



Istituto HERA  
**U.M.R.**  
Unità di Medicina della Riproduzione

**Convegno Nazionale  
Fertilità di Coppia:  
“Ri”Parliamone**

# **NATALITA' E FERTILITA': cosa è cambiato negli ultimi decenni**

**A. GUGLIELMINO**



**MD**  
**Responsabile,  
Direttore Sanitario U.M.R.  
Presidente S.I.R.U**

**18 OTTOBRE 2019**

**Comacchio (FE)  
18 ottobre 2019  
Palazzo Bellini**



Istituto HERA  
U.M.R.  
Unità di Medicina della Riprodu-



**I have no personal or financial interests to declare.**

**I have no financial support from an industry source at the current presentation.**



Review

## Fertility and infertility: Definition and epidemiology

Mélodie Vander Borcht<sup>b</sup>, Christine Wyns<sup>i</sup>

👤 **Worldwide >186 million people suffer from infertility**, the majority being residents of developing countries.

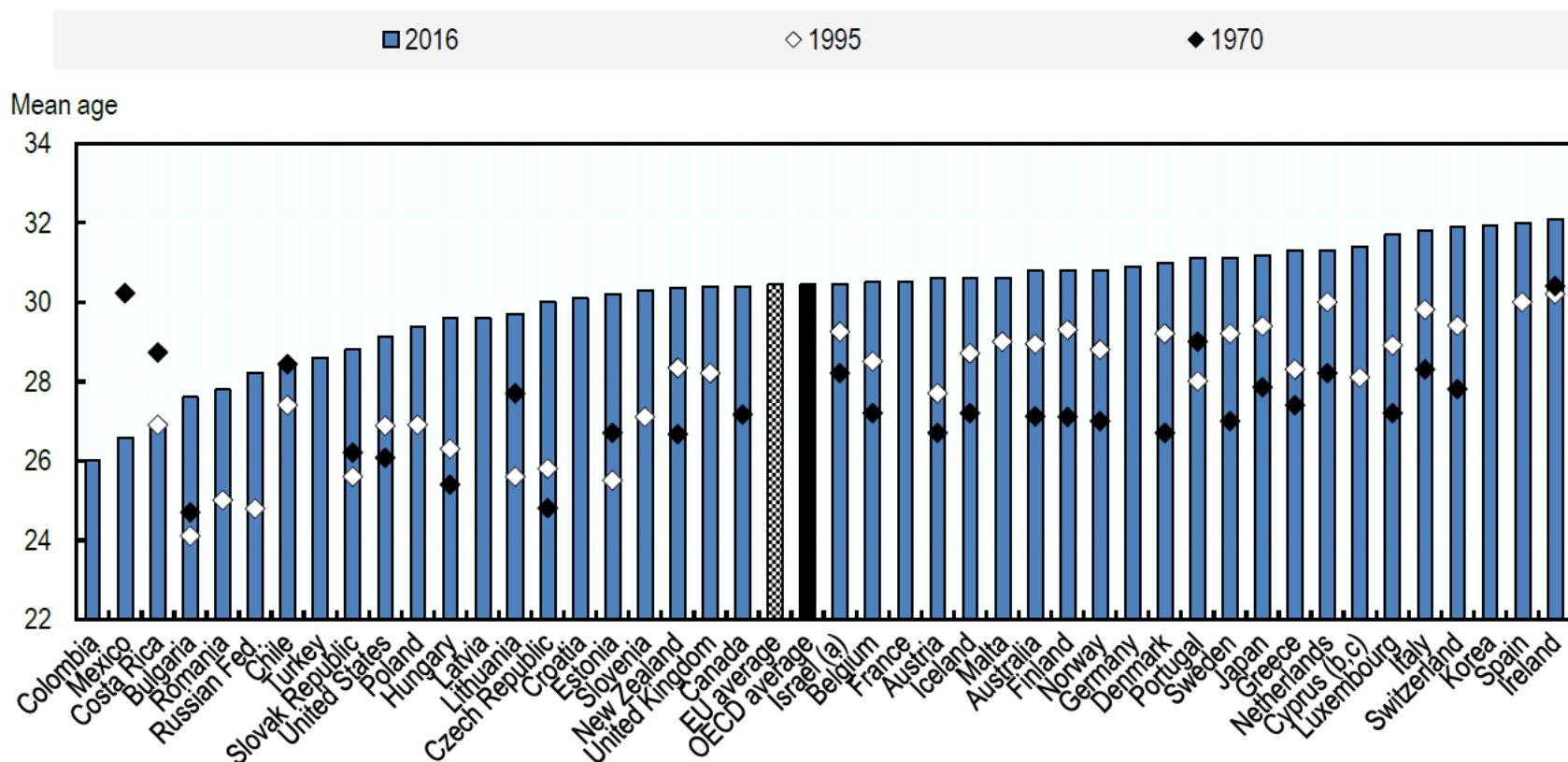
👤 **Infertility affect between 8 and 12% of reproductive-aged couples worldwide.**

👤 While the most powerful negative predictive factor of fertility is increasing women's age at conception, other factors including lifestyle and environmental factors are believed to play an increasing role.



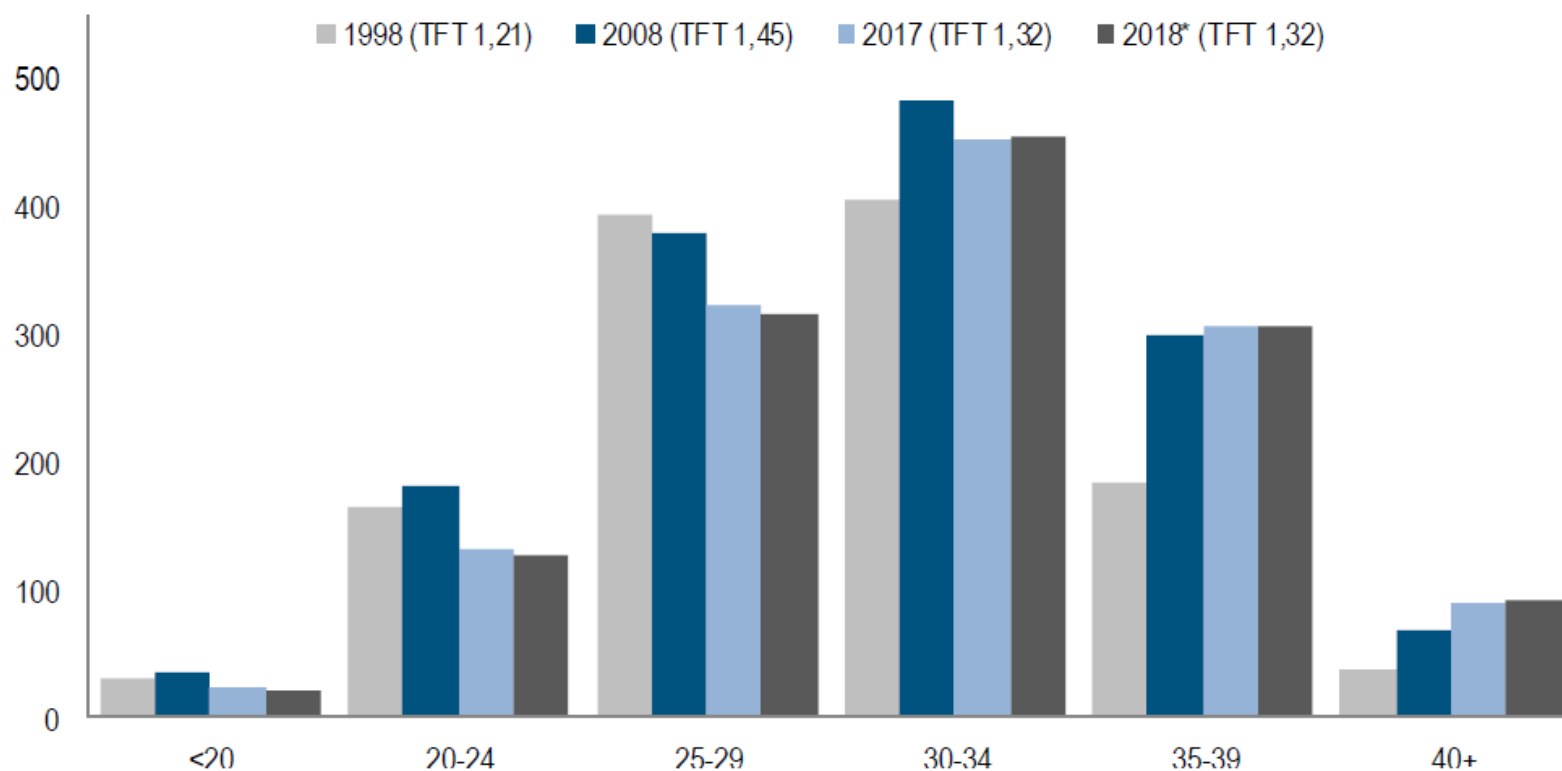
### SF2.3: Age of mothers at childbirth and age-specific fertility

Chart SF2.3.A. Mean age of women at birth, 1970, 1995 and 2016 or latest available



# INDICATORI DEMOGRAFICI

**FIGURA 2. TASSI SPECIFICI DI FECONDITÀ CUMULATI PER CLASSE DI ETÀ DELLA MADRE, ITALIA.**  
 Anni 1998, 2008, 2017 e 2018\*, valori per mille



(\*) 2018 stima, TFT=tasso di fecondità totale o numero medio di figli per donna.

