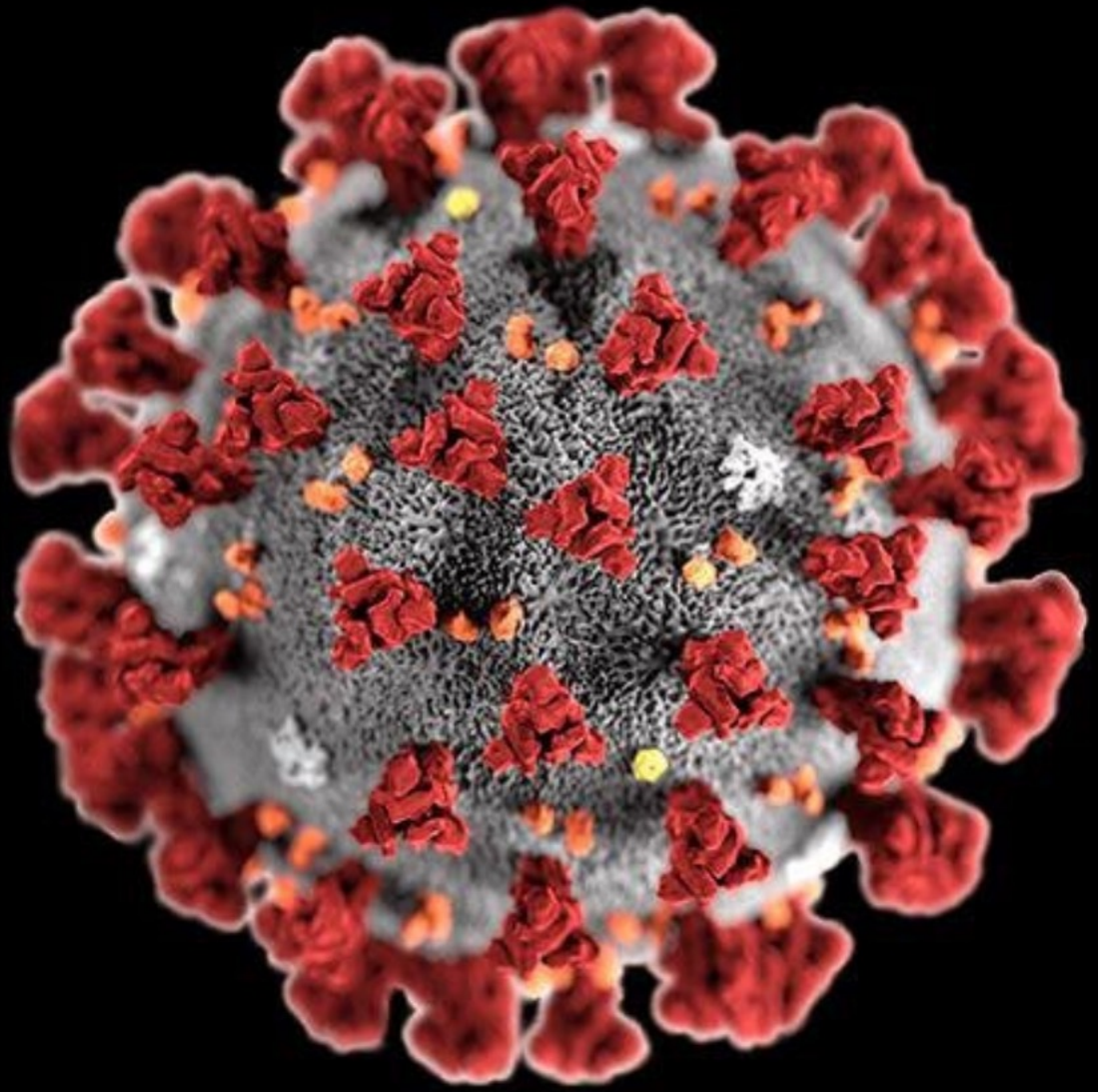
Life expectancy changes

in **urban** and **rural** populations of European countries during the **pandemic** years

Ilya Kashnitsky, Seirgi Trias-Llimos, Francisco Villavicencio

2023-09-25, Dondena Centre, Milan



2020-02-11

Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE

Total Confirmed
43,141

Confirmed Cases by Country/Region

- 42,670 Mainland China
- 135 Others
- 49 Hong Kong
- 45 Singapore
- 32 Thailand
- 28 South Korea
- 26 Japan
- 18 Malaysia
- 18 Taiwan

Country/Region

Last Updated at (M/D/YYYY)
2/11/2020 10:23:04 a.m.

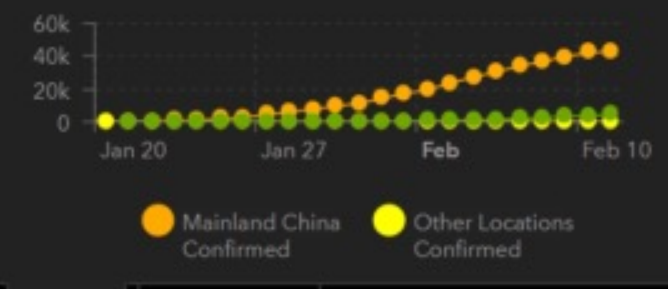
Visualization: JHU CSSE. Automation Support: Esri Living Atlas team.
Data sources: WHO, CDC, ECDC, NHC and DXY. Read more in this blog. Contact US.
GitHub: Here. Google Sheet: Here. Time series table: Here. Feature layer: Here.

Total Deaths
1,018

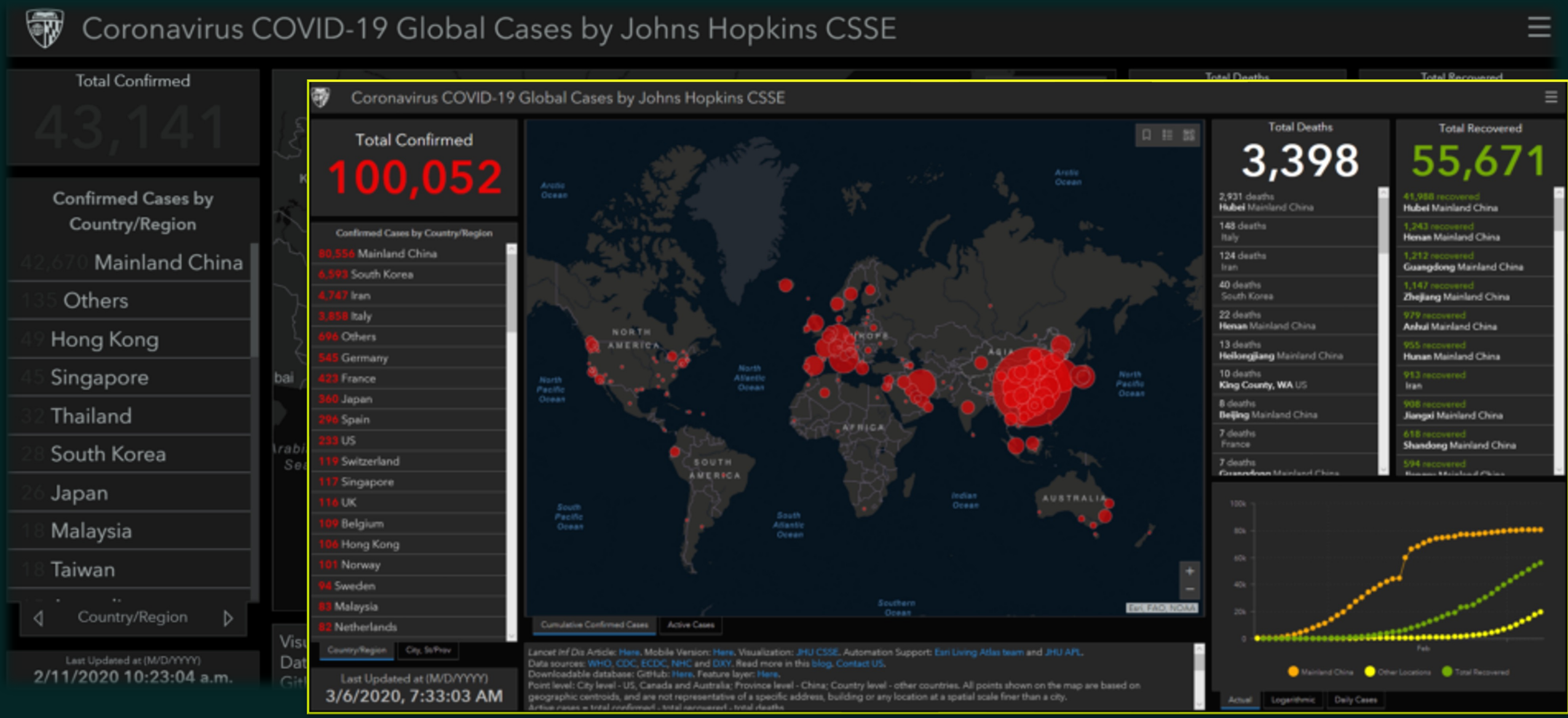
- 974 deaths **Hubei** Mainland China
- 1 deaths **Guangdong** Mainland China
- 7 deaths **Henan** Mainland China
- 1 deaths **Hunan** Mainland China
- 4 deaths **Anhui** Mainland China

Total Recovered
4,340

- 2,310 recovered **Hubei** Mainland China
- 270 recovered **Zhejiang** Mainland China
- 247 recovered **Hunan** Mainland China
- 218 recovered **Henan** Mainland China



2020-03-06


Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE
Total Confirmed
43,141
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135 Others
49 Hong Kong
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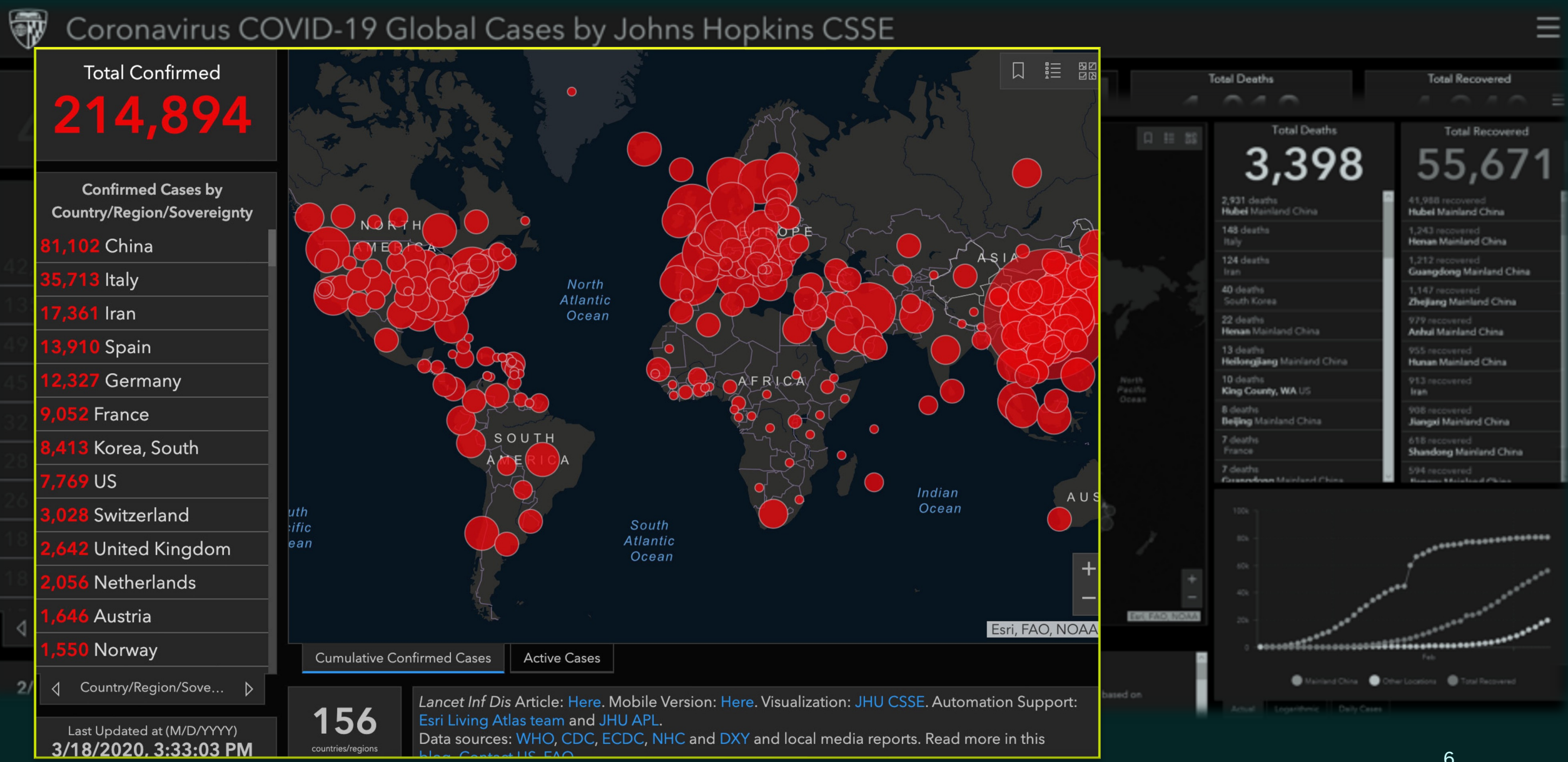
32 Thailand
28 South Korea
26 Japan
18 Malaysia
18 Taiwan
Country/Region
Last Updated at (M/D/YYYY)
2/11/2020 10:23:04 a.m.
Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE
Total Confirmed
100,052
Confirmed Cases by Country/Region
80,556 Mainland China
6,593 South Korea
4,747 Iran
3,858 Italy
696 Others
545 Germany
423 France
360 Japan
296 Spain
233 US
119 Switzerland
117 Singapore
116 UK
109 Belgium
106 Hong Kong
101 Norway
94 Sweden
83 Malaysia
82 Netherlands
Country/Region
City, St/Prov
Last Updated at (M/D/YYYY)
3/6/2020, 7:33:03 AM
NORTH AMERICA
EUROPE
ASIA
AFRICA
SOUTH AMERICA
AUSTRALIA
Arctic Ocean
North Atlantic Ocean
North Pacific Ocean
South Pacific Ocean
South Atlantic Ocean
Indian Ocean
Southern Ocean
Esri, FAO, NOAA
Cumulative Confirmed Cases
Active Cases
Lancet Inf Dis Article: Here. Mobile Version: Here. Visualization: JHU CSSE. Automation Support: Esri Living Atlas team and JHU APL.
Data sources: WHO, CDC, ECDC, NHC and DXY. Read more in this blog. Contact US.
Downloadable database: GitHub: Here. Feature layer: Here.
Point level: City level - US, Canada and Australia; Province level - China; Country level - other countries. All points shown on the map are based on geographic centroids, and are not representative of a specific address, building or any location at a spatial scale finer than a city.
Total Deaths
3,398
2,931 deaths Hubei Mainland China
148 deaths Italy
124 deaths Iran
40 deaths South Korea
22 deaths Henan Mainland China
13 deaths Heilongjiang Mainland China
10 deaths King County, WA US
8 deaths Beijing Mainland China
7 deaths France
7 deaths
Total Recovered
55,671
41,988 recovered Hubei Mainland China
1,243 recovered Henan Mainland China
1,212 recovered Guangdong Mainland China
1,147 recovered Zhejiang Mainland China
979 recovered Anhui Mainland China
955 recovered Hunan Mainland China
913 recovered Iran
908 recovered Jiangxi Mainland China
618 recovered Shandong Mainland China
594 recovered
100k
80k
60k
40k
20k
0
Feb
Mainland China
Other Locations
Total Recovered
Actual
Logarithmic
Daily Cases

2020-03-18


Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE
Total Confirmed
214,894
Confirmed Cases by Country/Region/Sovereignty
81,102 China
35,713 Italy
17,361 Iran
13,910 Spain
12,327 Germany
9,052 France
8,413 Korea, South
7,769 US
3,028 Switzerland
2,642 United Kingdom
2,056 Netherlands
1,646 Austria
1,550 Norway
Country/Region/Sove...
Last Updated at (M/D/YYYY)
3/18/2020, 3:33:03 PM
NORTH AMERICA
EUROPE
ASIA
AFRICA
SOUTH AMERICA
AUS
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean
Esri, FAO, NOAA
Cumulative Confirmed Cases
Active Cases
156
countries/regions
Lancet Inf Dis Article: Here. Mobile Version: Here. Visualization: JHU CSSE. Automation Support: Esri Living Atlas team and JHU APL.
Data sources: WHO, CDC, ECDC, NHC and DXY and local media reports. Read more in this
Total Deaths
Total Recovered
Total Deaths
3,398
2,931 deaths Hubei Mainland China
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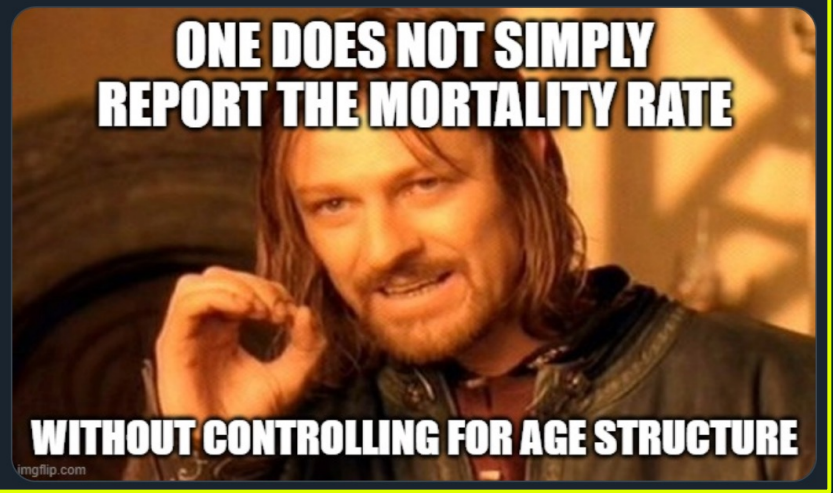
594 recovered

