippines, China, Indonesia, Malaysia
--2021: Nepal, Turkey
--2022: Pakistan, Armenia, Bangladesh, Maldives
-- 2023: Georgia, India,
-- 2024: Myanmar

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