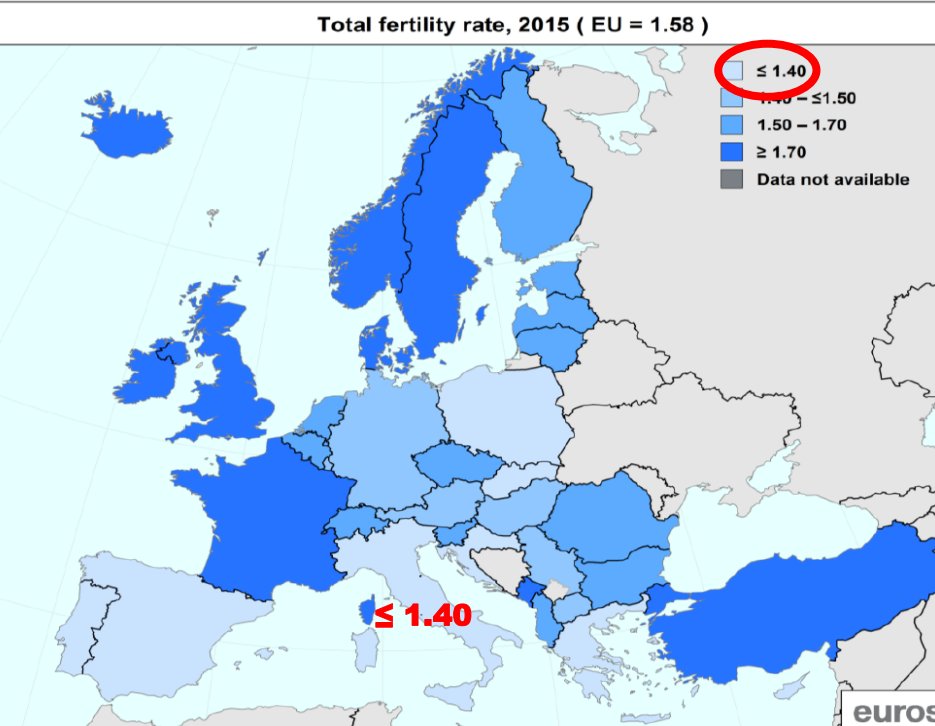
Births and fertility

# Over 5 million babies born in the EU in 2015

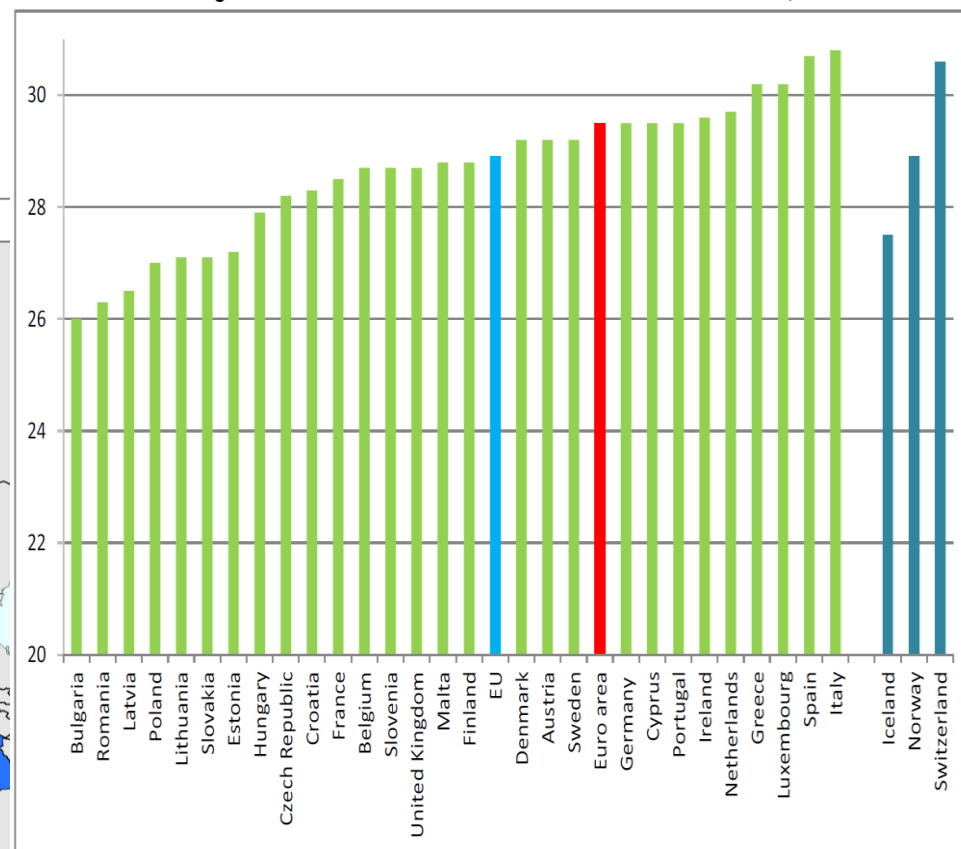
Women first became mothers at almost 29 on average

**BACKGROUND**

On average in the EU, women who gave birth to their first child in 2015 were aged nearly 29 (28.9 years). Across Member States, first time mothers were the youngest in **Bulgaria** and the oldest in **Italy**.



Mean age of women at birth of first child in the EU Member States, 2015





# SITUAZIONE DI DENATALITA' IN ITALIA

## BACKGROUND

### PROSPETTO 1. PRINCIPALI CARATTERISTICHE E INDICATORI DI NATALITÀ, FECONDITÀ E NUZIALITÀ.

Anni 2008, 2010 e 2014-2017

	2008	2010	2014	2015	2016	2017	2018
Nati in totale	576.659	561.944	502.596	485.780	473.438	458.151	449.000
Tassi di fecondità totale	1,45	1,46	1,37	1,35	1,34	1,32	
Età media al parto totale donne	31,1	31,3	31,5	31,7	31,8	31,9	32
Tassi di fecondità donne italiane	1,34	1,34	1,29	1,27	1,26	1,24	

Il 50% delle donne fra i 19 e i 49 anni è senza figli

--128.000 (--22,2%)

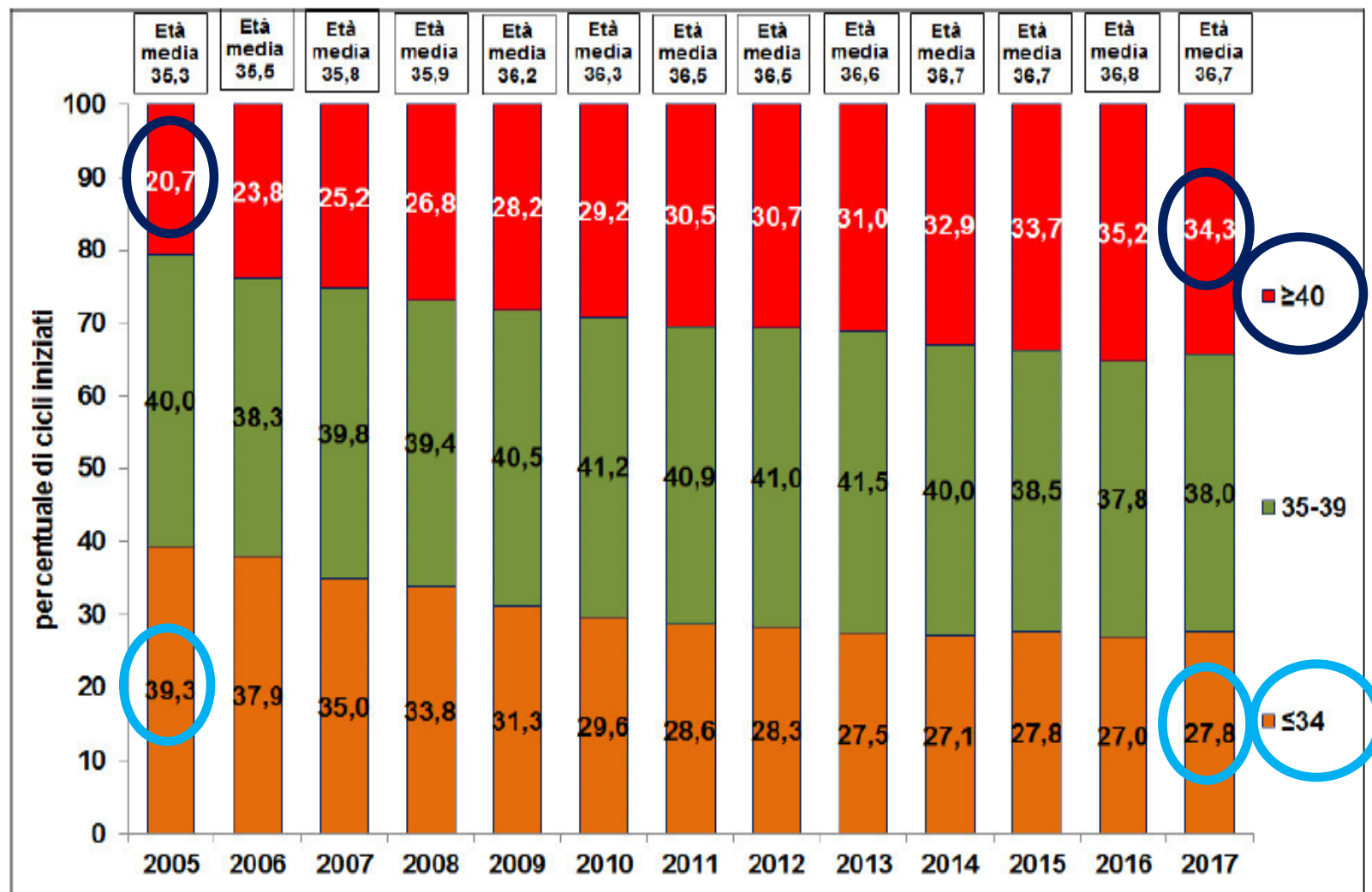
### PROSPETTO 5. NUMERO MEDIO DI FIGLI PER DONNA (TFT) ED ETÀ MEDIA DEI GENITORI ALLA NASCITA PER CITTADINANZA DELLA MADRE PER REGIONE. Anni 1995 e 2017

REGIONI	Numero medio di figli per donna				Età media delle donne				Età media degli uomini
	2017		1995		2017		1995		2017
	Italiane	Straniere	Totale residenti	Totale residenti	Italiane	Straniere	Totale residenti	Totale residenti	Totale residenti
Basilicata	1,15	1,91	1,19	1,31	33,1	28,2	32,7	29,6	36,5
Calabria	1,25	1,77	1,28	1,40	31,9	28,2	31,6	28,9	35,5
Sicilia	1,32	2,13	1,35	1,49	31,3	28,0	31,1	28,6	34,7
Sardegna	1,04	1,70	1,06	1,06	32,8	28,4	32,5	30,5	36,2
Nord-ovest	1,23	2,10	1,37	1,05	32,9	29,1	32,0	30,7	35,6
Nord-est	1,23	2,12	1,38	1,05	32,8	29,1	31,9	30,5	35,6
Centro	1,20	1,72	1,27	1,07	33,1	28,8	32,3	30,4	35,8
Sud	1,27	1,86	1,29	1,42	31,9	28,3	31,7	29,0	35,2
Isole	1,26	2,04	1,29	1,40	31,5	28,1	31,3	29,1	34,9
ITALIA	1,24	1,98	1,32	1,19	32,5	28,9	31,9	29,8	35,4

Italia e ripartizioni	Donne senza figli
<b>Donne nate nel 1950</b>	
Nord-ovest	9,4
Nord-est	10,5
Centro	7,5
Sud	14,9
Isole	15,2
ITALIA	11,1
<b>Donne nate nel 1960</b>	
Nord-ovest	16,3
Nord-est	16,3
Centro	12,5
Sud	11,6
Isole	11,3
ITALIA	13,4
<b>Donne nate nel 1977 (a)</b>	
Nord-ovest	23,0
Nord-est	23,9
Centro	22,3
Sud	22,3
Isole	21,8
ITALIA	22,0

## TREND ETA' DELLE PAZIENTI

Figura 3: Distribuzione dei cicli a fresco (FIVET-ICSI) senza donazione di gameti per classi di età delle pazienti. Anni 2005-2017



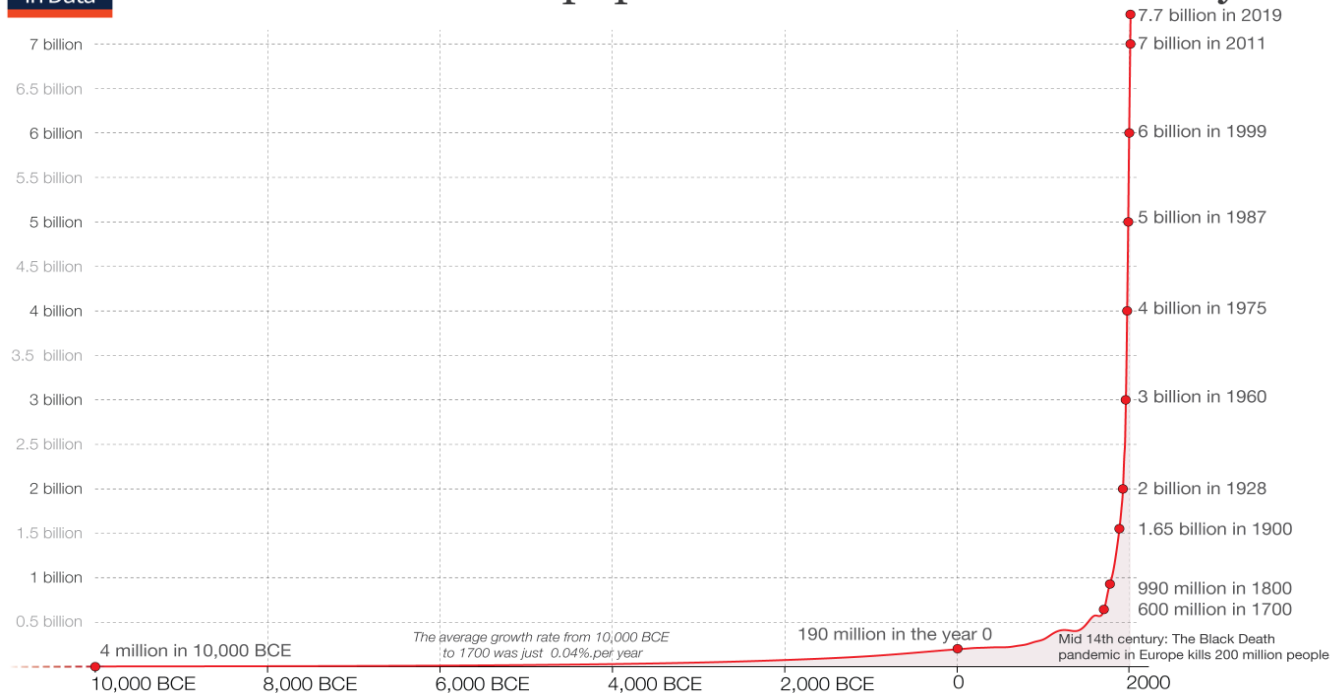


# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

## Our World in Data The size of the world population over the last 12.000 years



World population today  
Is 1860-times the size of  
What it was 12 millennia  
Ago.