T | Published 2020

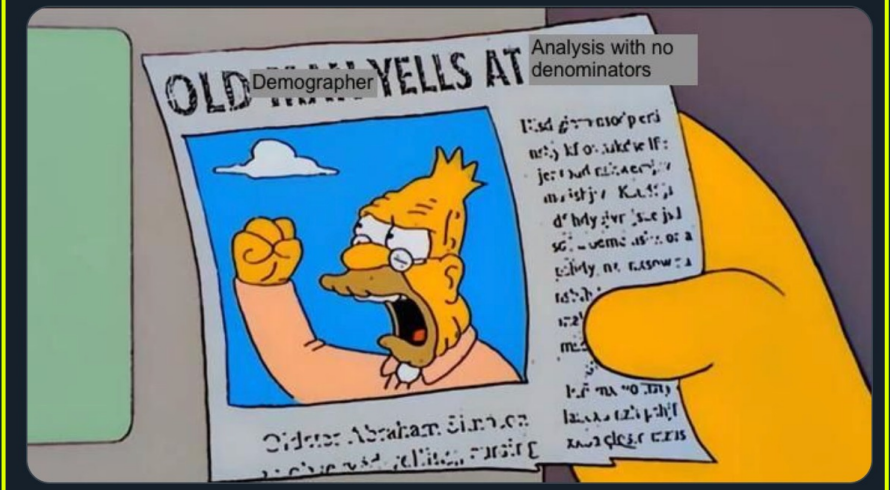

PEOPLE COMMENTING ON C19 IN EARLY 2020
YOU KNOW, I'M KINDA SCIENTIST MYSELF

Matt Hauer @theHauer · Mar 31, 2021



Monica Alexander
@monjalexander

The mood this morning



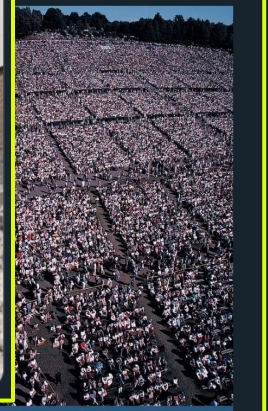
2:59 PM · Feb 14, 2022

Matt Hauer
@theHauer

8:10 PM · Mar 15, 2020

Ilya Kashnitsky @ikashnitsky · Oct 16, 2021

· Feb 5, 2022
OfMaths and @monjalexander

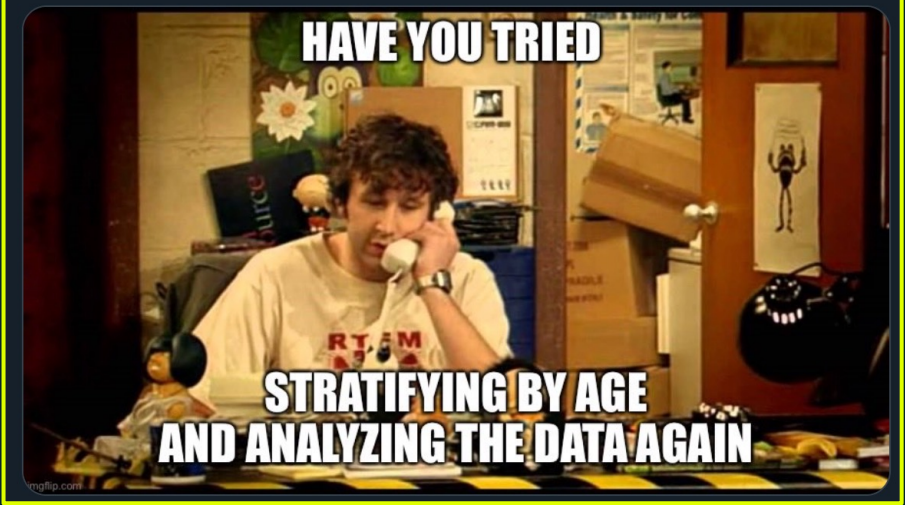


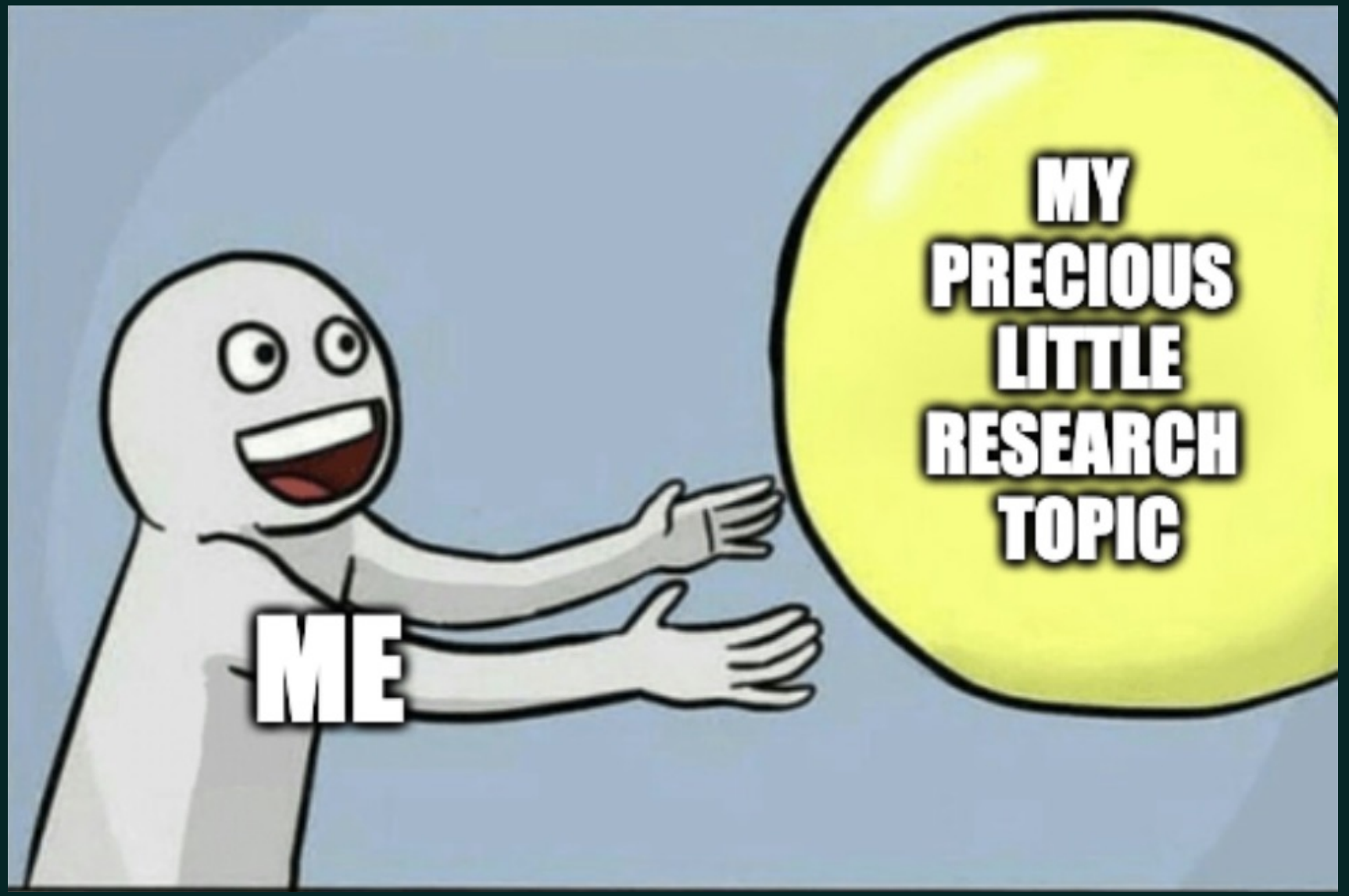
memography
capturing and gigging Population Processes
Blackwell Publishing

Ilya Kashnitsky @ikashnitsky · Oct 31, 2021

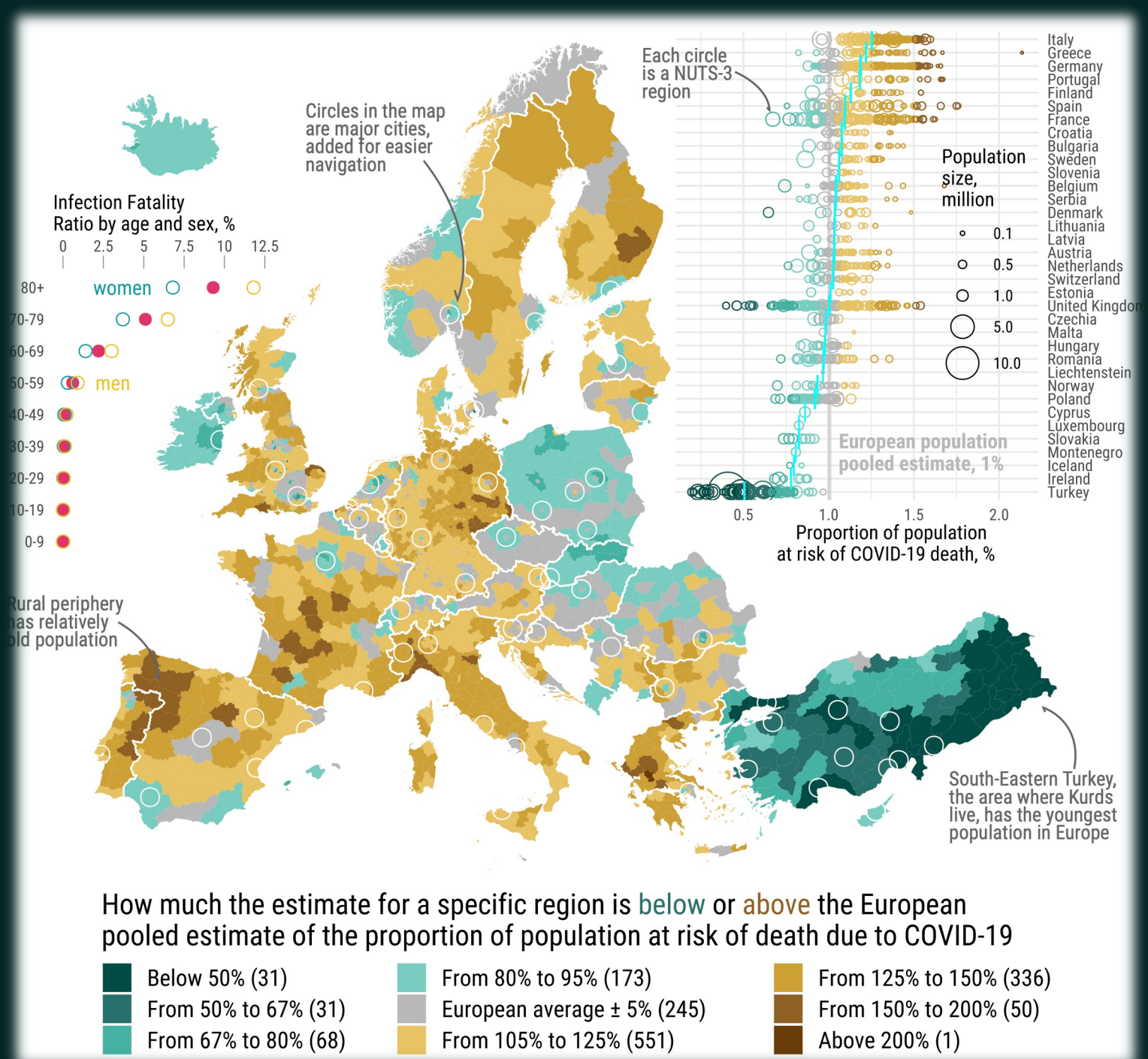
Monica Alexander
@monjalexander

Demographers:




MY PRECIOUS LITTLE RESEARCH TOPIC
ME


COVID-19
ME
MY PRECIOUS LITTLE RESEARCH TOPIC



World Development 136 (2020) 105170

Contents lists available at ScienceDirect

World Development

journal homepage: www.elsevier.com/locate/worlddev

Letters on Urgent Issues

COVID-19 in unequally ageing European regions

Ilya Kashnitsky [a,b,*], José Manuel Aburto [a,c]

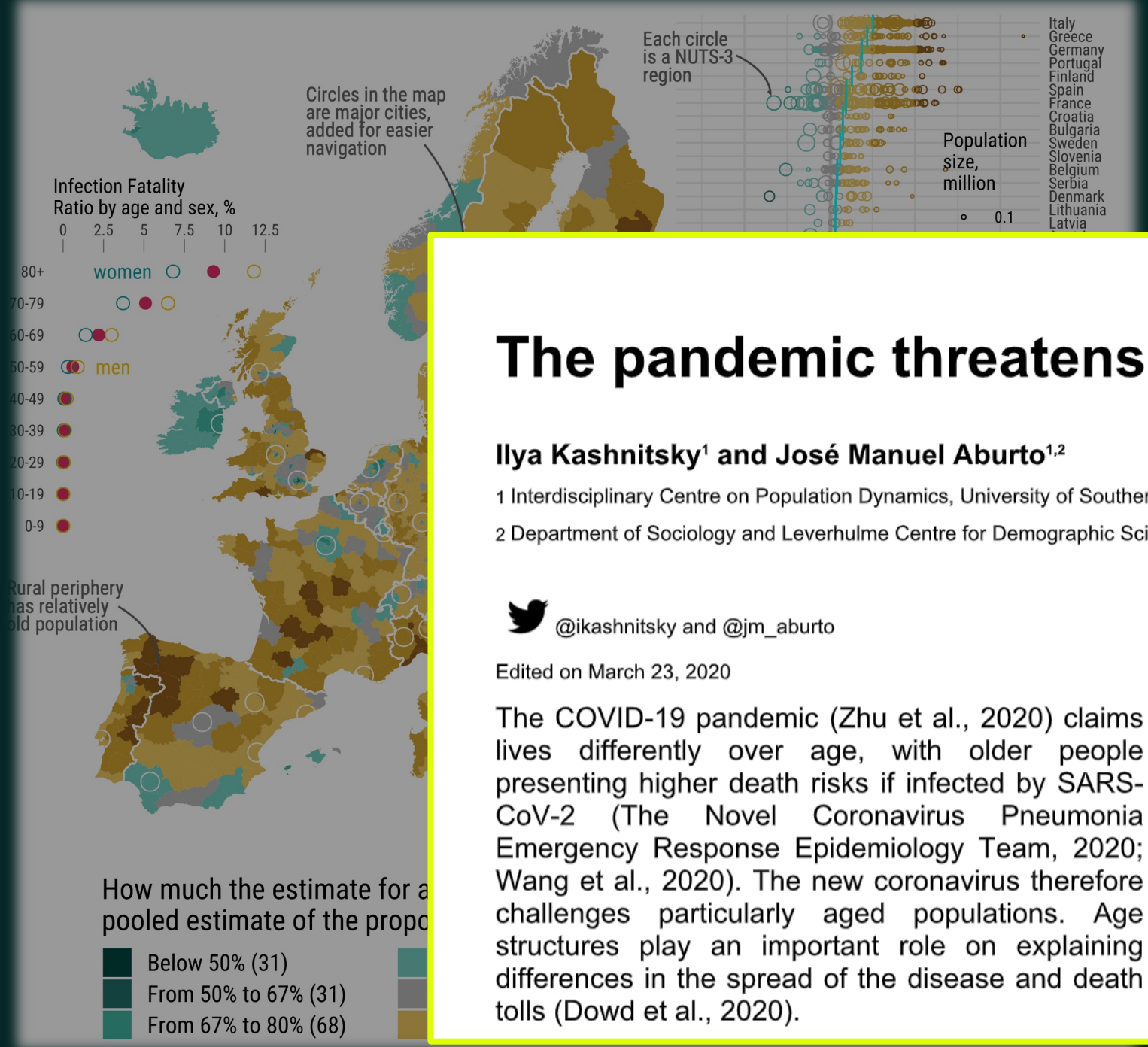
[a] Interdisciplinary Centre on Population Dynamics, University of Southern Denmark, Denmark
[b] Faculty of Spatial Sciences, University of Groningen, The Netherlands
[c] Department of Sociology & Leverhulme Centre for Demographic Science, University of Oxford, United Kingdom

ARTICLE INFO

Article history:
Available online 28 August 2020

ABSTRACT

The map presented in this brief note summarizes regional differences in population age structures between the NUTS-3 regions of Europe in the context of unequal age- and sex-specific death risks associated with the spread of the COVID-19 pandemic. Since older people are exposed to much higher death risks, older populations are expected to face much more difficult challenges coping with the pandemic. The urban/rural dimension turns out to be very important as the remote rural areas are also the oldest. In the map NUTS-3 regions of Europe are colored according to the deviation from European pooled estimate of the proportion of population at risk of death due to COVID-19. We assume that 5/6 of the populations get infected and experience age-specific infection-fatality ratios (IFRs) modelled by the Imperial College COVID-19 Response Team. We adjust IFRs by sex ratios of age-specific case-fatality ratios observed in the European countries that are included in the COVerAGE-DB. Thus, we effectively introduce a summary measure of population age structures focused on the most vulnerable to the pandemic. Such an estimate for the total European population is 1%. The map reflects the unequal population age structures rather than the precise figures on COVID-19 fatality. It is a case-if scenario that highlights the possible effect of the population age structures, a demographic perspective. This analysis clearly shows the contribution of regional differences in population age structures to the magnitude of the pandemic – other things equal, we expect to see a four-fold variation in average regional infection-fatality ratios across Europe due only to differences in the population structures.