From 10.000 BCE to 1700  
The population grew  
0,04 annually.

Based on estimates by the History Database of the Global Environment (HYDE) and the United Nations. On [OurWorldinData.org](https://OurWorldinData.org) you can download the annual data. This is a visualization from [OurWorldinData.org](https://OurWorldinData.org), where you find data and research on how the world is changing. Licensed under CC-BY-SA by the author Max Roser.

- The global population growth reached a peak in 1962 and 1963 with an annual growth rate of 2.2%; but since then, world population growth has halved.
- For the last half-century we have lived in a world in which the population growth rate has been declining. The UN projects that this decline will continue in the coming decades

A common question we're asked is: **is the global population growing exponentially?**

# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

The world population today is 1860 times the size of what it was 12 millennia ago when the world population was around 4 million.

The world population was around 1 billion in the year 1800 and increased 7-fold since then.

Around 108 billion people have ever lived on our planet. This means that today's population size makes up 6.5% of the total number of people ever born.

For the long period from the appearance of modern Homo sapiens up to the starting point of this chart in 10,000 BCE it is estimated that the total world population was often well under one million.

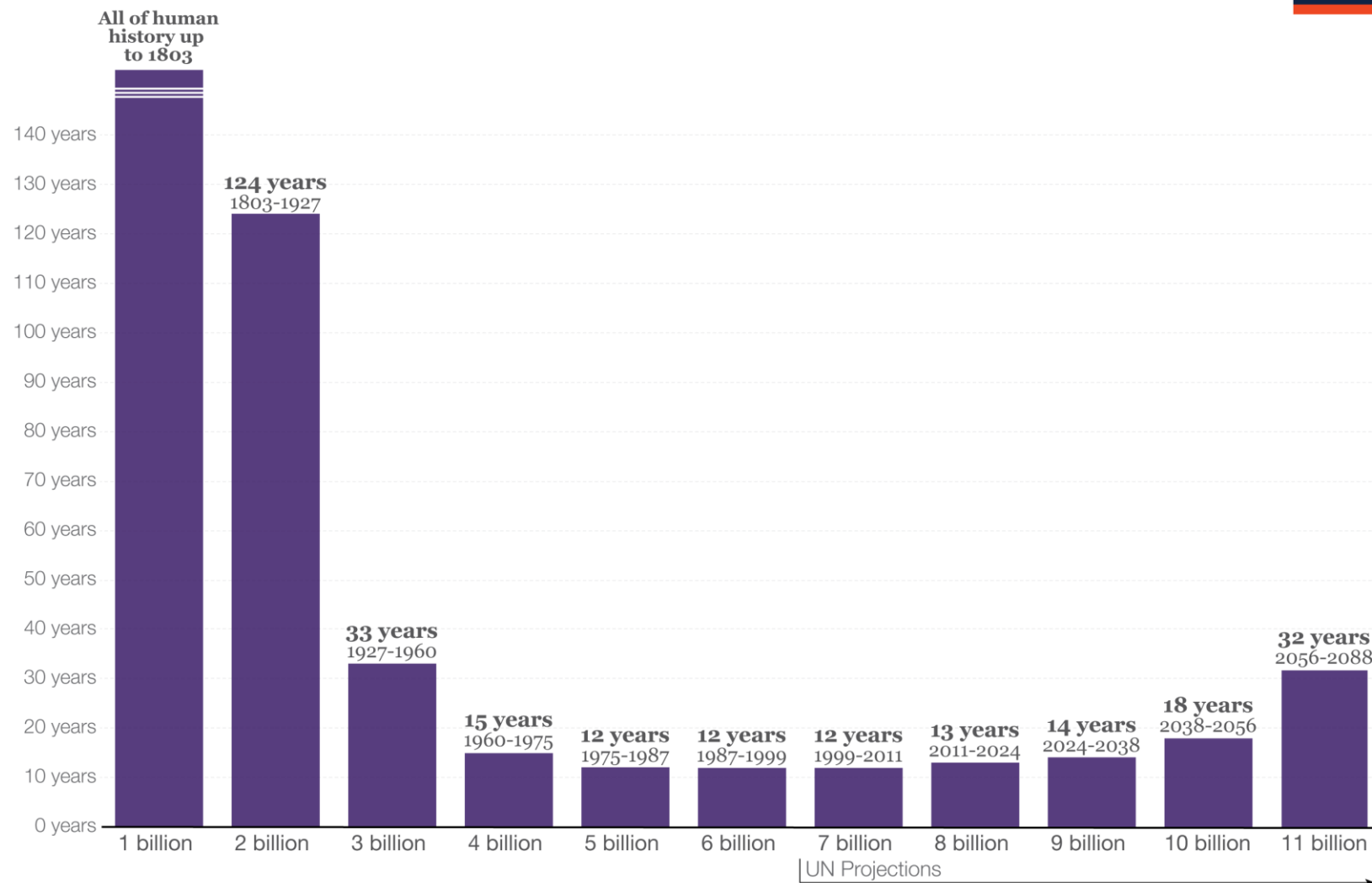
# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

## Time it took for the world population to increase by one billion

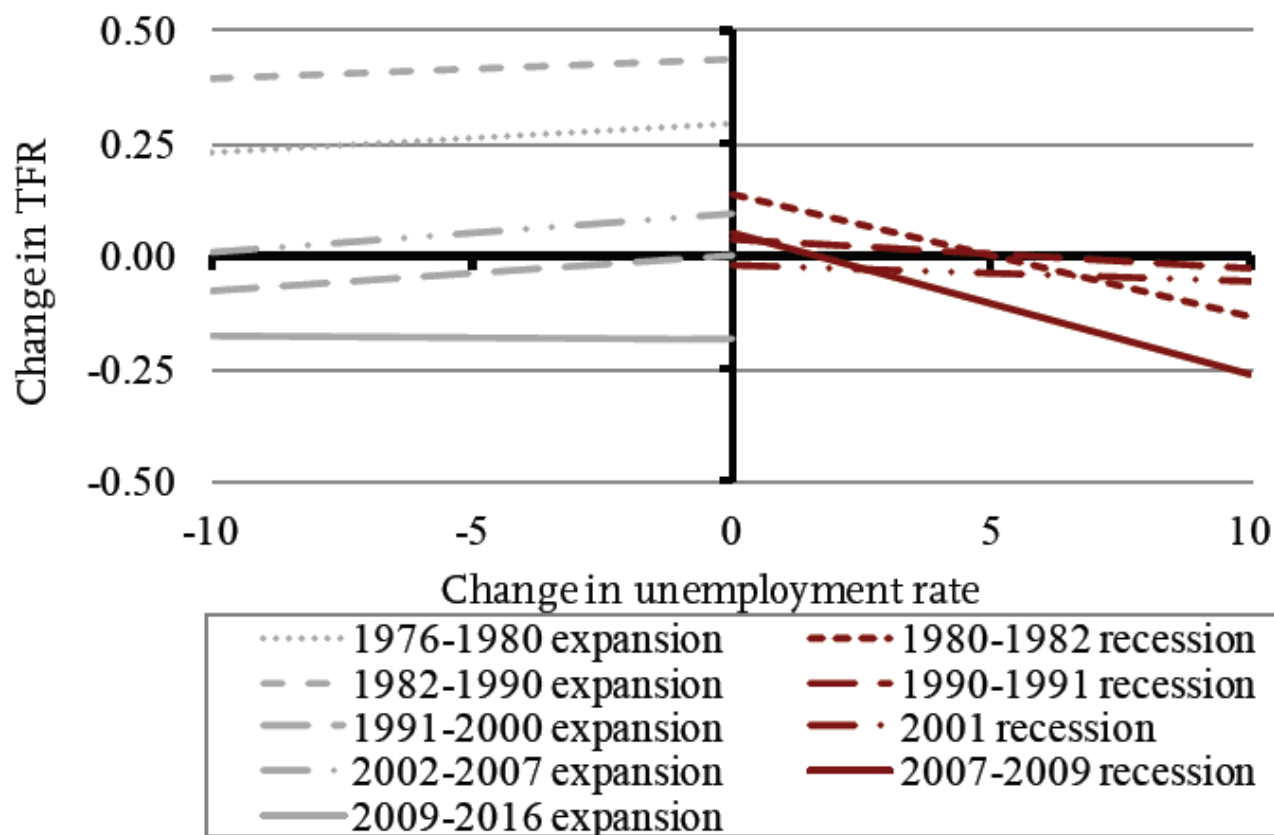
Our World  
in Data



# IS THE DROP IN FERTILITY TEMPORARY OR PERMANENT?

BY ALICIA H. MUNNELL, ANQI CHEN, AND GEOFFREY T. SANZENBACHER\*

FIGURE 6. **PATTERN OF CHANGE IN TFR ACROSS STATES**  
DURING EXPANSIONS AND RECESSIONS, 1976-2016

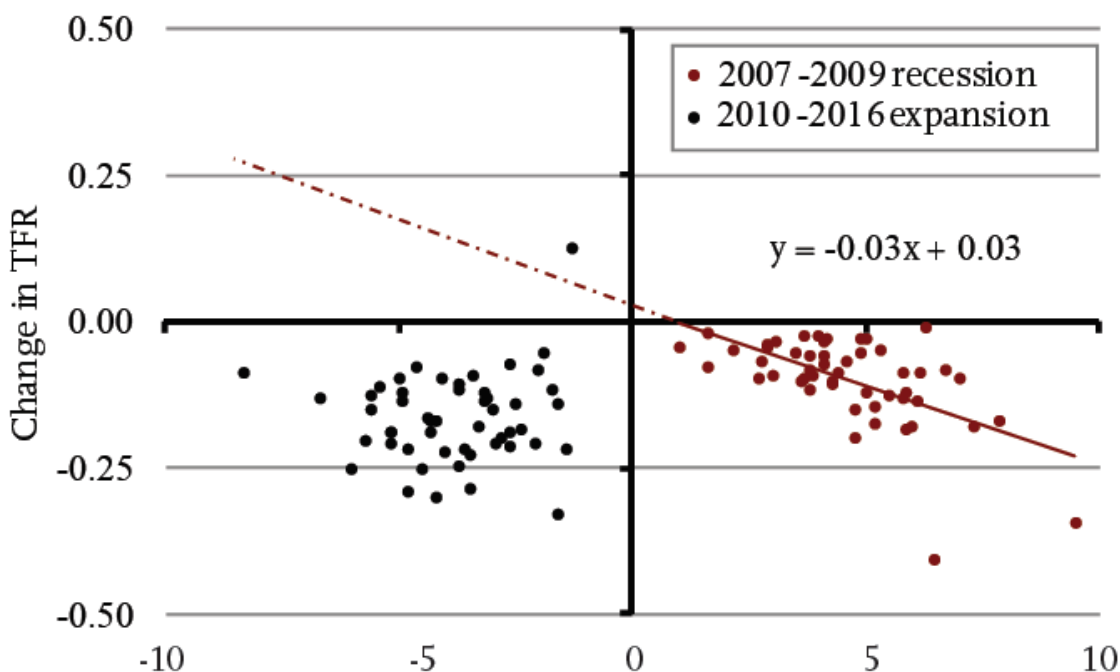


Note: Recession years are defined as the years between the peak and trough of real GDP for each state.

# IS THE DROP IN FERTILITY TEMPORARY OR PERMANENT?

BY ALICIA H. MUNNELL, ANQI CHEN, AND GEOFFREY T. SANZENBACHER\*

FIGURE 5. **RELATIONSHIP BETWEEN CHANGE IN TFR**  
AND CHANGE IN UNEMPLOYMENT RATE DURING GREAT  
RECESSION AND SUBSEQUENT EXPANSION, BY STATE



⊗ The **TFR** has not rebounded as in previous expansions, the reasons for its persistent decline are not clear.

## TWO POSSIBILITIES

THE TASTE  
FOR  
CHILDREN  
HAS  
CHANGED

WOMEN ARE  
SIMPLY  
POSTPONING  
HAVING  
CHILDREN



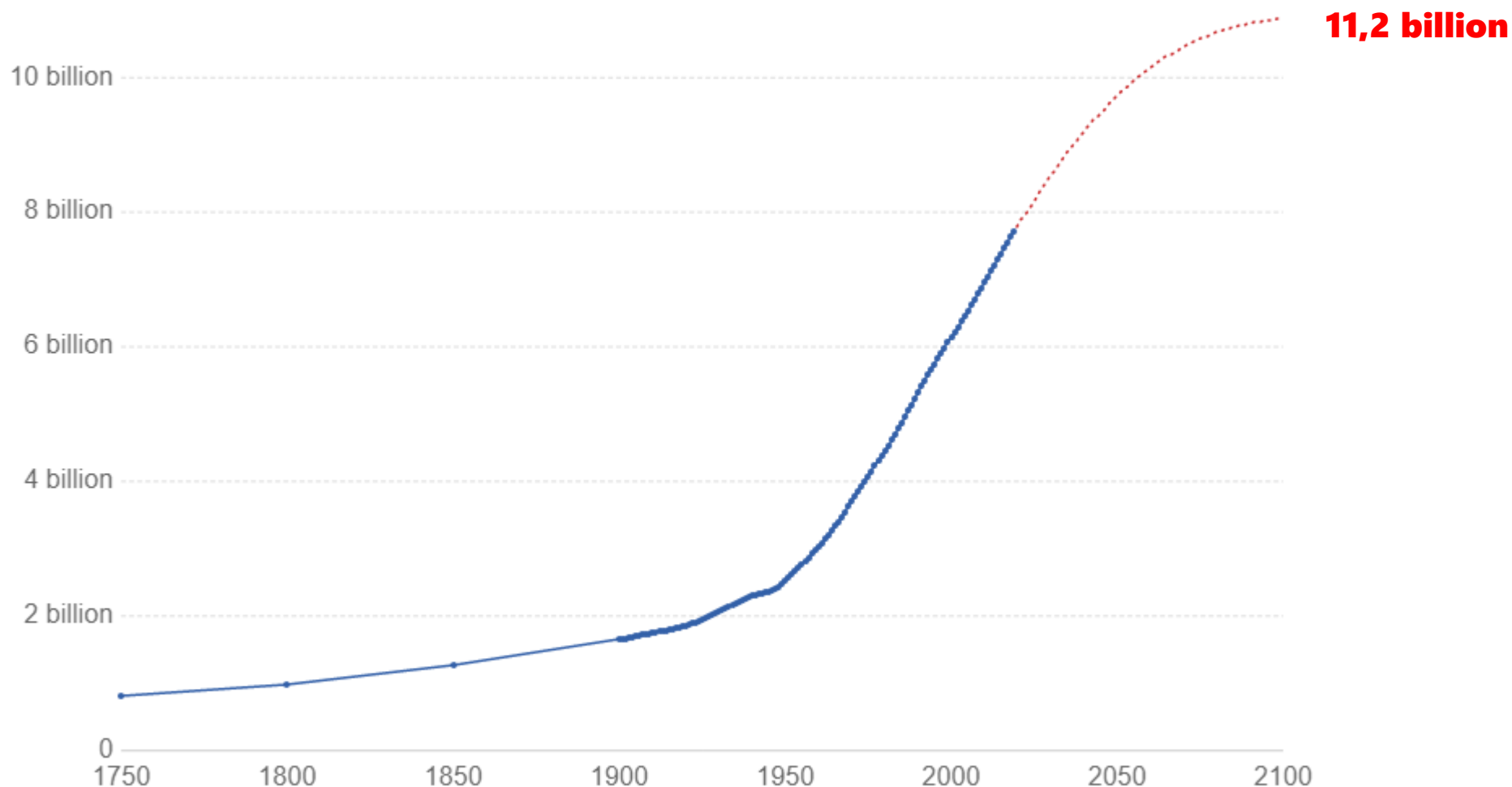
# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

World Population over the last 12,000 years and UN projection until 2100

Our World  
in Data



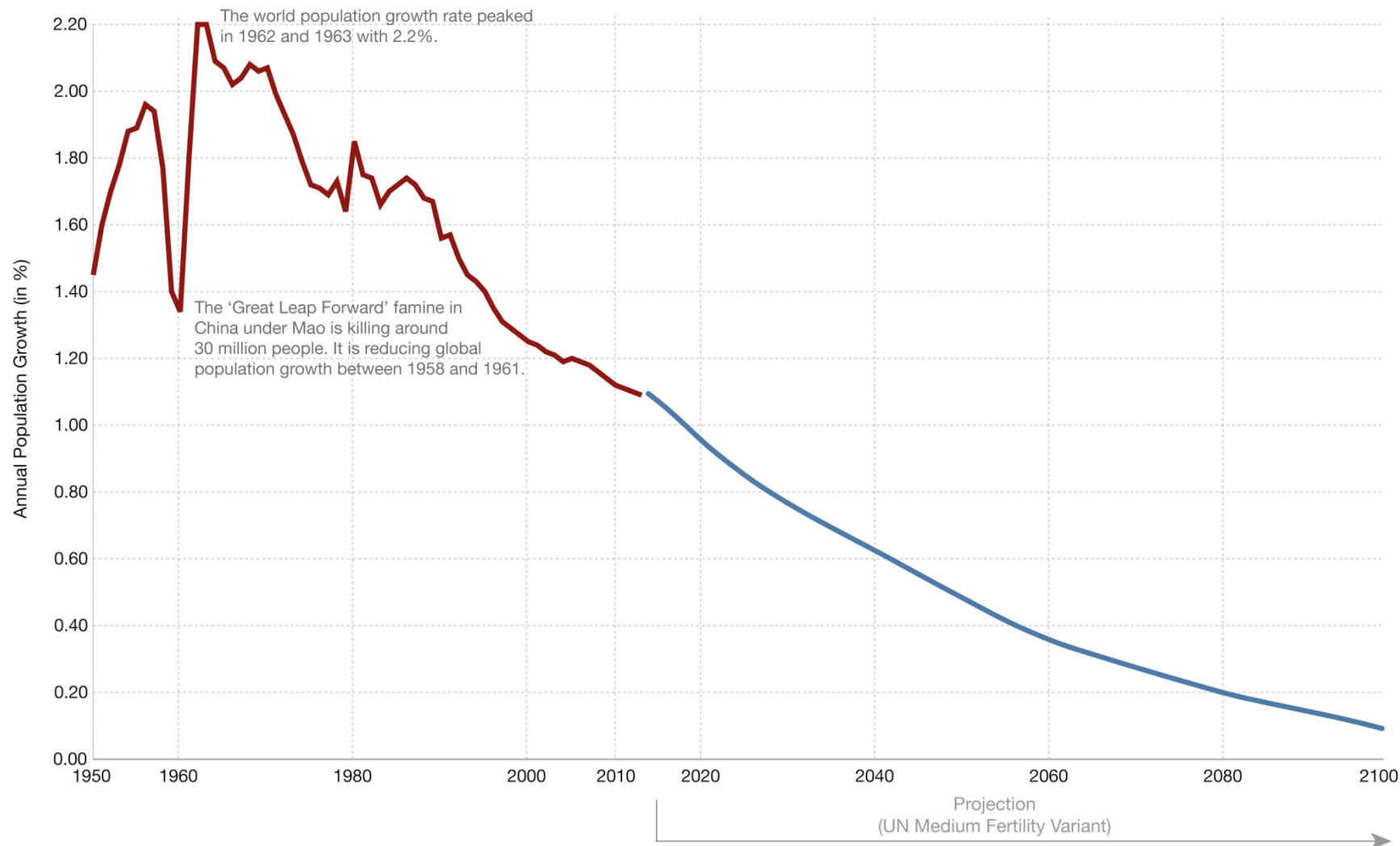
Source: World Population over 12000 years - various sources (2019), Medium Projection – UN Population Division (2019 revision)  
OurWorldInData.org/world-population-growth/ • CC BY

# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

## Our World in Data Annual world population growth rate (1950-2100)



# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

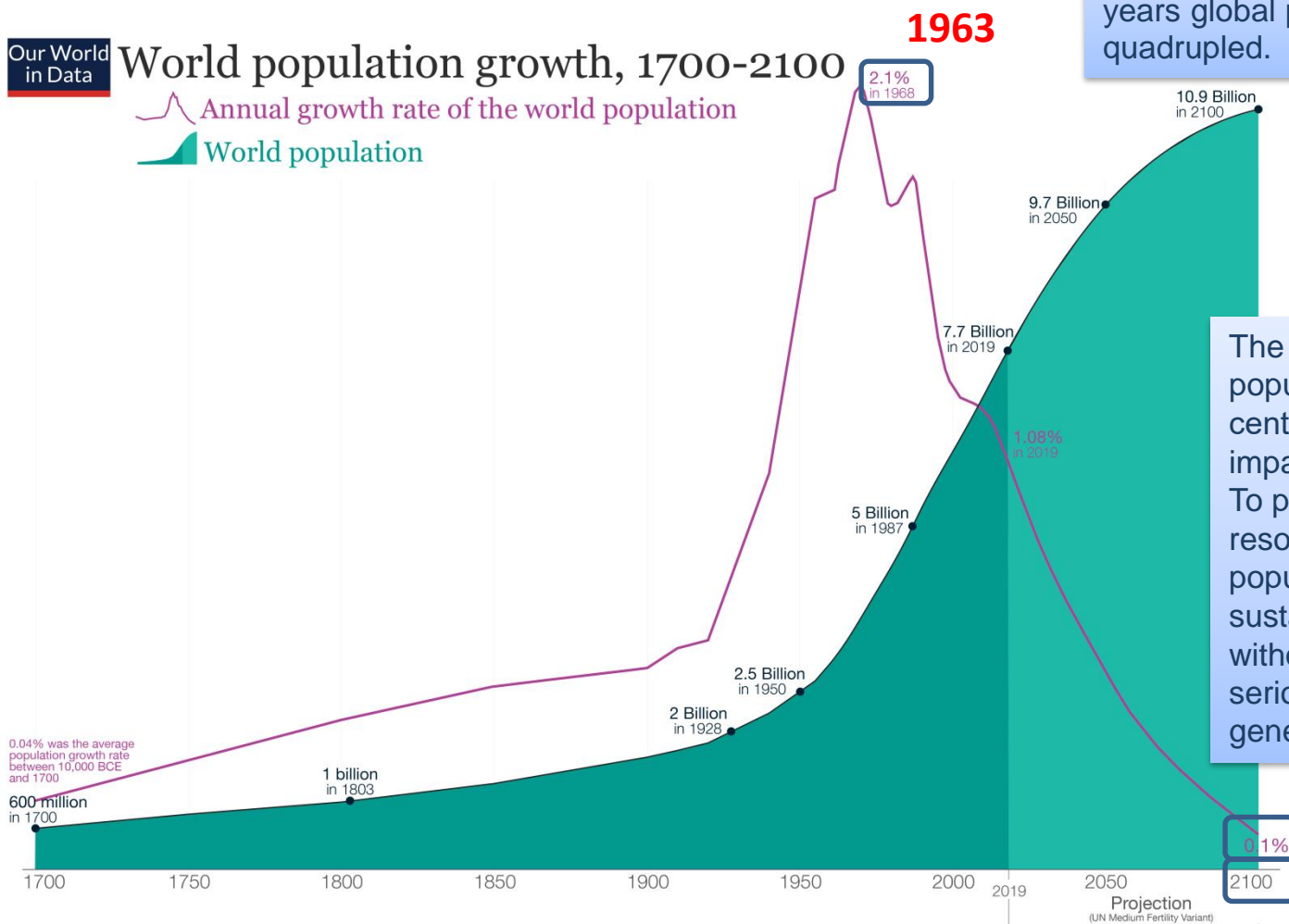
## The future of global population growth

Once health improved and mortality declined things changed quickly. Particularly over the course of the 20th century: Over the last 100 years global population more than quadrupled.