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Ilya Kashnitsky[a,b,*], José Manuel Aburto[a,c]

The pandemic threatens aged rural regions most

Ilya Kashnitsky[1] and José Manuel Aburto[1,2]

1 Interdisciplinary Centre on Population Dynamics, University of Southern Denmark (ilya.kashnitsky@gmail.com)

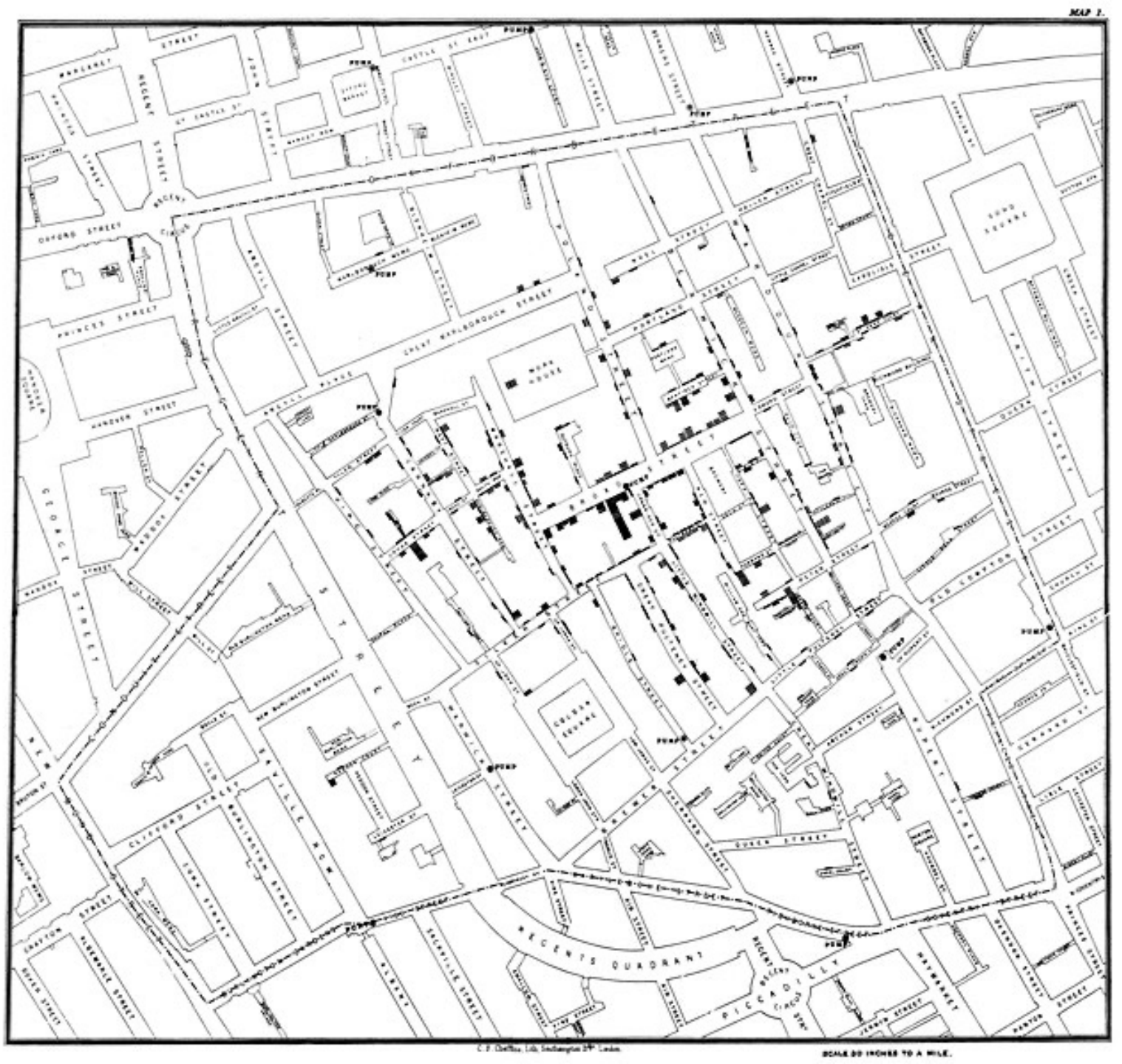
2 Department of Sociology and Leverhulme Centre for Demographic Science, University of Oxford & Max Planck Institute for Demographic Research

@ikashnitsky and @jm_aburto

Edited on March 23, 2020

The COVID-19 pandemic (Zhu et al., 2020) claims lives differently over age, with older people presenting higher death risks if infected by SARS-CoV-2 (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, 2020; Wang et al., 2020). The new coronavirus therefore challenges particularly aged populations. Age structures play an important role on explaining differences in the spread of the disease and death tolls (Dowd et al., 2020).

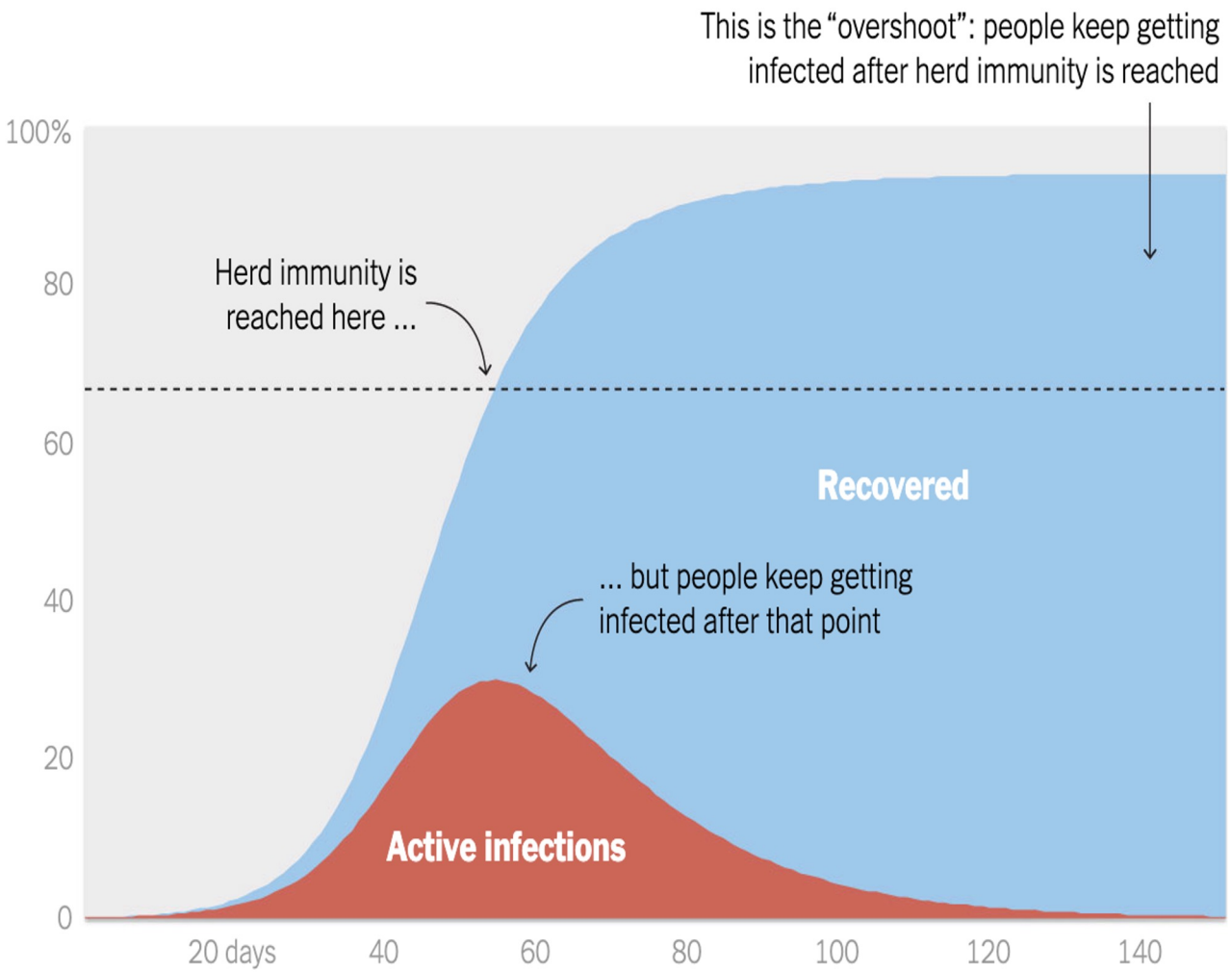
interpretation of the assumptions and limitations is needed. Specially regarding the imperfect data on the unfolding pandemic. The estimated proportions of population at risk of death would only be useful in predicting the pandemic tolls if the age- and sex-specific profile of case-fatality ratios stays constant and the virus does infect 2/3 of the population (Bennhold & Eddy, 2020) uniformly across all the subregions of Europe.


MAP 1.
OXFORD STREET
REGENT STREET
PRINCES STREET
HANOVER STREET
GEORGE STREET
GREAT MARLBOROUGH STREET
BROAD STREET
SOHO SQUARE
GOLDEN SQUARE
REGENTS QUADRANT
PICCADILLY
HAYMARKET
PUMP
C. F. Cheffins, Lith. Southampton Bldgs. London.
SCALE 80 INCHES TO A MILE.


Hills Place
Ramillies Place
Sweatbox
Fitness First
Great Marlborough Street
Noel Street
Poland Street
D'Arblay Street
Wardour Street
Wardour Mews
Hopkins Street
Duck Lane
Richmond Mews
Newburgh Street
Marshall Street
Dufour's Place
Broadwick Street
Berwick Street
Kingly Street
Ingestre Place
Peter Street
Lexington Street
Bridle Lane
Beak Street
Golden Square
Brewer Street
Smith's Court
Great Windmill Street
Archer Street
Ham Yard
Shaftesbury Ave
Regent Street
Warwick Street

After Herd Immunity ... More Infections

Herd immunity doesn't stop a virus in its tracks. The number of infections continues to climb after herd immunity is reached.



By The New York Times

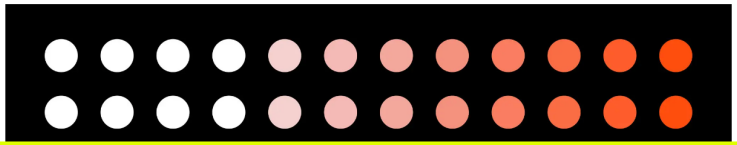
The New York Times

OPINION

What the Proponents of 'Natural' Herd Immunity Don't Say

Try to reach it without a vaccine, and millions will die.

May 1, 2020



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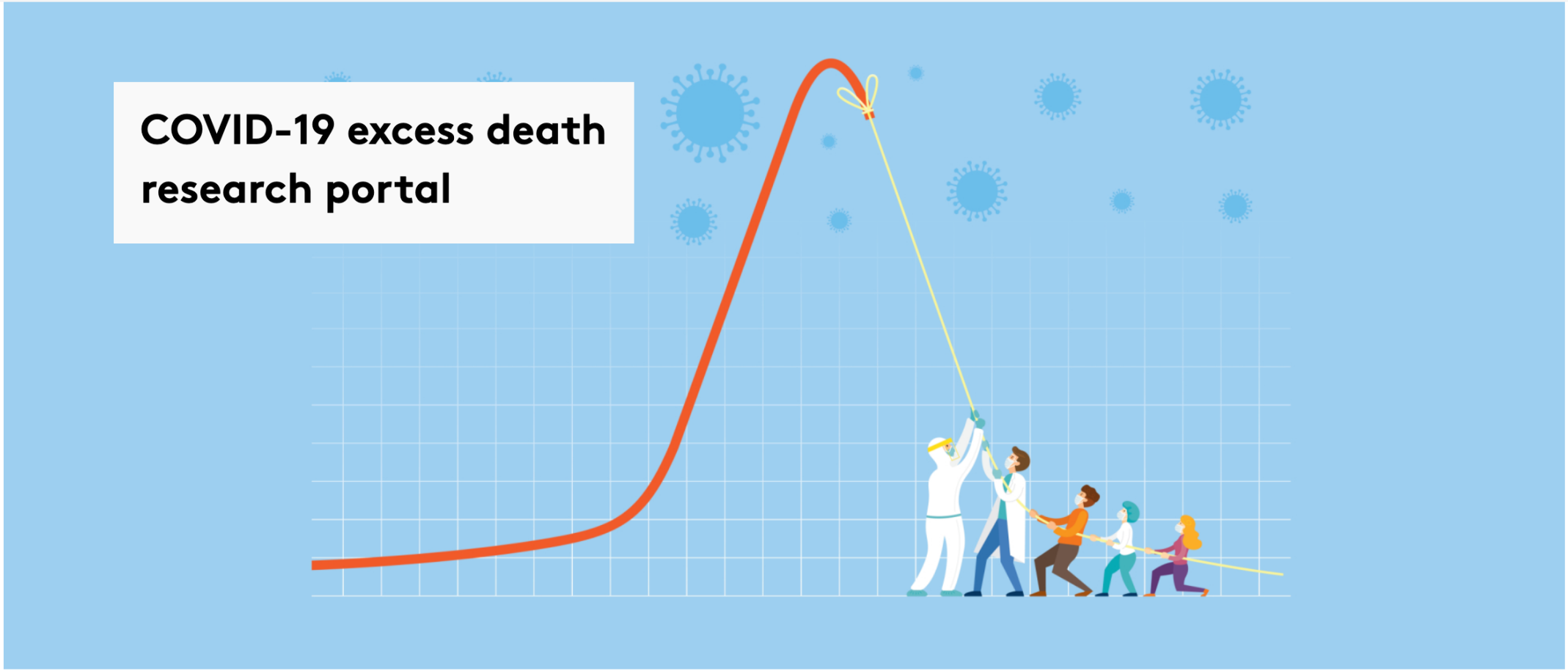


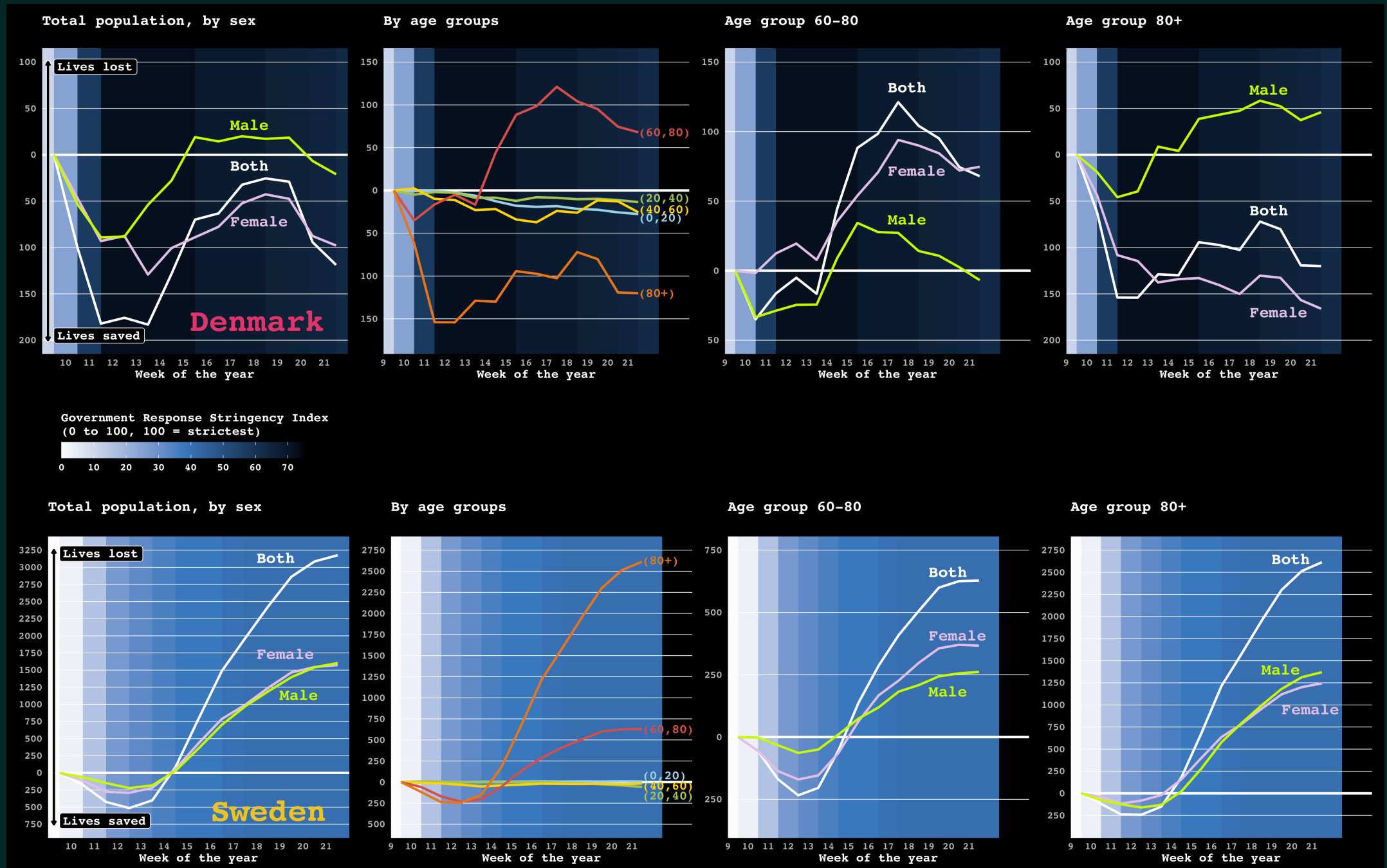
Almost all studies of the health impact of COVID-19 have focused on analyzing incomplete and often inaccurate data on reported infections, hospitalizations and deaths. We are estimating excess deaths by age and sex and over time. We study excess deaths caused directly by COVID-19 or indirectly because of