Our World  
in Data

### World population growth, 1700-2100

Annual growth rate of the world population  
World population



The 7-fold increase of the world population over the course of two centuries amplified humanity's impact on the natural environment. To provide space, food, and resources for a large world population in a way that is sustainable into the distant future is without question one of the large, serious challenges for our generation.

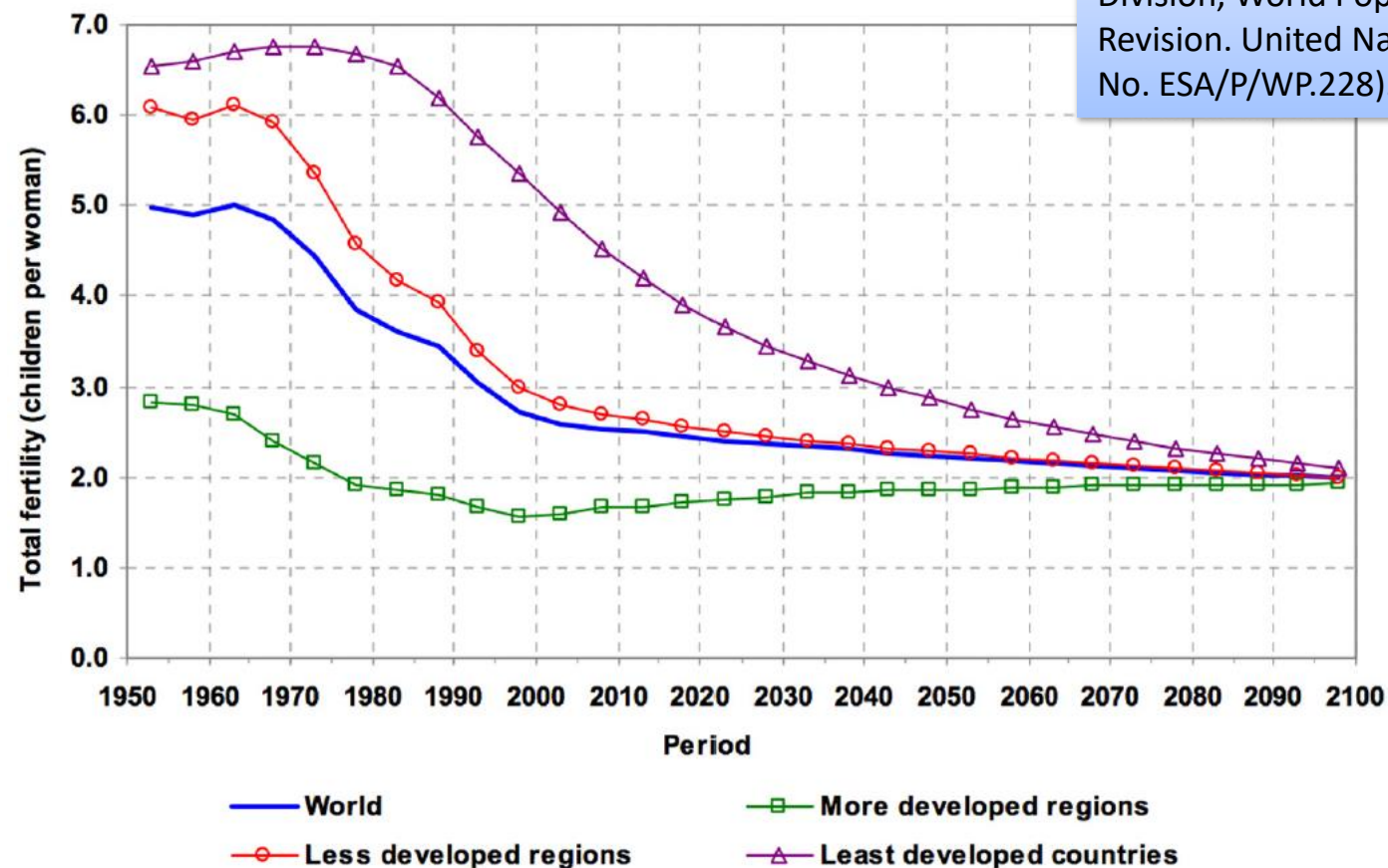


Review

# Fertility and infertility: Definition and epidemiology

Mélodie Vander Borgh<sup>b</sup>, Christine Wyns<sup>i</sup>

Fig. 1. Fertility estimates (1950–2010) and projections (2010–2050) by region [11] (United Nations, D.o.E.a.S.A., Population Division, World Population Prospects: The 2012 Revision. United Nations. New York, 2013: p. Paper No. ESA/P/WP.228).



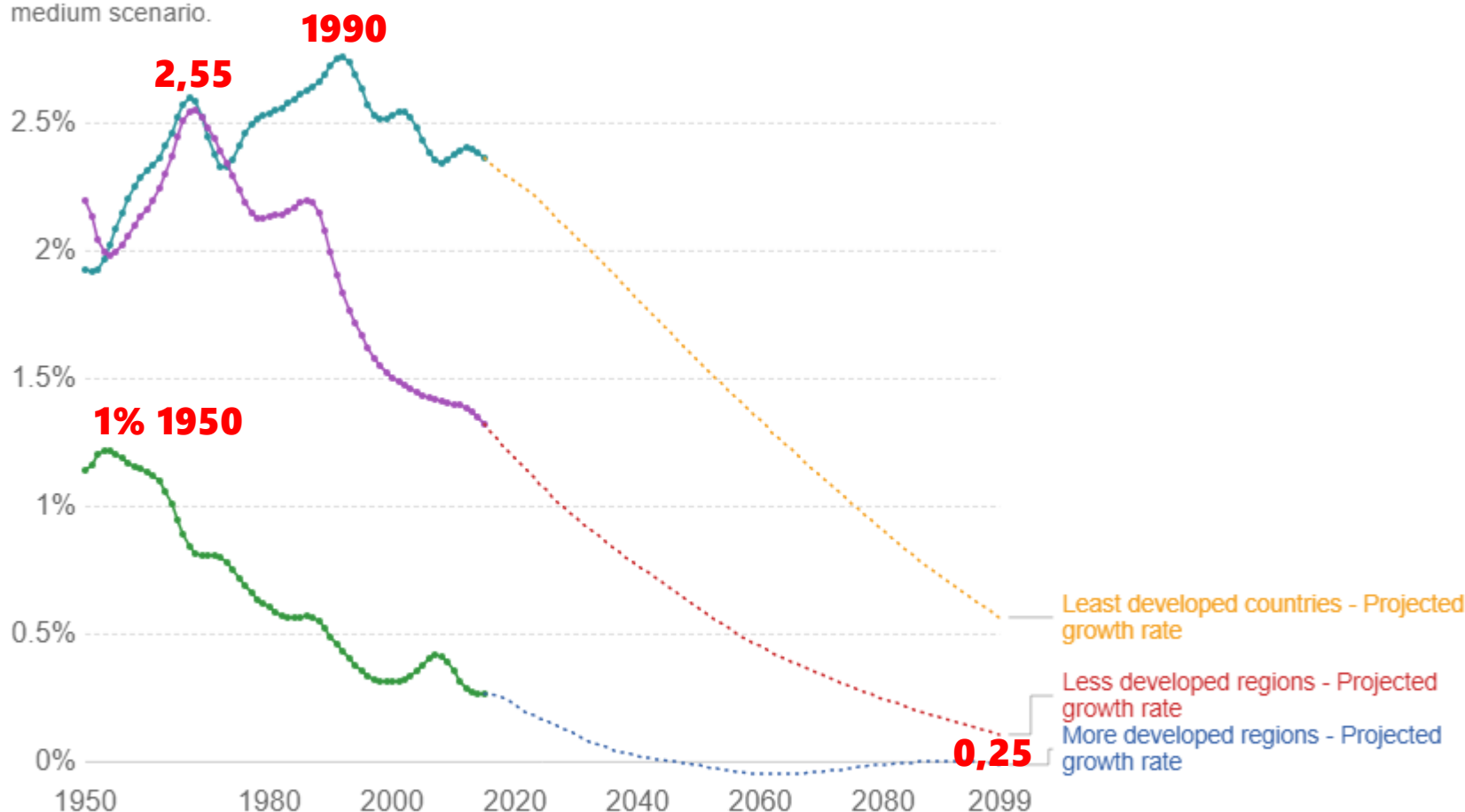
# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

## Population growth rate by level of development

Historic population growth rates by the level of development of the region, with projections to 2100 using the UN medium scenario.



Source: UN Population Division (2017 Revision)

OurWorldInData.org/world-population-growth/ • CC BY

Note: More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan; less developed regions comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia; least developed countries are 48 countries, 33 in Africa, 9 in Asia, 5 in Oceania plus one in Latin America and the Caribbean.



Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017

*GBD 2017 Population and Fertility Collaborators\**

Population decline and the associated shift to an older population has profound

*CULTURAL, ECONOMIC* and *SOCIAL* implications.