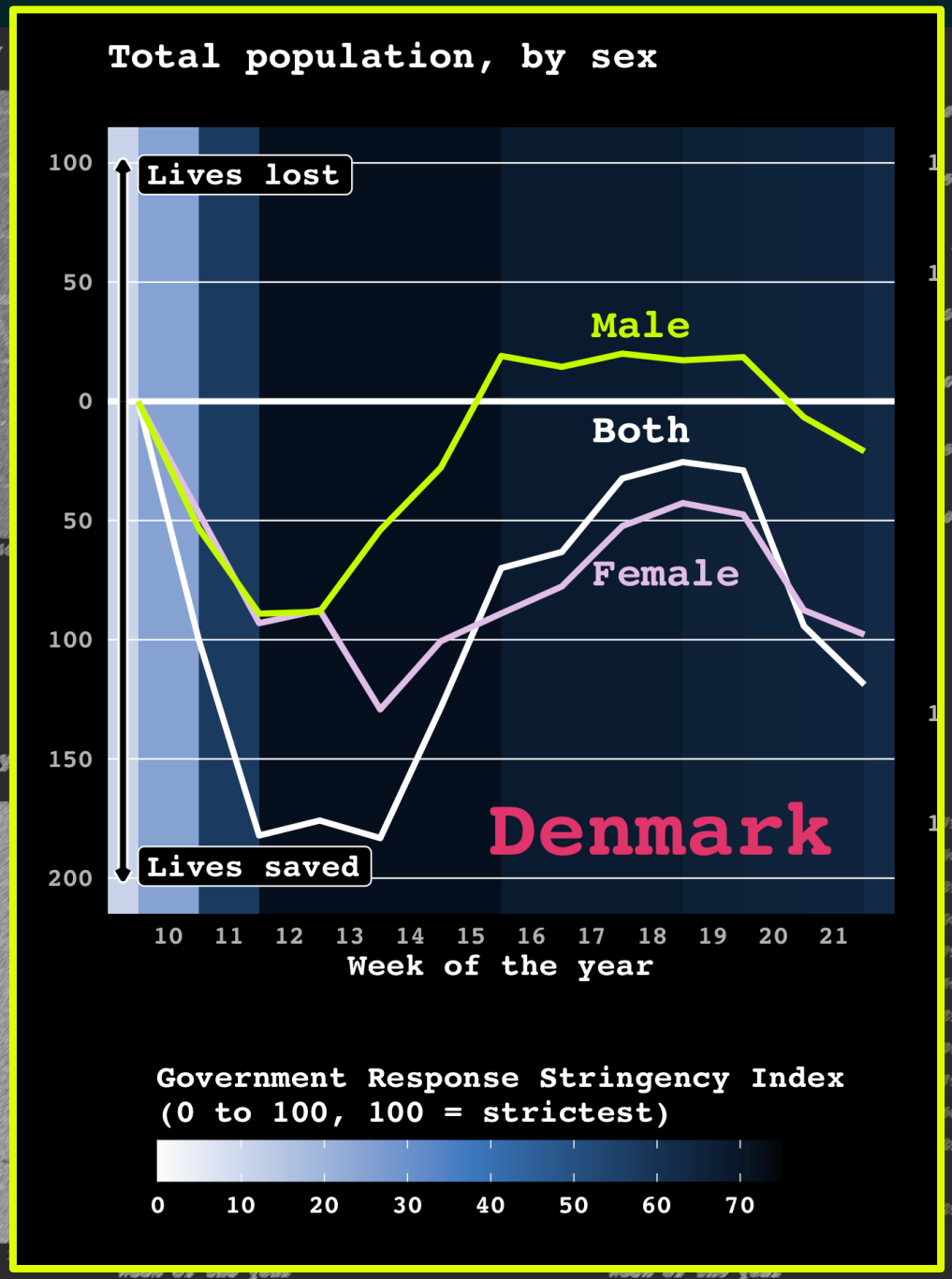
Publications

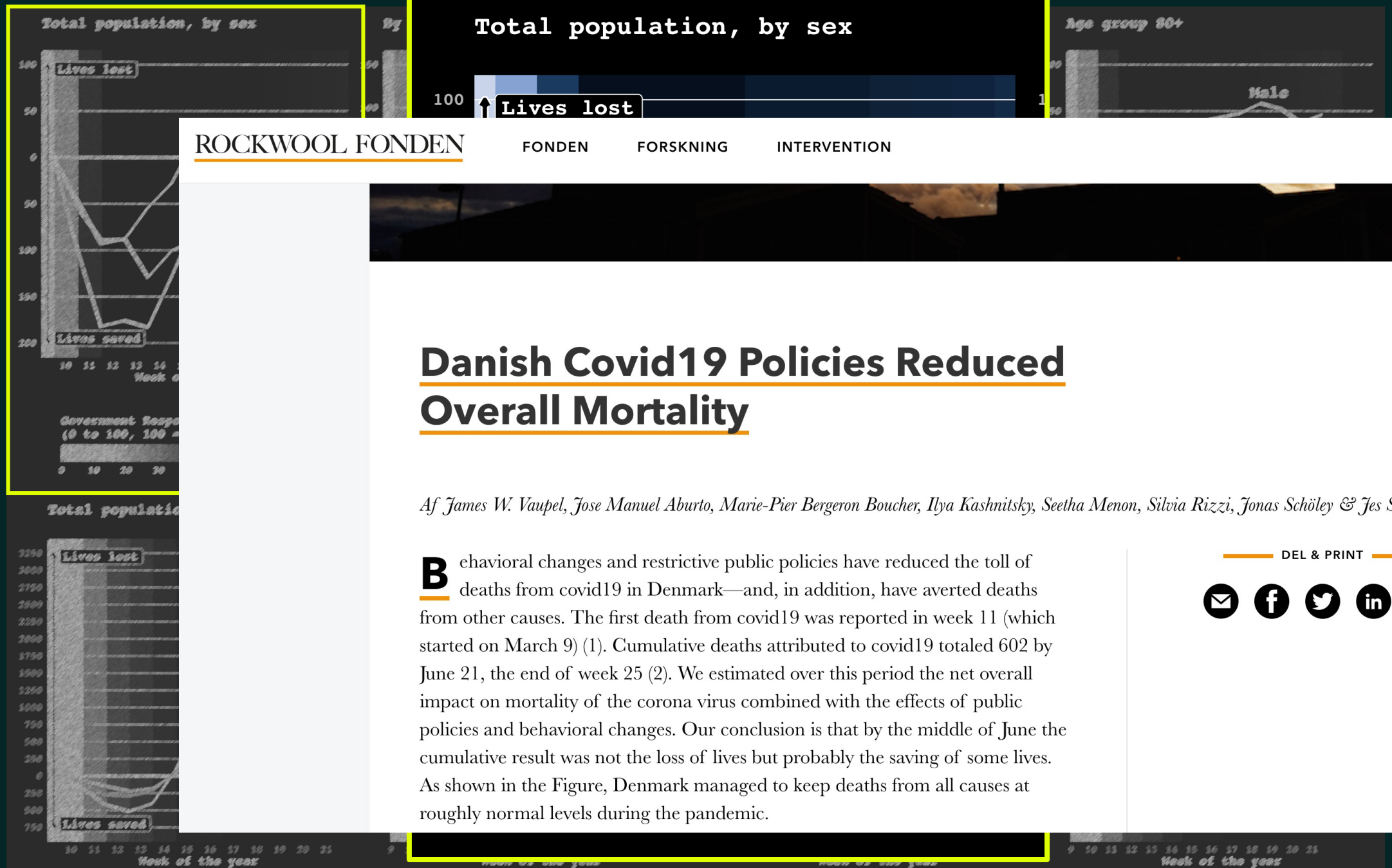
Read our publications on the COVID-19 related excess death and related issues.

Remembering James W. Vaupel and his living legacy

https://remembering-james-vaupel.org


Total population, by sex
Lives lost
Male
Both
Female
Lives saved
Denmark
Week of the year
By age groups
(60,80)
(20,40)
(40,60)
(0,20)
(80+)
Week of the year
Age group 60-80
Both
Female
Male
Week of the year
Age group 80+
Male
Both
Female
Week of the year
Government Response Stringency Index
(0 to 100, 100 = strictest)
0 10 20 30 40 50 60 70
Total population, by sex
Lives lost
Both
Female
Male
Lives saved
Sweden
Week of the year
By age groups
(80+)
(60,80)
(0,20)
(40,60)
(20,40)
Week of the year
Age group 60-80
Both
Female
Male
Week of the year
Age group 80+
Both
Male
Female
Week of the year


Total population, by sex
Lives lost
Lives saved
Male
Both
Female
Denmark
100
50
0
50
100
150
200
10 11 12 13 14 15 16 17 18 19 20 21
Week of the year
Government Response Stringency Index
(0 to 100, 100 = strictest)
0 10 20 30 40 50 60 70



ROCKWOOL FONDEN

FONDEN FORSKNING INTERVENTION

24.07.2020

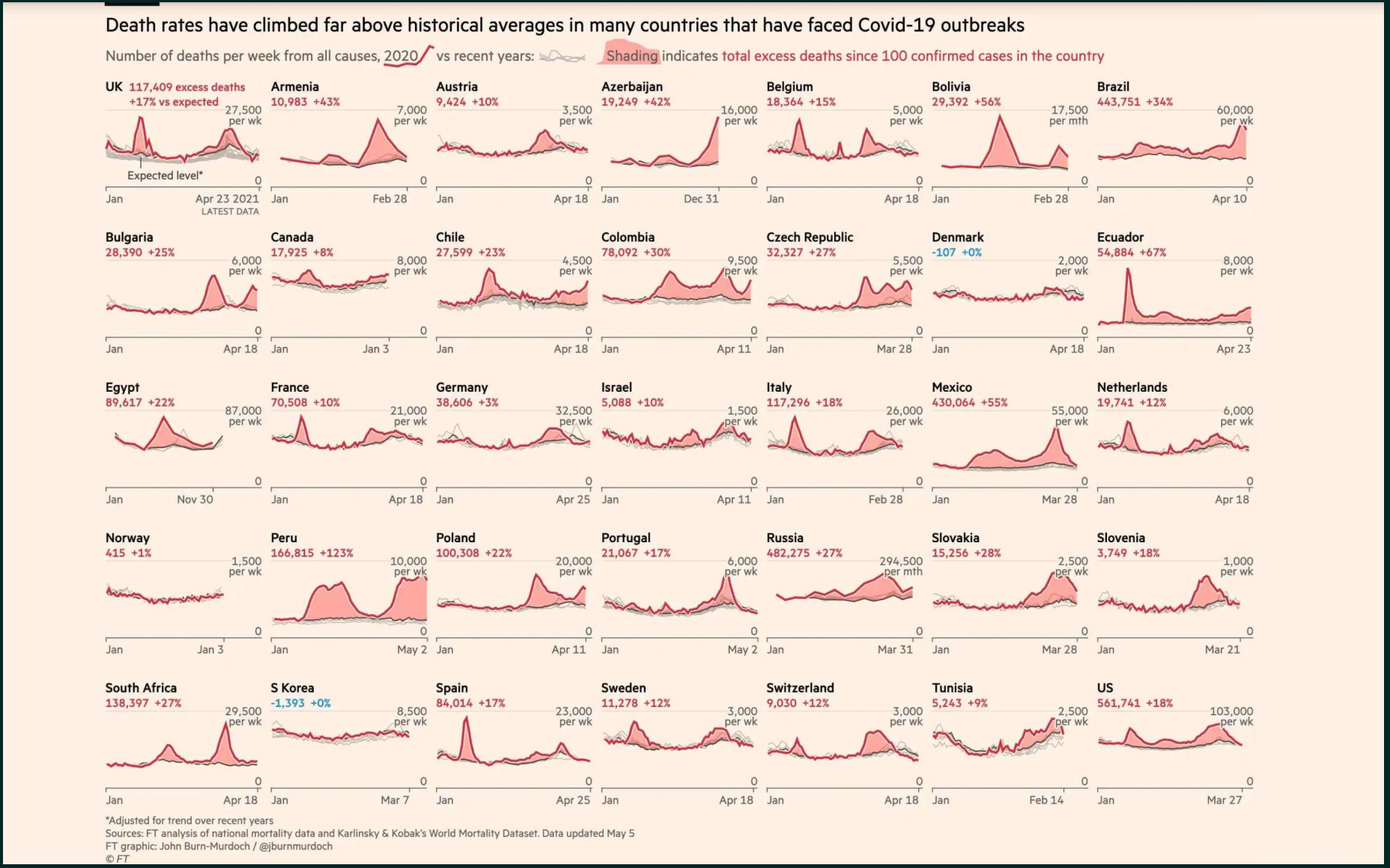
Danish Covid19 Policies Reduced Overall Mortality

Af James W. Vaupel, Jose Manuel Aburto, Marie-Pier Bergeron Boucher, Ilya Kashnitsky, Seetha Menon, Silvia Rizzi, Jonas Schöley & Jes Søgaard

Behavioral changes and restrictive public policies have reduced the toll of deaths from covid19 in Denmark—and, in addition, have averted deaths from other causes. The first death from covid19 was reported in week 11 (which started on March 9) (1). Cumulative deaths attributed to covid19 totaled 602 by June 21, the end of week 25 (2). We estimated over this period the net overall impact on mortality of the corona virus combined with the effects of public policies and behavioral changes. Our conclusion is that by the middle of June the cumulative result was not the loss of lives but probably the saving of some lives. As shown in the Figure, Denmark managed to keep deaths from all causes at roughly normal levels during the pandemic.

DEL & PRINT

Measuring the impact of c19



https://www.ft.com/content/a2901ce8-5eb7-4633-b89c-cbdf5b386938

eLife

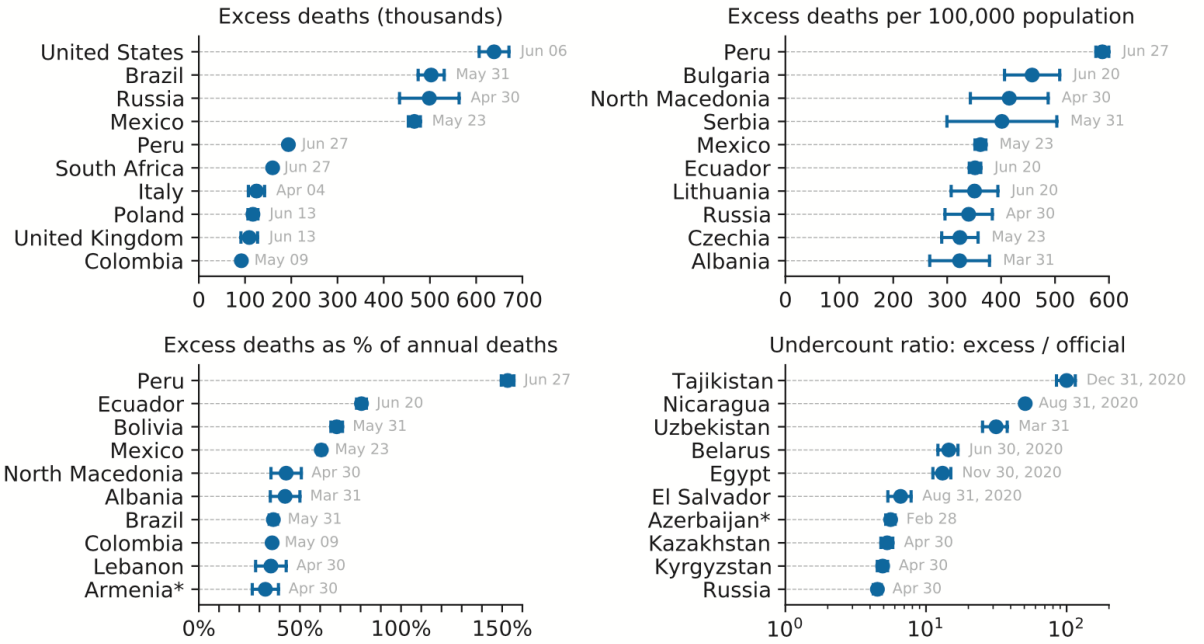
TOOLS AND RESOURCES

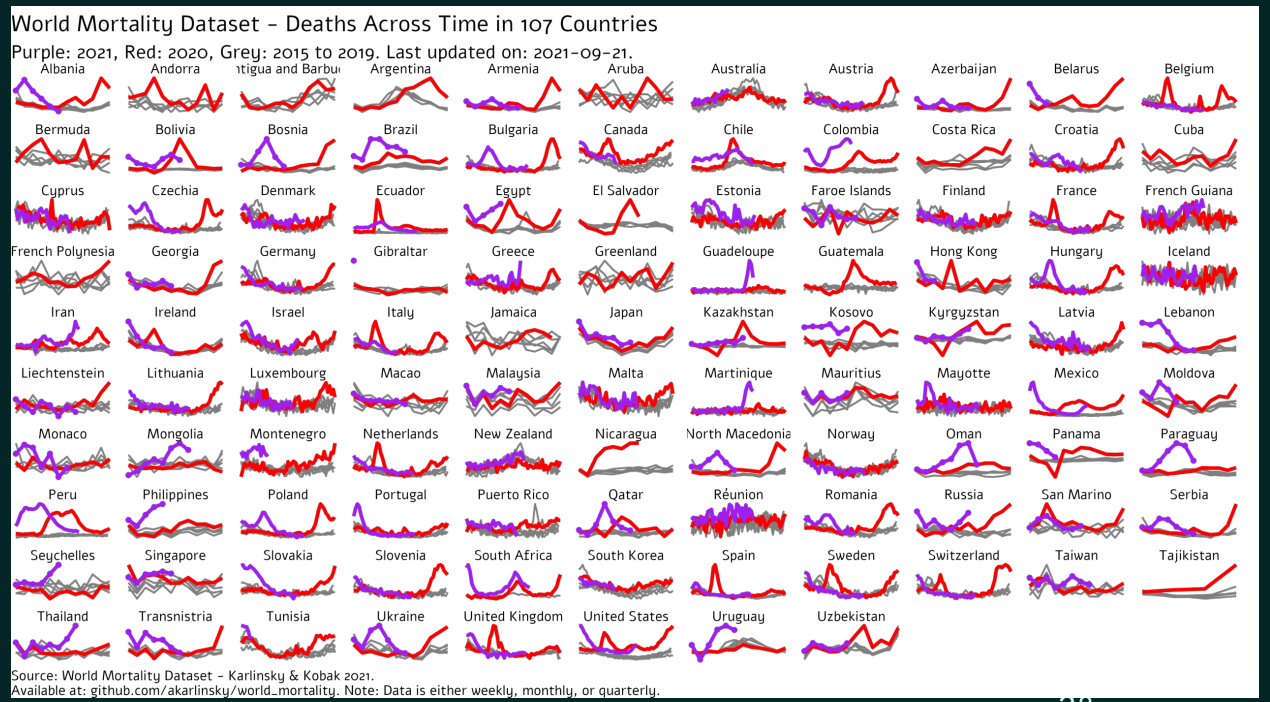
Tracking excess mortality across countries during the COVID-19 pandemic with the World Mortality Dataset

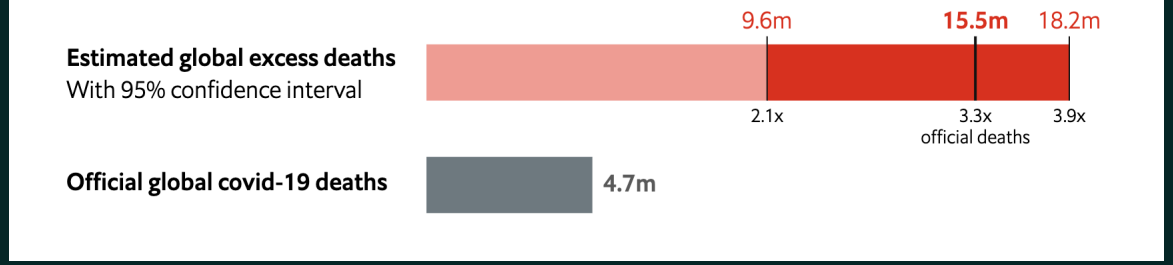
Ariel Karlinsky[1]*, Dmitry Kobak[2]*

[1]Hebrew University, Jerusalem, Israel; [2]Institute for Ophthalmic Research, University of Tübingen, Tübingen, Germany