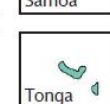
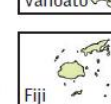
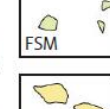
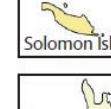
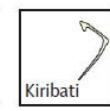
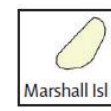
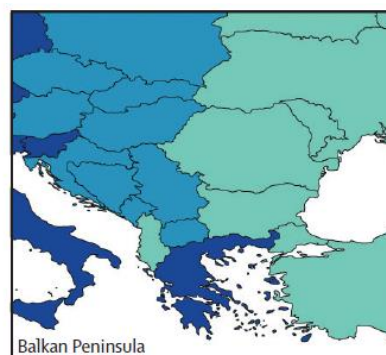
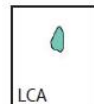
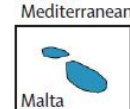
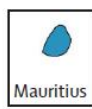
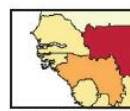
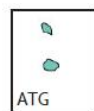
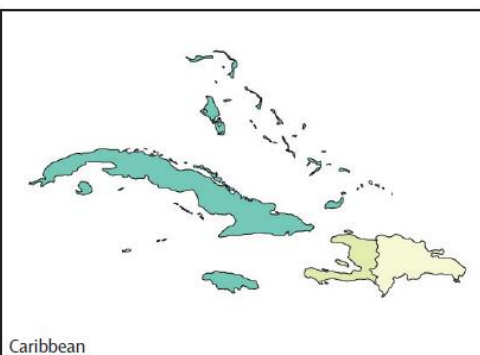
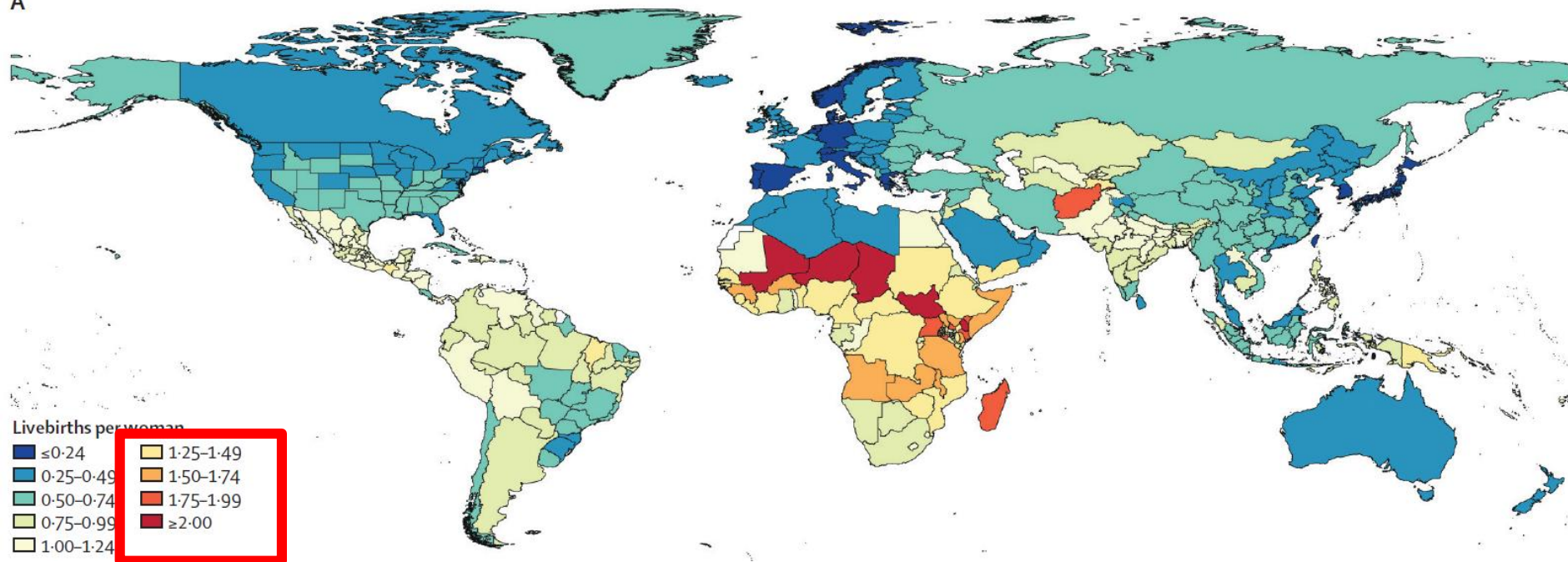
**INFERTILITY COME FROM ALL OF THEM**

In 89 countries, the size of the birth cohort has decreased since 2000

# Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017

*GBD 2017 Population and Fertility Collaborators\**

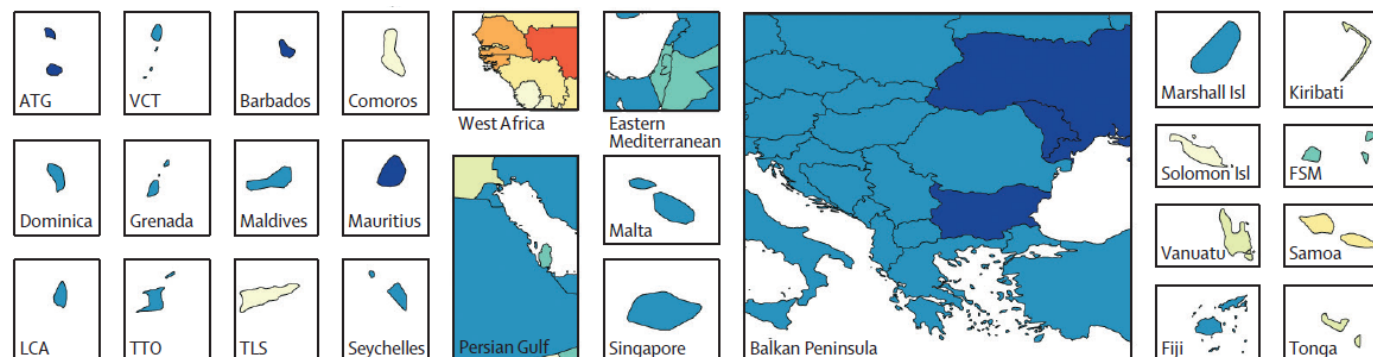
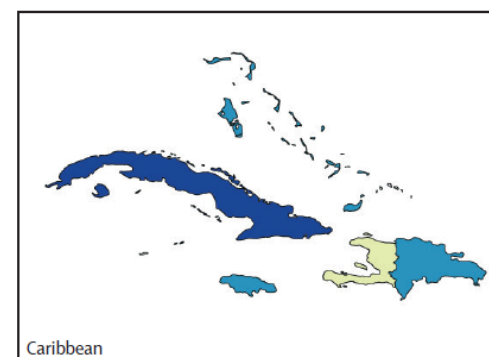
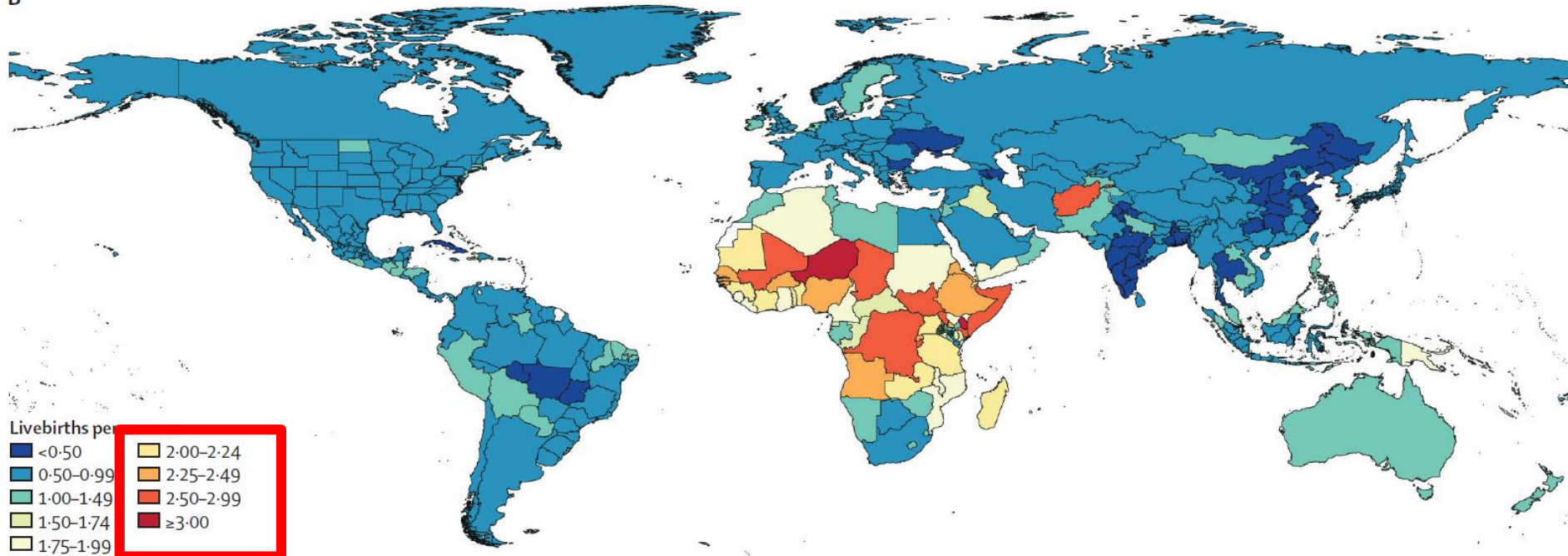
A



# Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017

*GBD 2017 Population and Fertility Collaborators\**

B

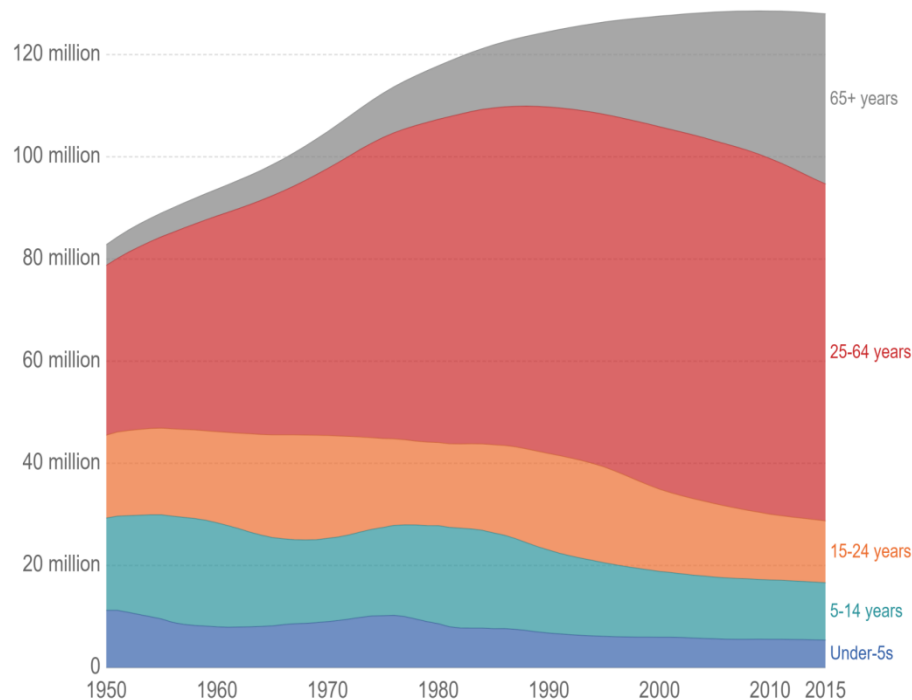


# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

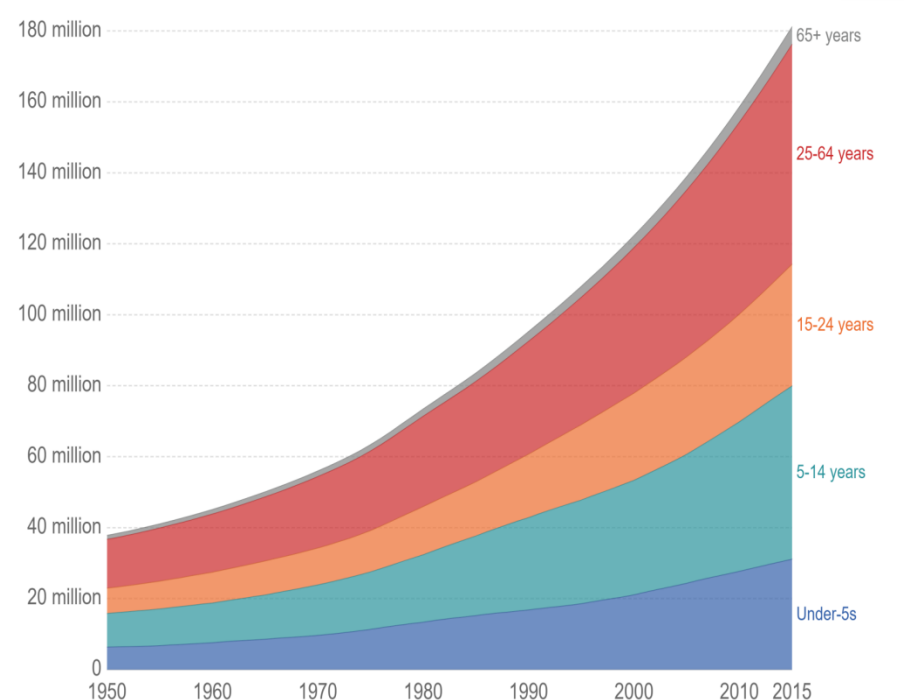
Population by broad age group, Japan



Source: UN Population Division (2017 Revision)

OurWorldInData.org/world-population-growth • CC BY

Population by broad age group, Nigeria



Source: UN Population Division (2017 Revision)

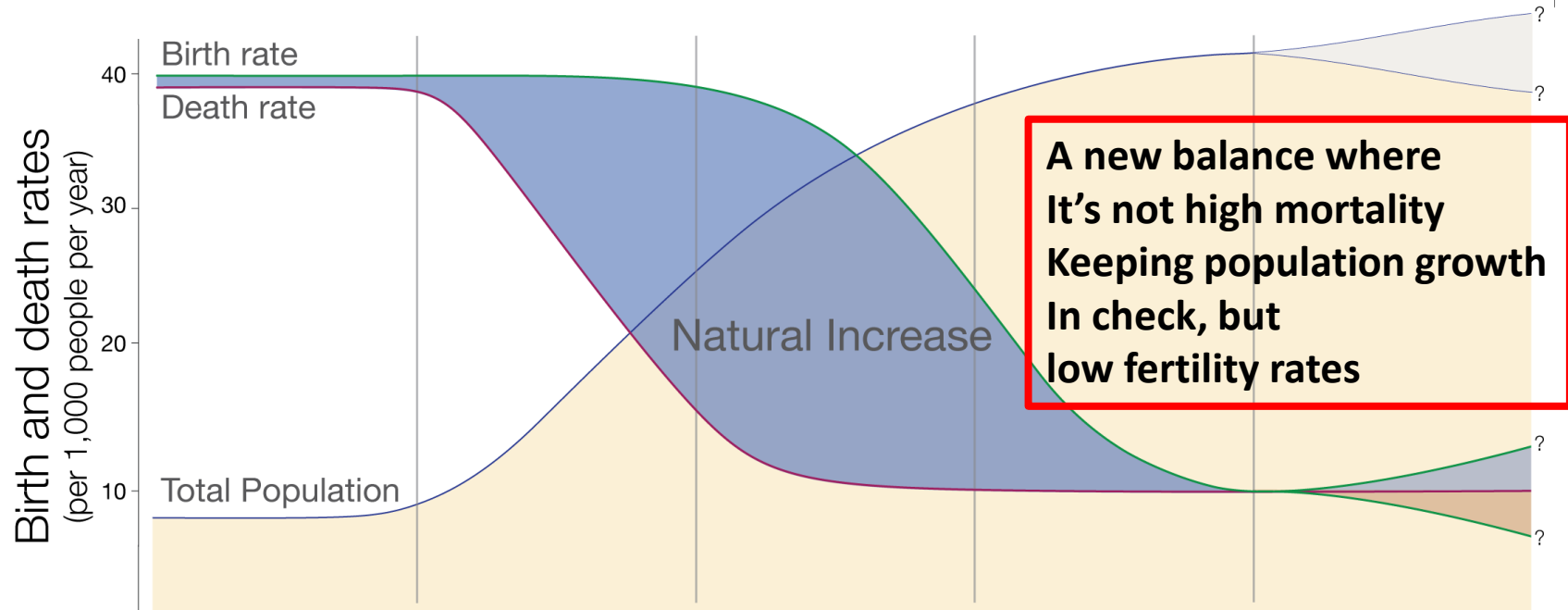
OurWorldInData.org/world-population-growth • CC BY

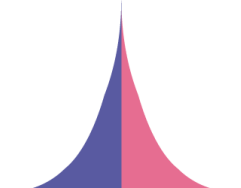


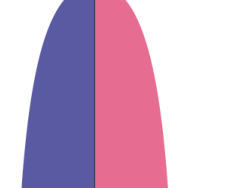
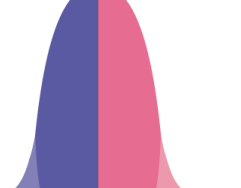


# The five stages of the demographic transition

Our World  
in Data

The demographic transition is a model that describes why rapid population growth is a temporary phenomenon.



	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	High	High	Falling	Low	Yet to be seen (Possibly falling further, possibly rising again)
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Rapid increase	Increase slows down	Falling and then stable	Little change
Population Pyramid					
	Men Women	Men Women	Men Women	Men Women	Men Women



## The World Population Is Growing Older

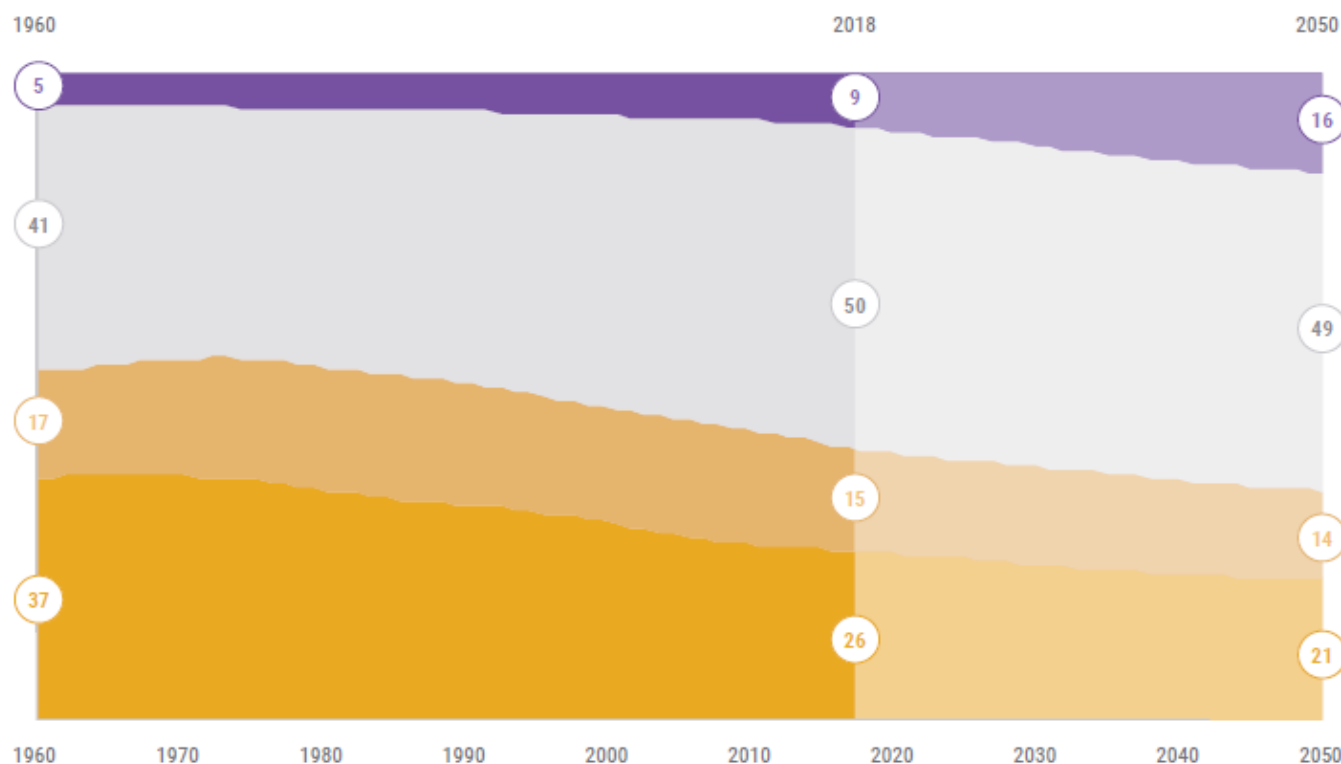
With continued declines in fertility and mortality, the global population's shift toward an older age structure, known as population aging, will accelerate. Older adults' (ages 65+) share of the global population increased from 5 percent in 1960 to 9 percent in 2018 and is projected to rise to 16 percent by 2050, with the segment ages 85 and older growing the fastest. Children's (ages 0 to 14) share is falling, from 37 percent in 1960, to 26 percent in 2018, with a projected decrease to 21 percent by 2050. The timing and speed of age structure changes vary by country, and these changes have important social and economic implications.

### What Is Age Structure?

Age structure is the share of the total population in each age group. Population aging is measured by the relative share of older people in the population.

Percent of Population by Age Group, 1960-2050

■ Ages 0-14   
 ■ Ages 15-24   
 ■ Ages 25-64   
 ■ Ages 65+



**Note:** Lighter shaded areas show projected shares from 2018 through 2050.

**Source:** United Nations Population Division, *World Population Prospects: The 2017 Revision* (New York: United Nations, 2017).

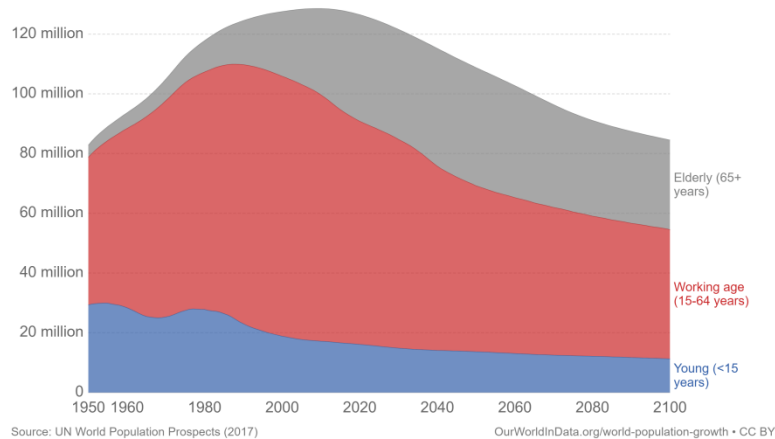
# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

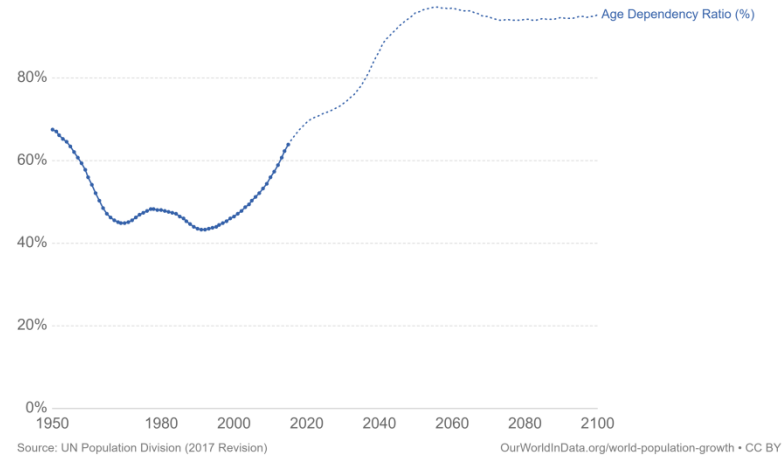
## Size of young, working-age and elderly populations projected to 2100, Japan

Total population categorised by three age groups: young (under 15 years old); working-age population (15-64 years old); and elderly (65+ years old). This is shown for historic estimates from 1950 to 2015, and projected to 2100 based on the UN medium scenario.



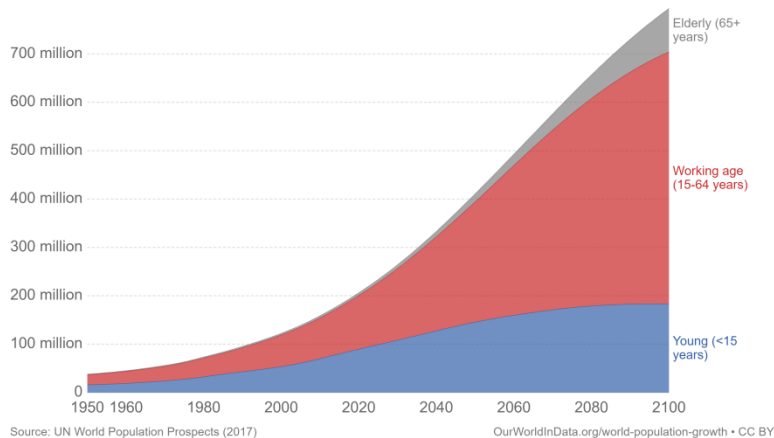
## Age dependency ratio projected to 2100, Japan

The age dependency ratio is the sum of the young population (under age 15) and elderly population (age 65 and over) relative to the working-age population (ages 15 to 64). Data are shown as the number of dependents per 100 working-age population. Projections to 2100 are based on the UN's medium population scenario.