Measuring the impact of c19







The Economist

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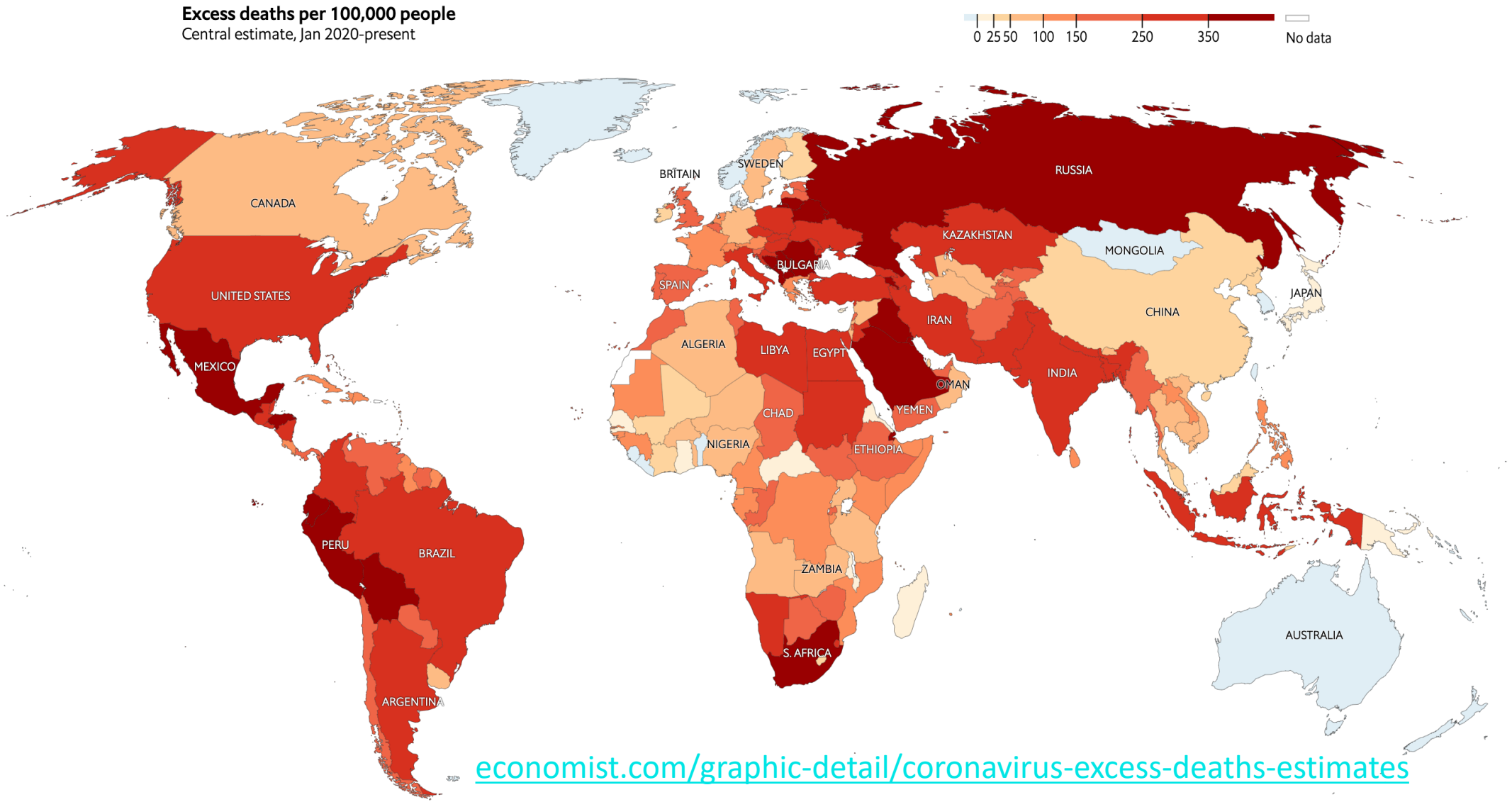
Graphic detail

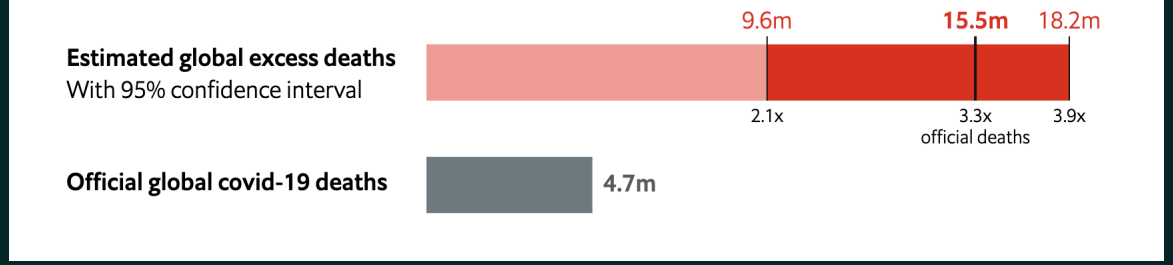
Covid-19 data

The pandemic's true death toll

excess deaths around the world



economist.com/graphic-detail/coronavirus-excess-deaths-estimates



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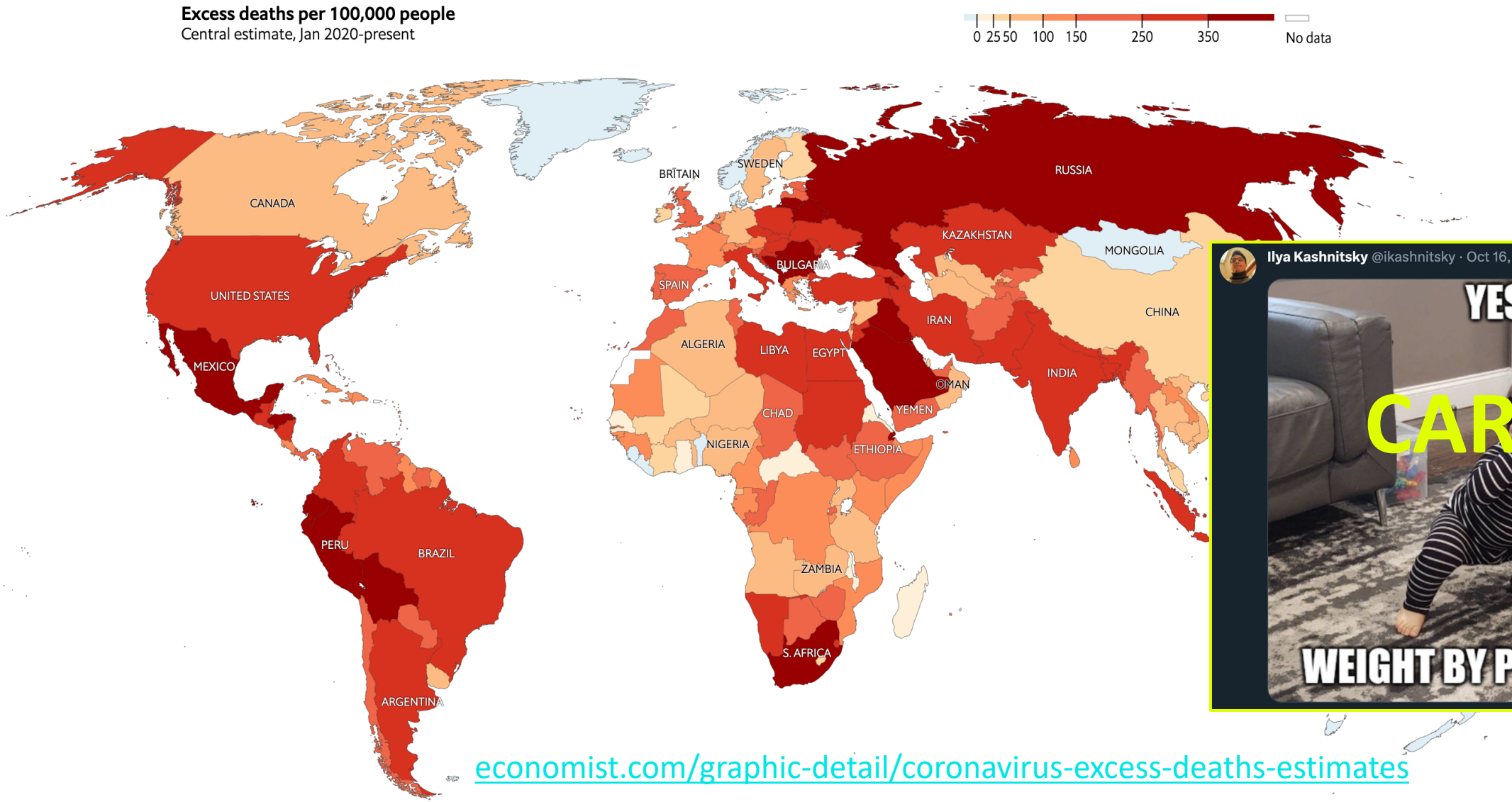

economist.com/graphic-detail/coronavirus-excess-deaths-estimates

Life expectancy is the ultimate measure of current mortality

- Free from population age structure effect
- No need to choose a standard
- Comparable across place and time

Gerontology

Of General Interest / Viewpoint

Gerontology 2020;66:95–104
DOI: 10.1159/000500955

Received: April 12, 2019
Accepted after revision: May 14, 2019
Published online: August 7, 2019

Life Expectancy: Frequently Used, but Hardly Understood

Marc Luy[a, b] Paola Di Giulio[a, b] Vanessa Di Lego[a, b] Patrick Lazarevič[a, b] Markus Sauerberg[a, b]

[a] Wittgenstein Centre for Demography and Global Human Capital (IIASA, VID/ÖAW, WU), Vienna, Austria; [b] Vienna Institute of Demography, Austrian Academy of Sciences, Vienna, Austria

Keywords
Life expectancy · Cohort effects · Heterogeneity · Harvesting effect · Tempo effects

Abstract
Period life expectancy is one of the most used summary indicators for the overall health of a population. Its levels and trends direct health policies, and researchers try to identify the determining risk factors to assess and forecast future developments. The use of period life expectancy is often based on the assumption that it directly reflects the mortality conditions of a certain year. Accordingly, the explanation for changes in life expectancy are typically sought in factors that have an immediate impact on current mortality conditions. It is frequently overlooked, however, that this indicator can also be affected by at least three kinds of effects, in particular in the situation of short-term fluctuations: cohort effects, heterogeneity effects, and tempo effects. We demonstrate their possible impact with the example of the almost Europe-wide decrease in life expectancy in 2015, which caused a series of reports about an upsurge of a health crisis, and we show that the consideration of these effects can lead to different conclusions. Therefore, we want to raise an awareness concerning the sensitivity of life expectancy to sudden changes and the menaces a misled interpretation of this indicator can cause.

Introduction

Period life expectancy (PLE) is one of the most used summary indicators for the overall health of a population. It is based on the set of observed age-specific death rates, i.e., the number of deaths in a certain year and age group divided by the average number of people alive in this year and age group. These death rates are then transformed into probabilities of dying and connected to a survival function from birth to the highest age in which people are living. The mean age at death derived from this survival function is the PLE. It can be interpreted as the average number of years that newborns of a certain period would live under the hypothetical scenario that the prevailing age-specific death rates remain constant in the future [1].

The period perspective must be strictly distinguished from the cohort perspective. The latter is the more intuitive and more clearly interpretable analytic concept. It connects the age-specific death rates experienced by a cohort longitudinally over its entire life course. Thus, cohort life expectancy (CLE) reflects the actual mean age at death of real people who were born at the same time. Naturally, CLE can only summarize past mortality experiences, whereas PLE reflects the most current death rates cross-sectionally across all ages. This is why PLE is of higher relevance for most practical purposes and more frequently used than CLE.

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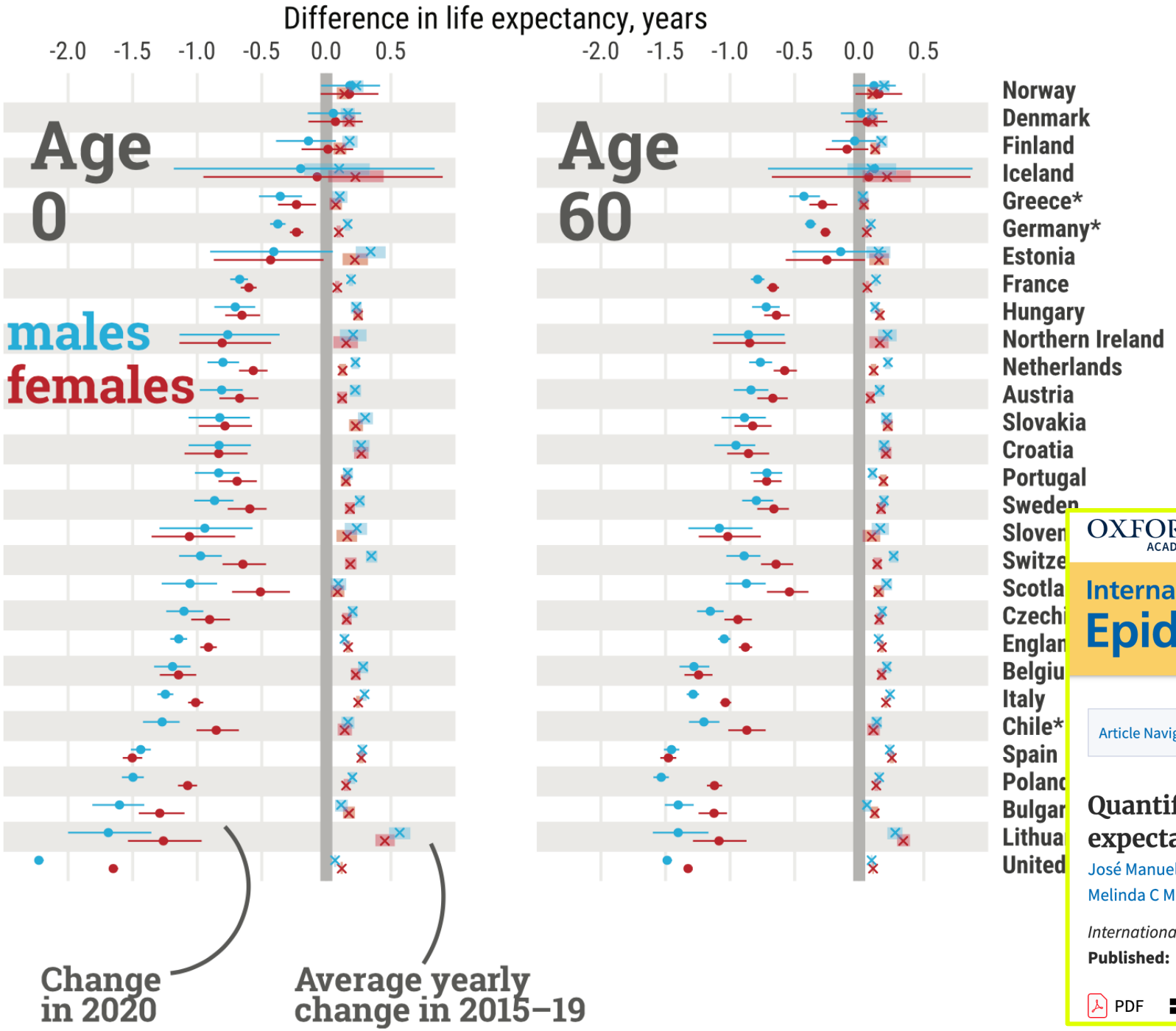

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International Journal of Epidemiology

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Article Navigation

Quantifying impacts of the COVID-19 pandemic through life-expectancy losses: a population-level study of 29 countries

José Manuel Aburto, Jonas Schöley, Ilya Kashnitsky, Luyin Zhang, Charles Rahal, Trifon I Missov, Melinda C Mills, Jennifer B Dowd, Ridhi Kashyap Author Notes

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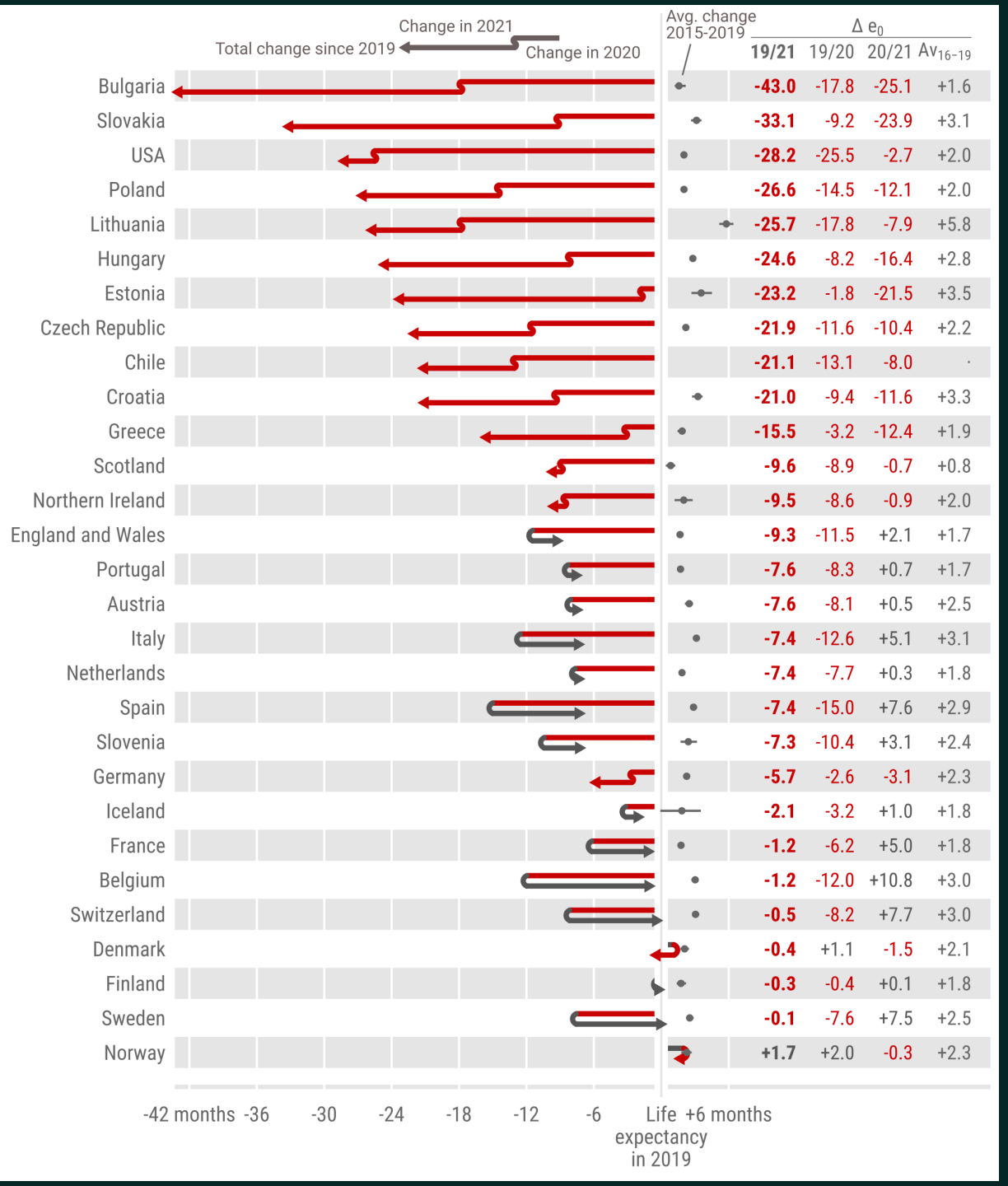