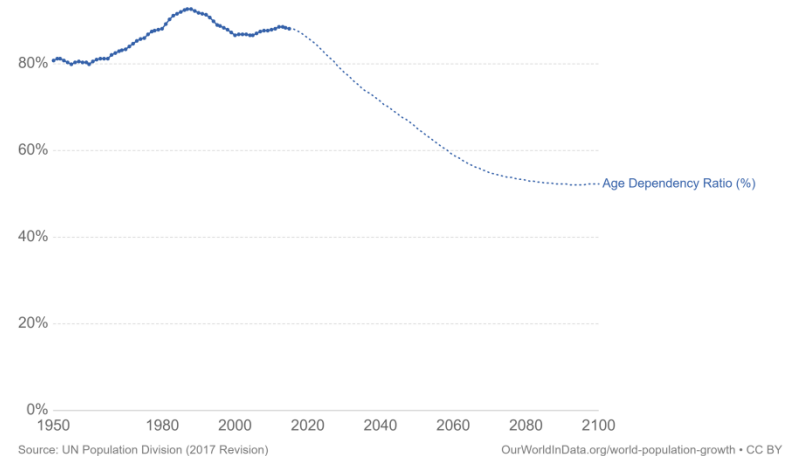
## Size of young, working-age and elderly populations projected to 2100, Nigeria

Total population categorised by three age groups: young (under 15 years old); working-age population (15-64 years old); and elderly (65+ years old). This is shown for historic estimates from 1950 to 2015, and projected to 2100 based on the UN medium scenario.



## Age dependency ratio projected to 2100, Nigeria

The age dependency ratio is the sum of the young population (under age 15) and elderly population (age 65 and over) relative to the working-age population (ages 15 to 64). Data are shown as the number of dependents per 100 working-age population. Projections to 2100 are based on the UN's medium population scenario.



# Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017

*GBD 2017 Population and Fertility Collaborators\**

## IN THE HIGH-INCOME COUNTRIES

The proportion of the population that is of working age has also decreased in the past 5 years, and this trend is likely to continue for the foreseeable future.

### CONSEQUENCES

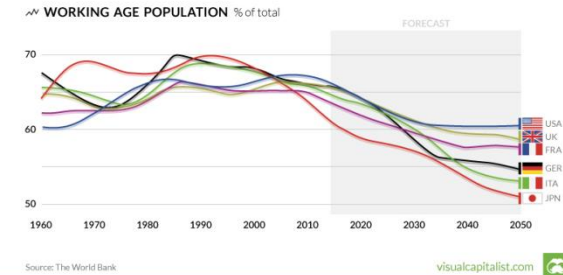
REDUCTION  
IN  
ECONOMIC  
GROWTH

DECREASING  
TAX REVENUE

GREATER USE OF  
SOCIAL SECURITY  
WITH FEWER  
CONTRIBUTOR

INCREASING HEALTH-CARE  
AND OTHER DEMANDS  
PROMPTED BY AN AGEING  
POPULATION

Chart of the Week



## Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017

*GBD 2017 Population and Fertility Collaborators\**

The options in these countries to deal with the social and economic consequences of population decline include:

### **PRO-NATALIST POLICIES**

Pro-natalist policies have been pursued in more than a dozen countries but the effects on fertility rates have not been large.

### **LIBERAL IMMIGRATION POLICIES**

Liberal immigration policies have been effective in sustaining population numbers in several countries

### **INCREASING THE RETIREMENT AGE**

# WHEN START TRYING CONCEIVE

**IF A COUPLE DESIRES  
TO HAVE TWO CHILDREN  
WITHOUT MAKING USE  
OF TERTILITY  
TREATMENTS**

**THEY SHOULD START TRYING TO  
CONCEIVE WHEN THE WOMAN IS 27  
YEARS OLD TO HAVE A 90% CHANCE  
OF SUCCESS.**

*Habbema et al*  
• *Human Repr 2015*

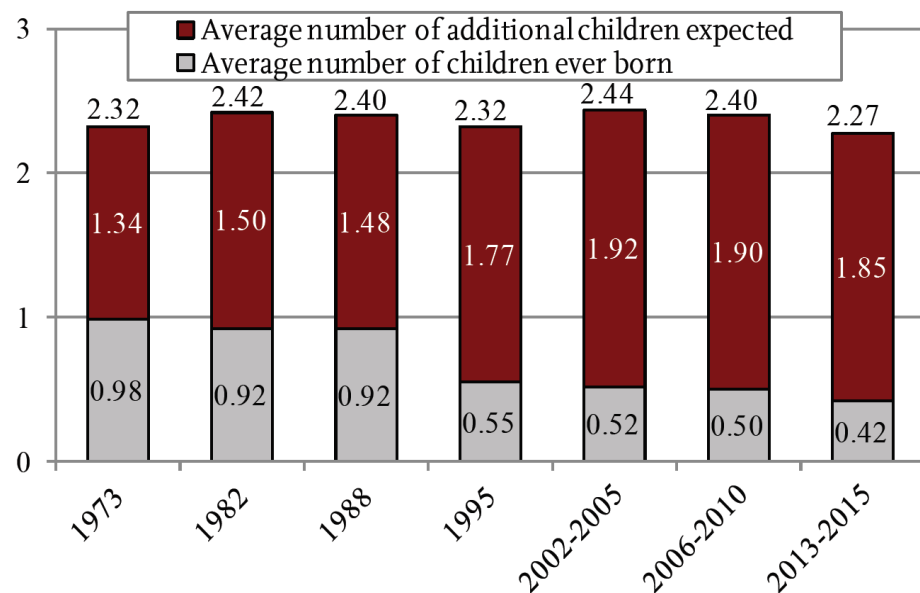
JULY 2018, NUMBER 18-14

**IS THE DROP IN FERTILITY TEMPORARY  
OR PERMANENT?**

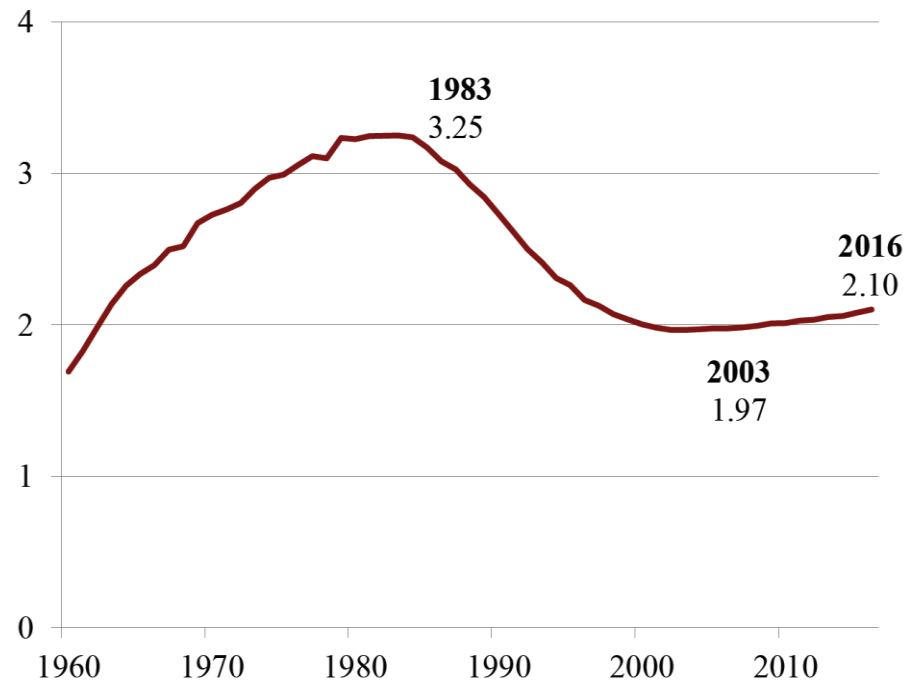
BY ALICIA H. MUNNELL, ANQI CHEN, AND GEOFFREY T. SANZENBACHER\*

CENTER for  
RETIREMENT  
RESEARCH  
at BOSTON COLLEGE

**FIGURE 4. TOTAL BIRTHS EXPECTED AMONG WOMEN  
AGES 20-24, VARIOUS YEARS**



**FIGURE 3. COMPLETED FERTILITY RATE, 1960-2016**





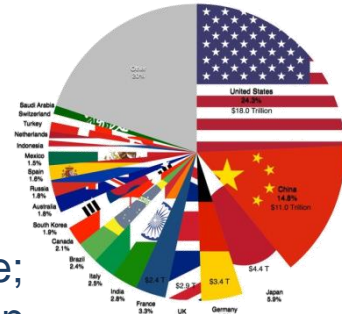
# World Population Growth

by Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina

First published in 2013; most recent substantial revision in May 2019.

## CONCLUSION

### The future of global population growth



The big global demographic transition that the world entered more than two centuries ago is therefore coming to an end: We are on the way to a new balance; this new equilibrium is not like in our long past when high mortality kept population growth in check, but when low fertility prevents the world population from growing.

### When will the world population stop growing?

Only the few generations during the population boom lived in families with many children – before and after two children are the norm.

Not children will be added to the world population, but people in working age and old age.

- The big demographic transition that the world entered more than a century ago is coming to an end: Global population growth peaked half a century ago, the number of babies is reaching its peak, and the age profile of the women in the world is changing so that 'population momentum' is slowly losing its momentum. This is not to say that feeding and supporting a still rising world population will be easy, but we are certainly on the way to a new balance where it's not high
- mortality keeping population growth in check, but low fertility rates.



**Alecci Carmelita:** *embriologa*  
**Bechi Marcella:** *segretaria*  
**Cardea Clementina:** *medico*  
**Catalano M. Concetta:** *amministrazione*  
**Chamayou Sandrine:** *embriologa, responsabile dei laboratori*  
**Garozzo Enza:** *inf. professionale*  
**Grasso Patrizia:** *biologa*  
**Liprino Annalisa:** *medico*  
**Maglia Elena:** *medico*

**Musumarra Maria :** *segretaria*  
**Nibali Daniela:** *caposala*  
**Ortobello Francesca:** *OSS*  
**Ragolia Claudia:** *embriologa*  
**Romano Simona:** *biologa*  
**Sicali Maria:** *biologa*  
**Spadaro Marilena:** *ausiliaria*  
**Storaci Giorgia:** *embriologa*  
**Tomaselli Gabriella:** *resp. segreteria*  
**Venturino Giada:** *inf. professionale*



**Cali' Vincenzo:** *medico*  
**Guglielmino Antonino:** *medico, responsabile dei trattamenti*  
**Palazzo Gesualdo:** *anestesista*  
**Platania Agatino:** *responsabile delle pulizie*  
**Uccellatore Filippo:** *biologo*  
**Venti Walter:** *medico*



# SIRU

SOCIETÀ ITALIANA DELLA  
RIPRODUZIONE UMANA

## 3° CONGRESSO NAZIONALE

### Tutta la fertilità possibile

Dalla Scienza alla stesura delle linee guida

## MILANO 7-9 NOVEMBRE 2019

Sheraton Milan San Siro - Viale Caldera, 21



PRESIDENTI DEL CONGRESSO

Antonino  
Guglielmino

Paola  
Viganò

Luigi  
Montano

#### SEGRETERIA SCIENTIFICA

**S.I.R.U. Società Italiana della Riproduzione Umana**

Via Federico Cesi, 21 - 00193 Roma

[info@siru.it](mailto:info@siru.it)



#### SEGRETERIA ORGANIZZATIVA

P.R. e Communication S.r.l.

Vocabolo Cugnetto snc - 02046

Magliano Sabina (RI)

Tel. 0744/919581 - Fax 0744/921501

[info@precommunication.com](mailto:info@precommunication.com)