nature human behaviour

Article

https://doi.org/10.1038/s41562-022-01450-3

Life expectancy changes since COVID-19

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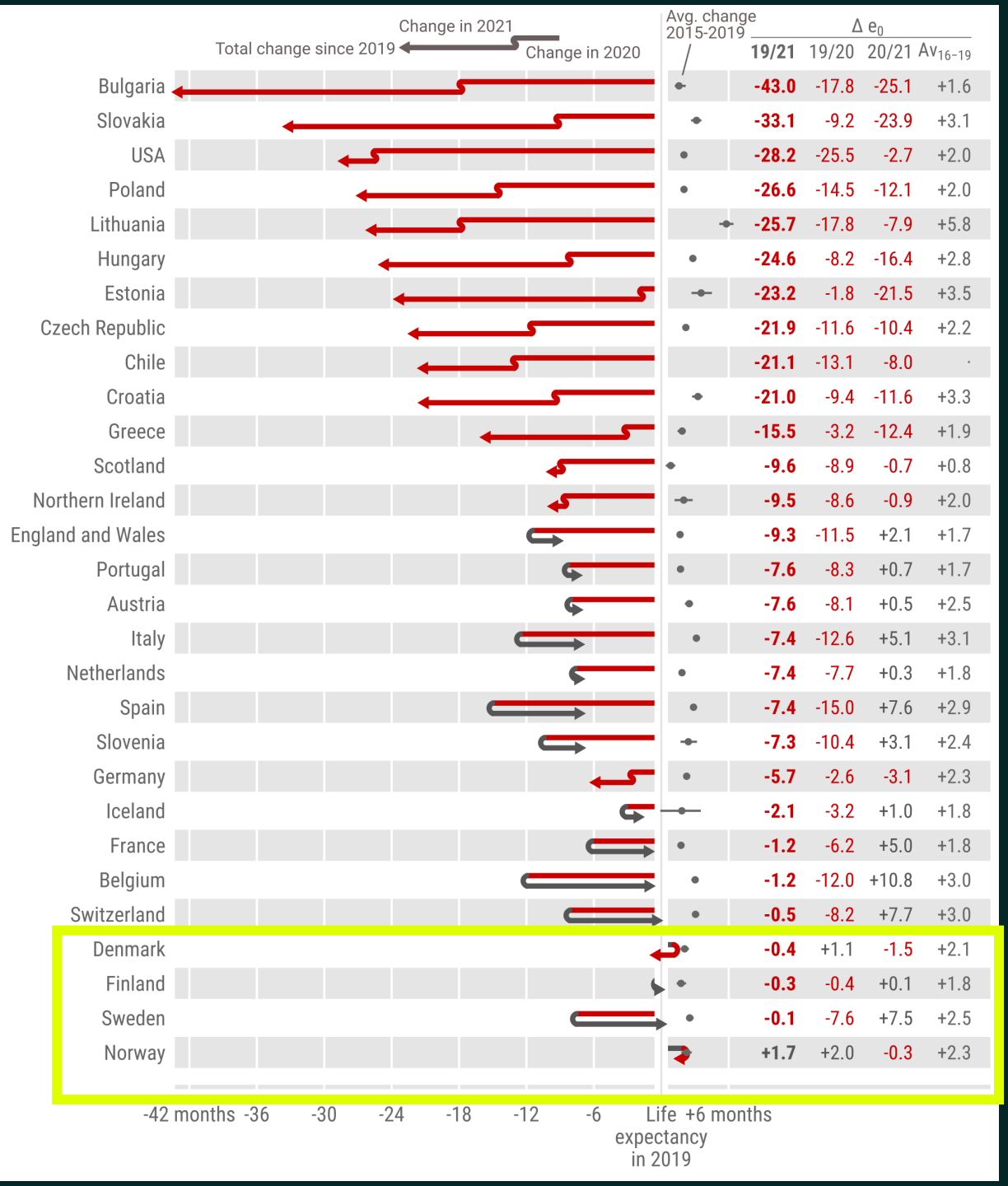
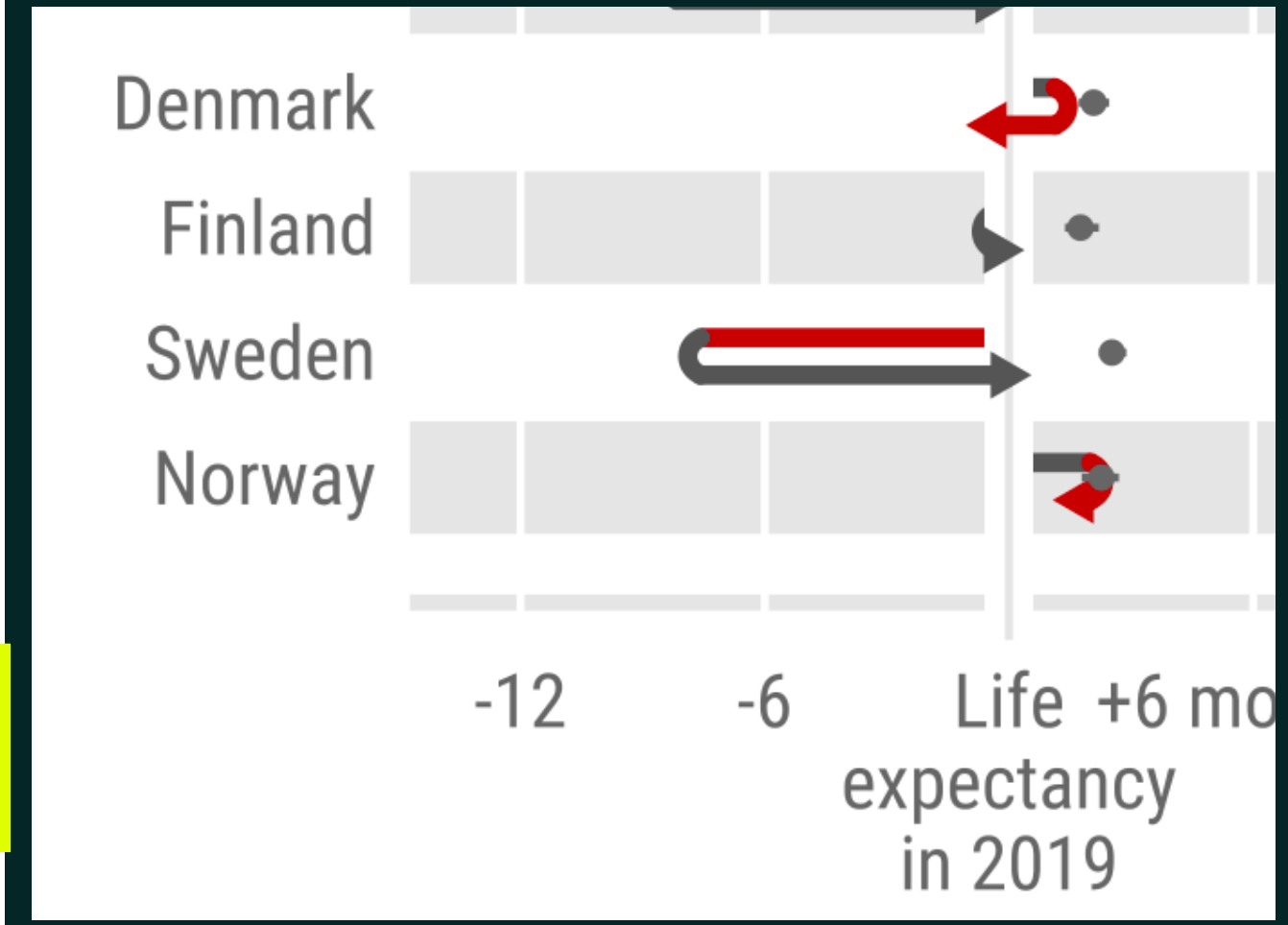
Check for updates

Jonas Schöley[1] ✉, José Manuel Aburto[2,3,4,5] ✉, Ilya Kashnitsky[4], Maxi S. Kniffka[1], Luyin Zhang[2], Hannaliis Jaadla[6,7], Jennifer B. Dowd[2,3] and Ridhi Kashyap[2,3] ✉

The COVID-19 pandemic triggered an unprecedented rise in mortality that translated into life expectancy losses around the world, with only a few exceptions. We estimate life expectancy changes in 29 countries since 2020 (including most of Europe, the United States and Chile), attribute them to mortality changes by age group and compare them with historic life expectancy shocks. Our results show divergence in mortality impacts of the pandemic in 2021. While countries in western Europe experienced bounce backs from life expectancy losses of 2020, eastern Europe and the United States witnessed sustained and substantial life expectancy deficits. Life expectancy deficits during fall/winter 2021 among people ages 60+ and <60 were negatively correlated with measures of vaccination uptake across countries ($r_{60+} = -0.86$; two-tailed $P < 0.001$; 95% confidence interval, −0.94 to −0.69; $r_{<60} = -0.74$; two-tailed $P < 0.001$; 95% confidence interval, −0.88 to −0.46). In contrast to 2020, the age profile of excess mortality in 2021 was younger, with those in under-80 age groups contributing more to life expectancy losses. However, even in 2021, registered COVID-19 deaths continued to account for most life expectancy losses.

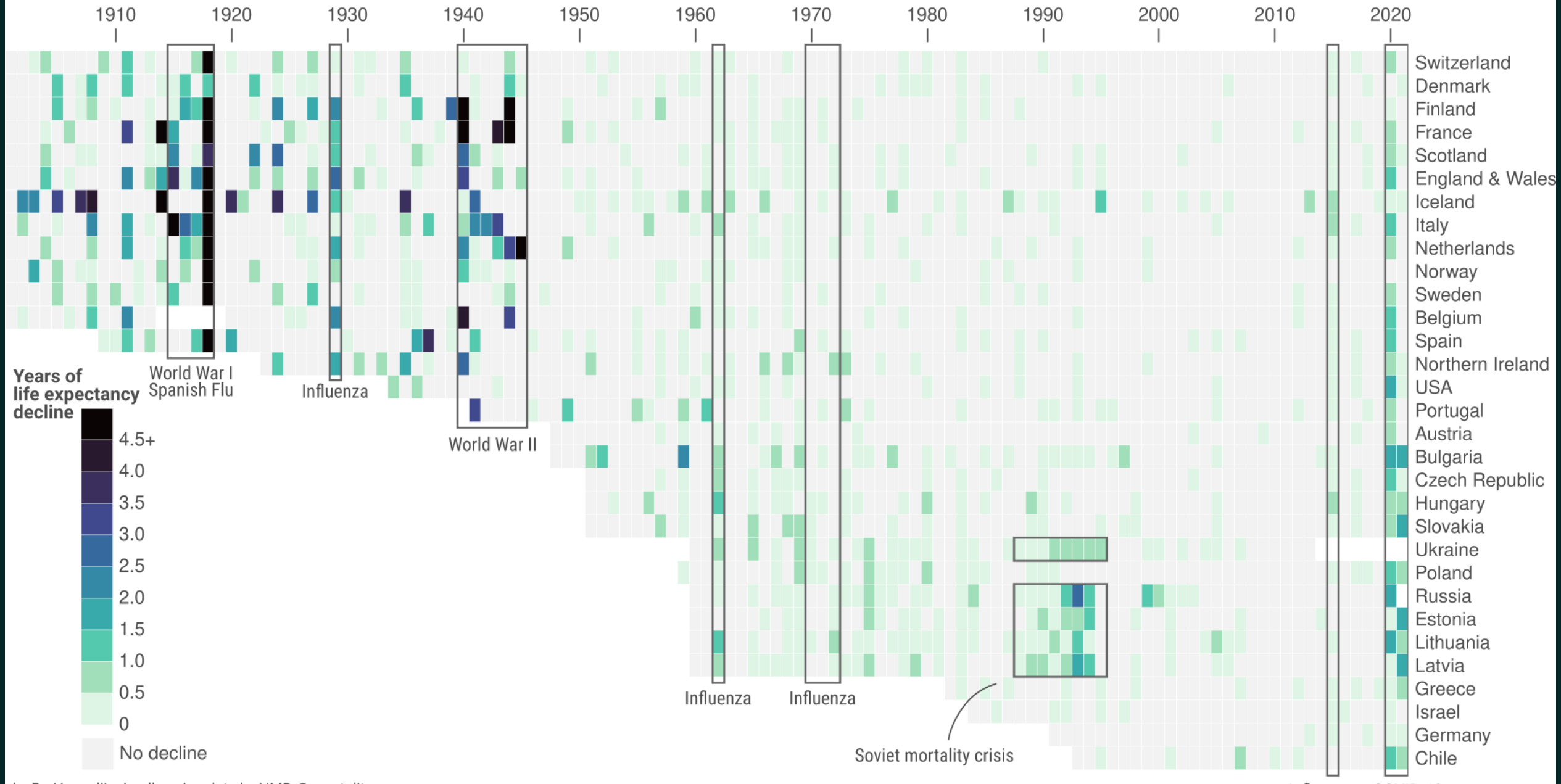
Nordics


Change in 2021
Total change since 2019
Change in 2020
Avg. change 2015-2019
Δ e0
19/21 19/20 20/21 Av16-19
Bulgaria -43.0 -17.8 -25.1 +1.6
Slovakia -33.1 -9.2 -23.9 +3.1
USA -28.2 -25.5 -2.7 +2.0
Poland -26.6 -14.5 -12.1 +2.0
Lithuania -25.7 -17.8 -7.9 +5.8
Hungary -24.6 -8.2 -16.4 +2.8
Estonia -23.2 -1.8 -21.5 +3.5
Czech Republic -21.9 -11.6 -10.4 +2.2
Chile -21.1 -13.1 -8.0
Croatia -21.0 -9.4 -11.6 +3.3
Greece -15.5 -3.2 -12.4 +1.9
Scotland -9.6 -8.9 -0.7 +0.8
Northern Ireland -9.5 -8.6 -0.9 +2.0
England and Wales -9.3 -11.5 +2.1 +1.7
Portugal -7.6 -8.3 +0.7 +1.7
Austria -7.6 -8.1 +0.5 +2.5
Italy -7.4 -12.6 +5.1 +3.1
Netherlands -7.4 -7.7 +0.3 +1.8
Spain -7.4 -15.0 +7.6 +2.9
Slovenia -7.3 -10.4 +3.1 +2.4
Germany -5.7 -2.6 -3.1 +2.3
Iceland -2.1 -3.2 +1.0 +1.8
France -1.2 -6.2 +5.0 +1.8
Belgium -1.2 -12.0 +10.8 +3.0
Switzerland -0.5 -8.2 +7.7 +3.0
Denmark -0.4 +1.1 -1.5 +2.1
Finland -0.3 -0.4 +0.1 +1.8
Sweden -0.1 -7.6 +7.5 +2.5
Norway +1.7 +2.0 -0.3 +2.3
-42 months -36 -30 -24 -18 -12 -6 Life +6 months
Life expectancy in 2019


Denmark
Finland
Sweden
Norway
-12
-6
Life +6 mo
expectancy
in 2019

A century of disrupted life expectancy increases

Years where life expectancy declined across 31 countries going back to 1900

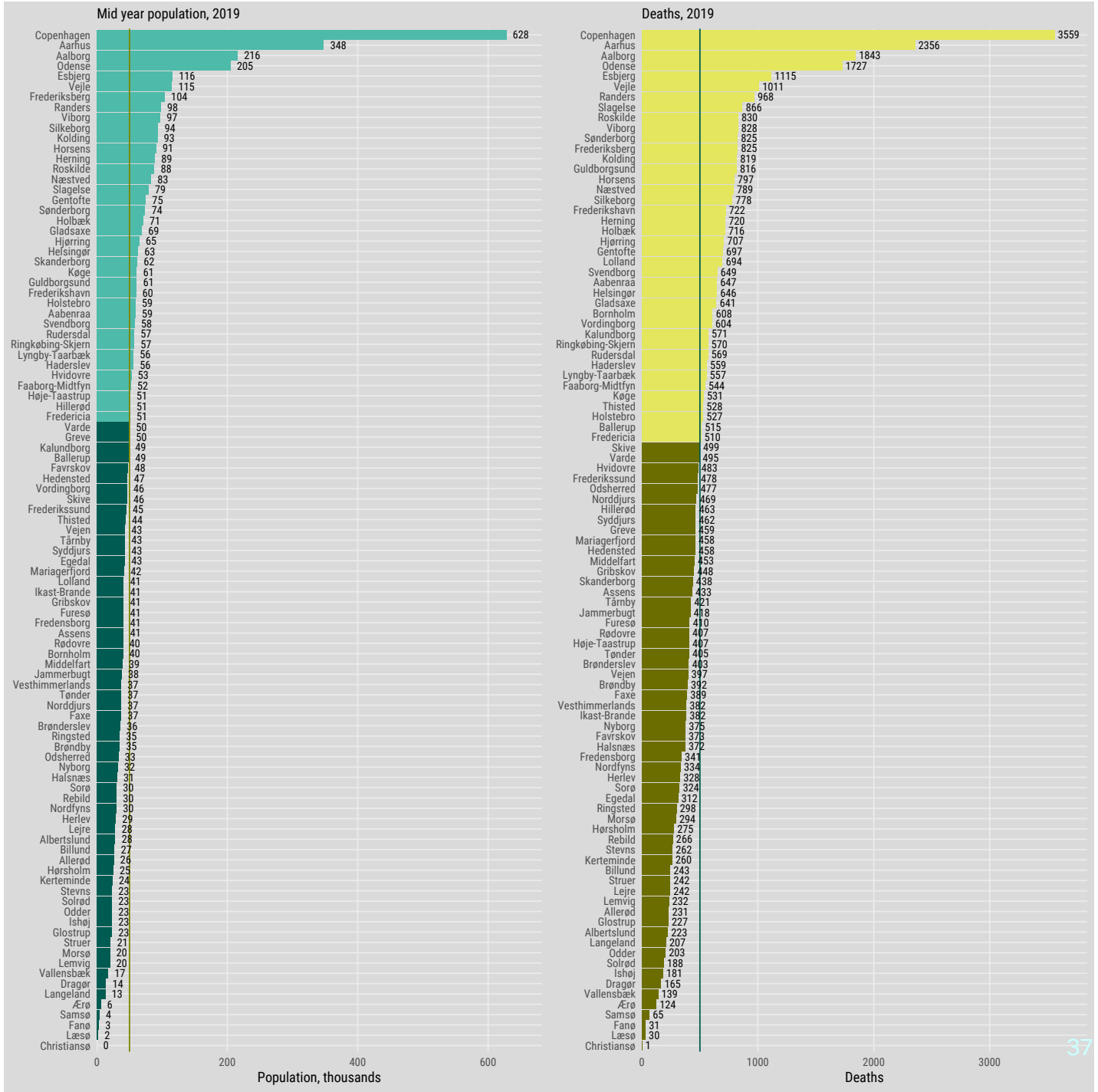


by Dr. Hannaliis Jaadla using data by HMD @ mortality.org

Danish municipalities are small

About half of them are less than **50K** people

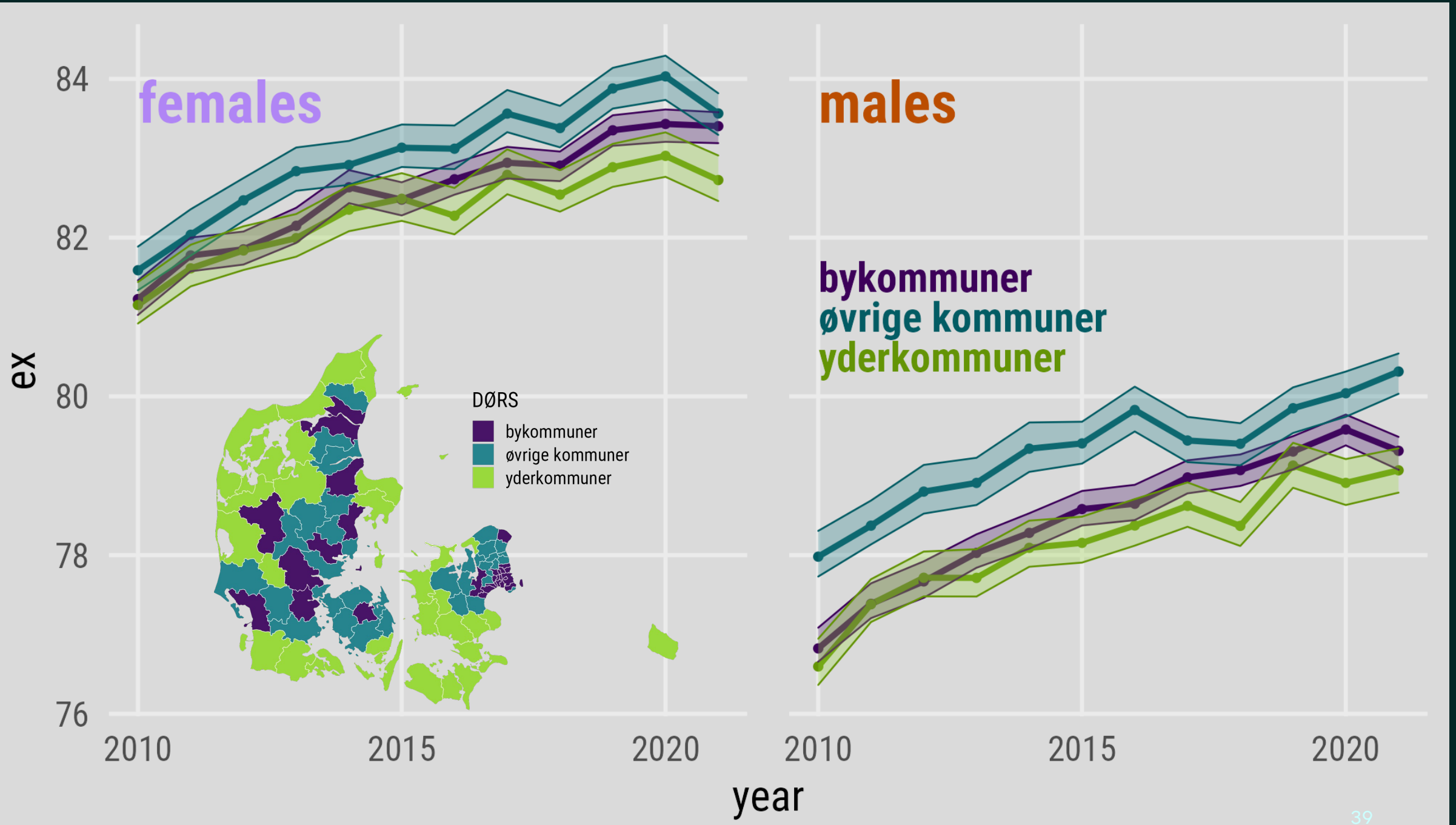
and see less than **500** deaths per year



The main message of Figs. 9 and 10 lies in the very high overlap between the posterior distributions of many of the microregions. These are not especially small areas: Livramento do Brumado was the least-populous microregion in Bahia, but it had a total population of 97,786 in 2010, and the median total population of Bahian microregions was slightly below 290,000.

Despite these fairly large areas, however, uncertainty dominates most pairwise comparisons. It is clear that at this geographic level, researchers and policy makers should not rely on point estimates to distinguish high- and low-mortality areas—especially if differences in best-guess estimates of median e_0 are less than one year. That result applies even more strongly to smaller areas, such as municipalities.

Schmertmann, C. P., & Gonzaga, M. R. (2018). Bayesian Estimation of Age-Specific Mortality and Life Expectancy for Small Areas With Defective Vital Records. ***Demography***, 55(4), 1363–1388. https://doi.org/10.1007/s13524-018-0695-2


females
males
bykommuner
øvrige kommuner
yderkommuner
DØRS
bykommuner
øvrige kommuner
yderkommuner
ex
year
84
82
80
78
76
2010
2015
2020
2010
2015
2020

No story

¯_(ツ)_/¯

No story

¯_(ツ)_/¯

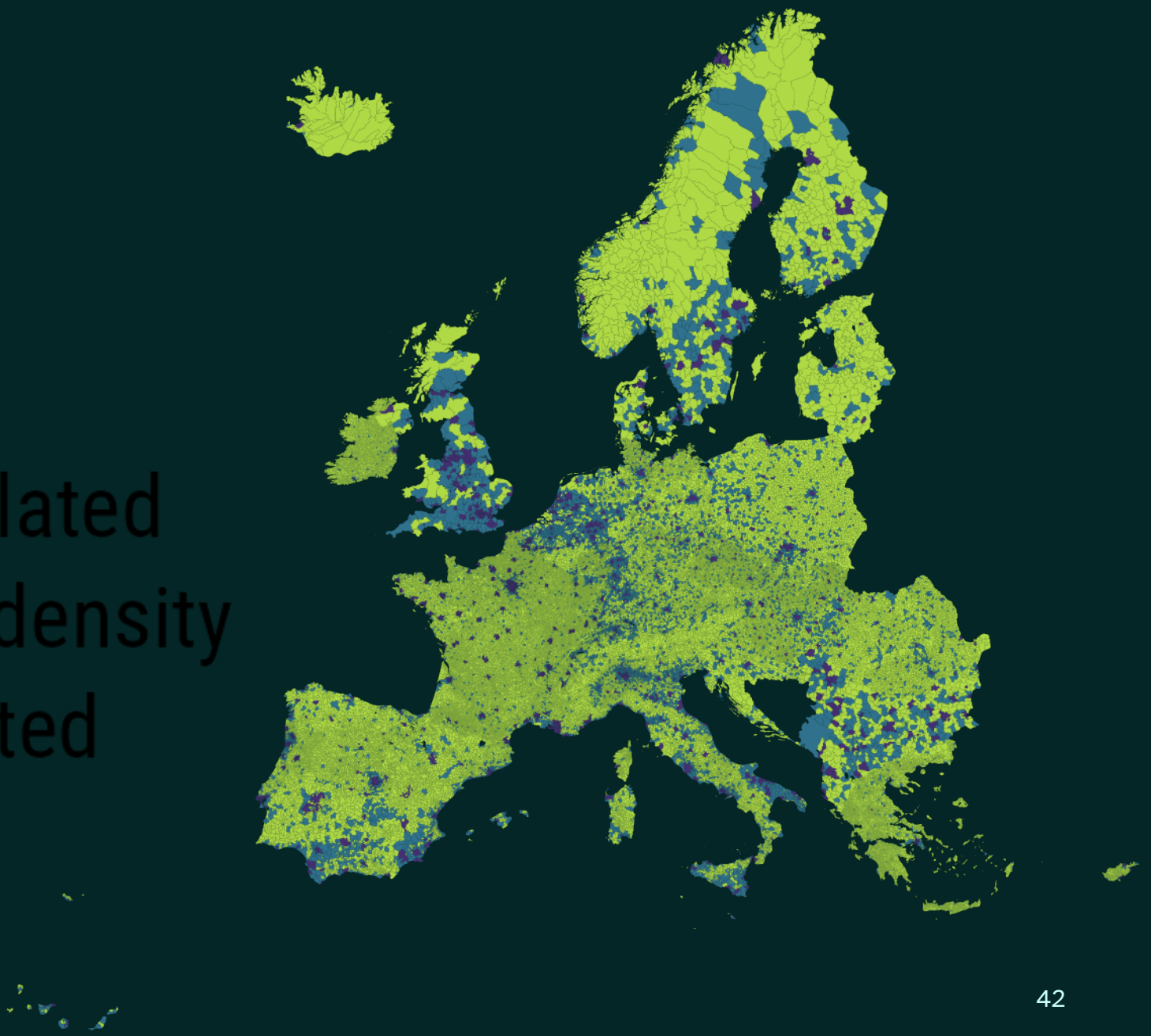
Maybe other countries?

DEGURBA classification

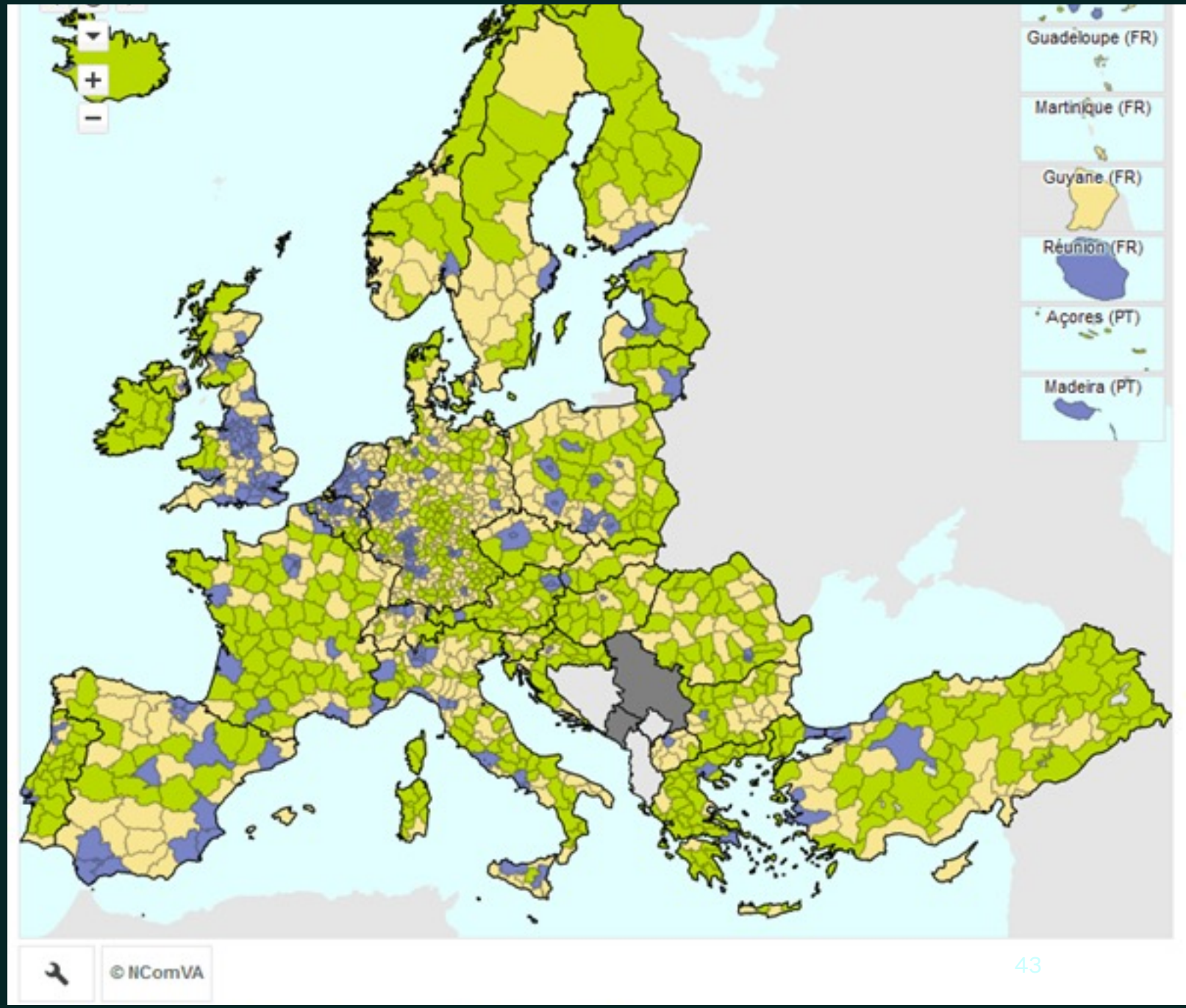
Densely populated

Intermediate density

Thinly populated



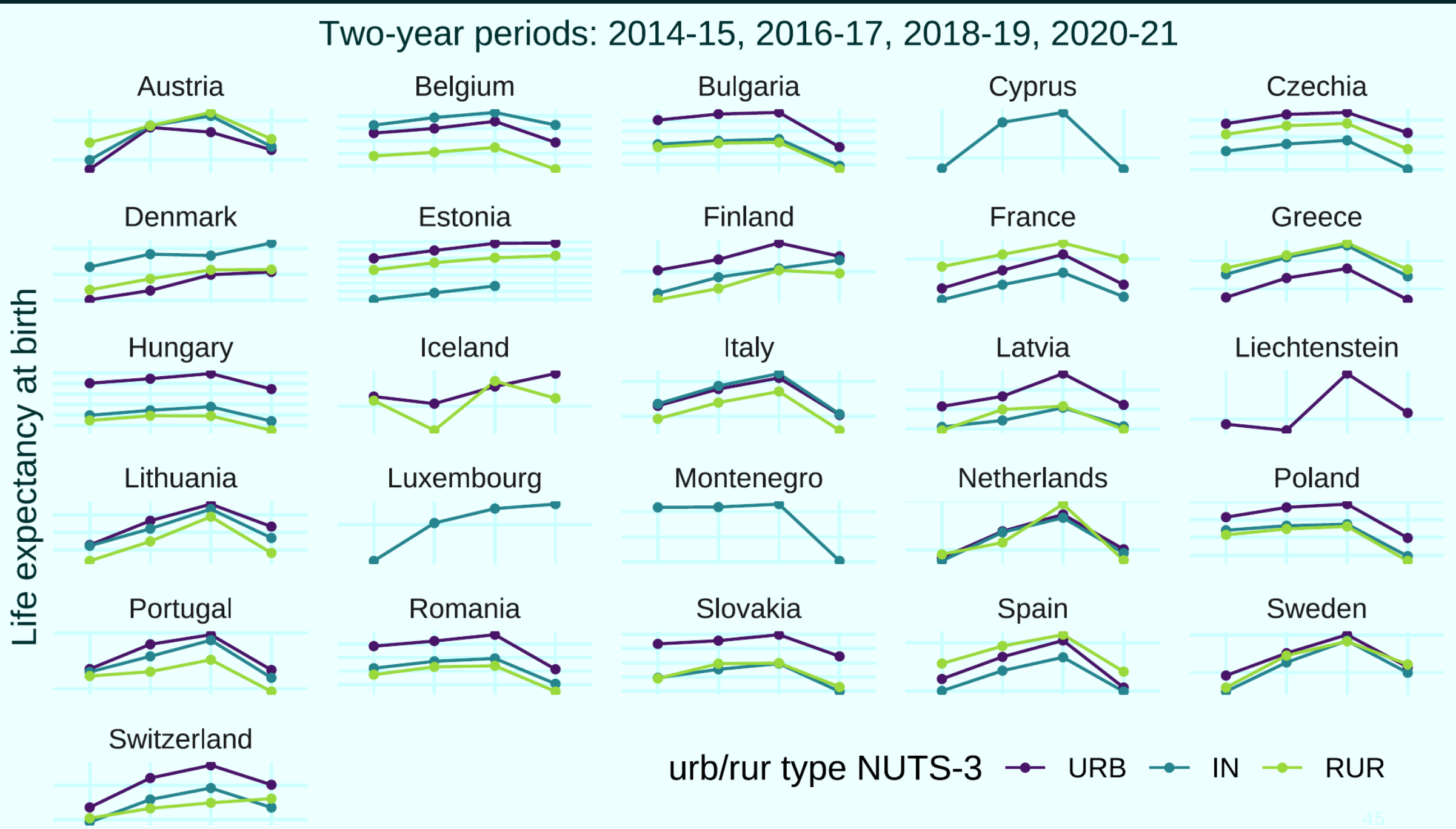
NUTS-3 classification

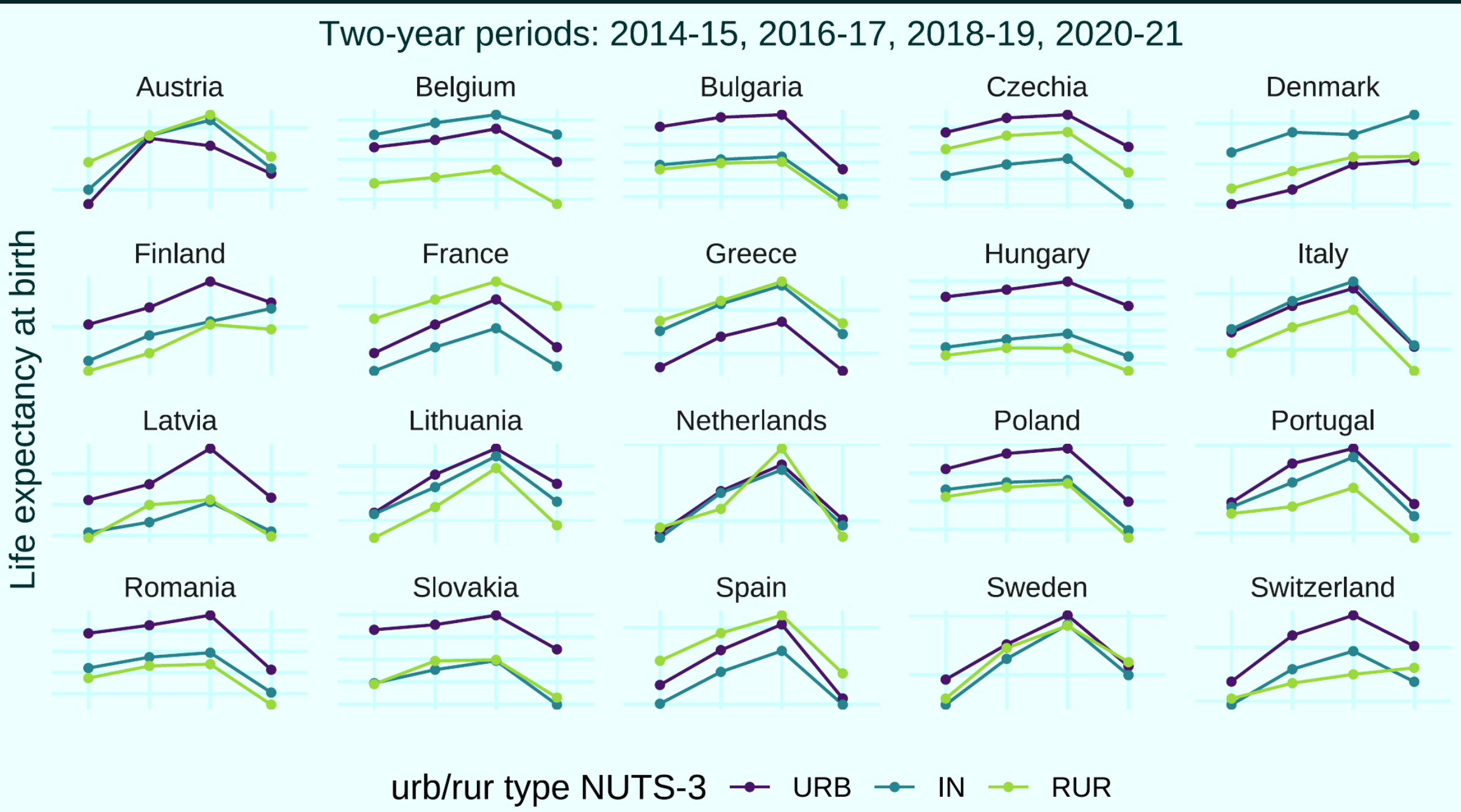


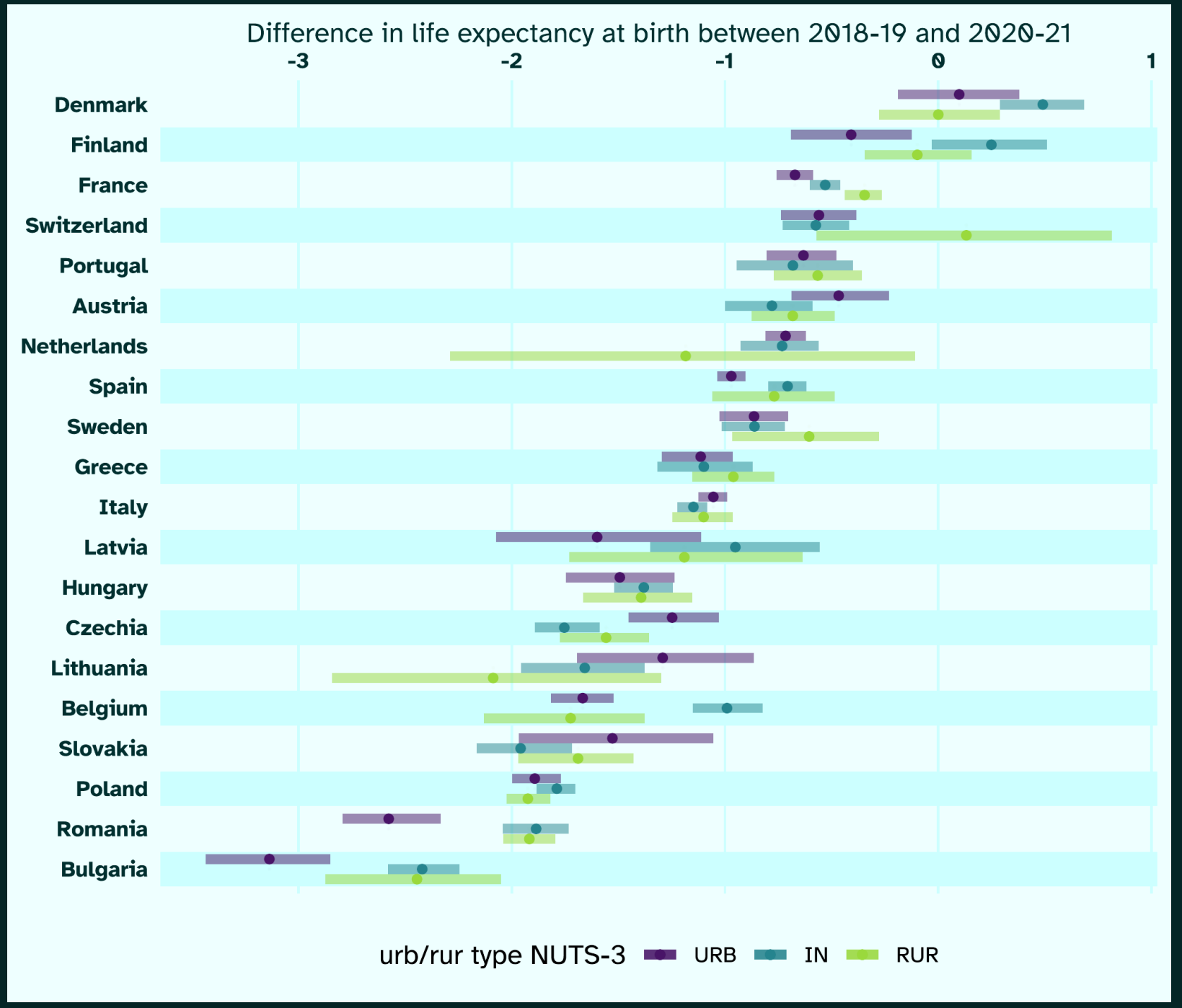
Matching the available data

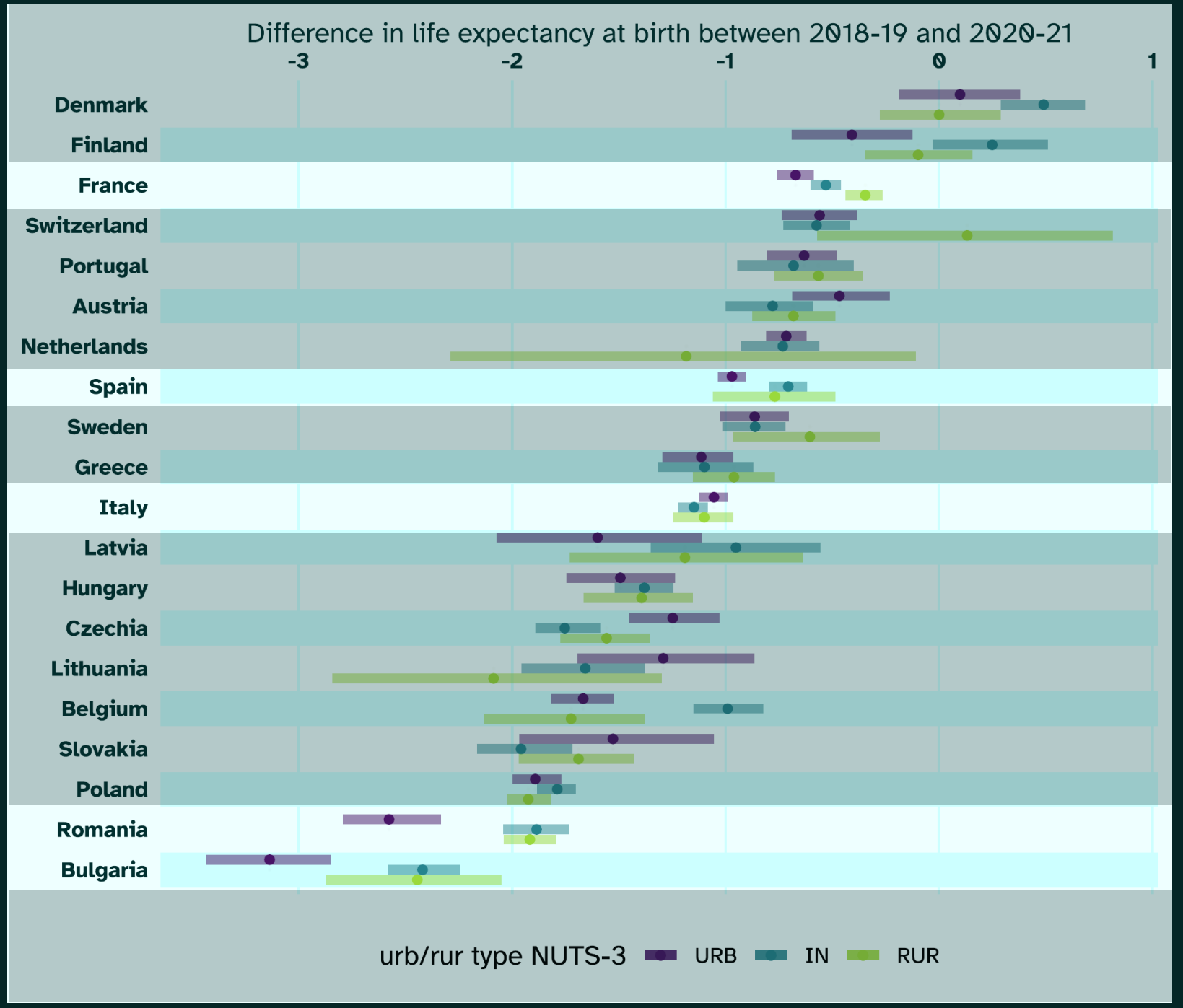
Population

Deaths


Two-year periods: 2014-15, 2016-17, 2018-19, 2020-21
Life expectancy at birth
Austria
Belgium
Bulgaria
Cyprus
Czechia
Denmark
Estonia
Finland
France
Greece
Hungary
Iceland
Italy
Latvia
Liechtenstein
Lithuania
Luxembourg
Montenegro
Netherlands
Poland
Portugal
Romania
Slovakia
Spain
Sweden
Switzerland
urb/rur type NUTS-3
URB
IN
RUR


Two-year periods: 2014-15, 2016-17, 2018-19, 2020-21
Austria
Belgium
Bulgaria
Czechia
Denmark
Finland
France
Greece
Hungary
Italy
Latvia
Lithuania
Netherlands
Poland
Portugal
Romania
Slovakia
Spain
Sweden
Switzerland
Life expectancy at birth
urb/rur type NUTS-3
URB
IN
RUR


Difference in life expectancy at birth between 2018-19 and 2020-21
-3
-2
-1
0
1
Denmark
Finland
France
Switzerland
Portugal
Austria
Netherlands
Spain
Sweden
Greece
Italy
Latvia
Hungary
Czechia
Lithuania
Belgium
Slovakia
Poland
Romania
Bulgaria
urb/rur type NUTS-3
URB
IN
RUR

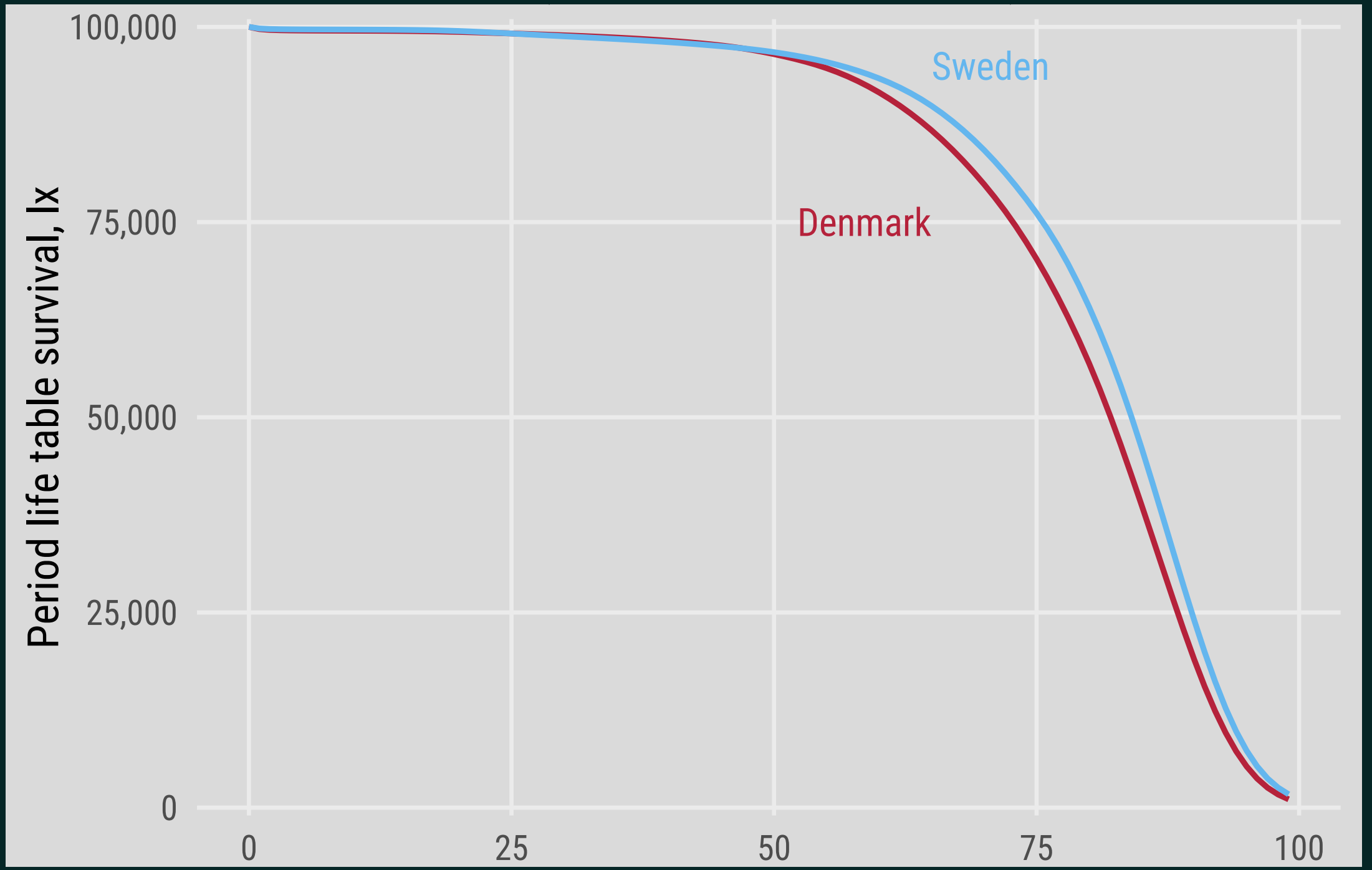

Difference in life expectancy at birth between 2018-19 and 2020-21
-3
-2
-1
0
1
Denmark
Finland
France
Switzerland
Portugal
Austria
Netherlands
Spain
Sweden
Greece
Italy
Latvia
Hungary
Czechia
Lithuania
Belgium
Slovakia
Poland
Romania
Bulgaria
urb/rur type NUTS-3
URB
IN
RUR

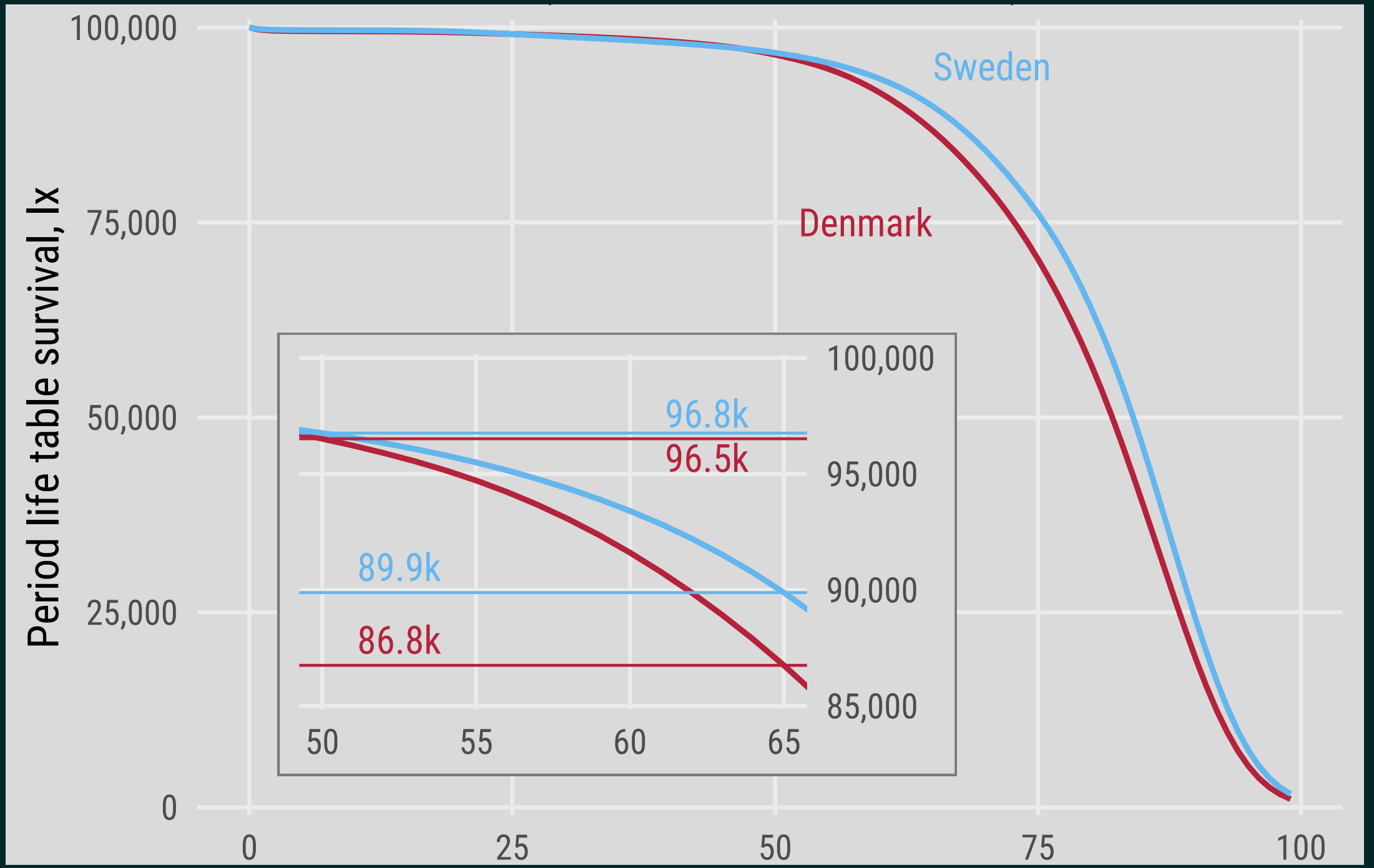
Thank you!

Ilya Kashnitsky

ikashnitsky@sdu.dk

@ikashnitsky

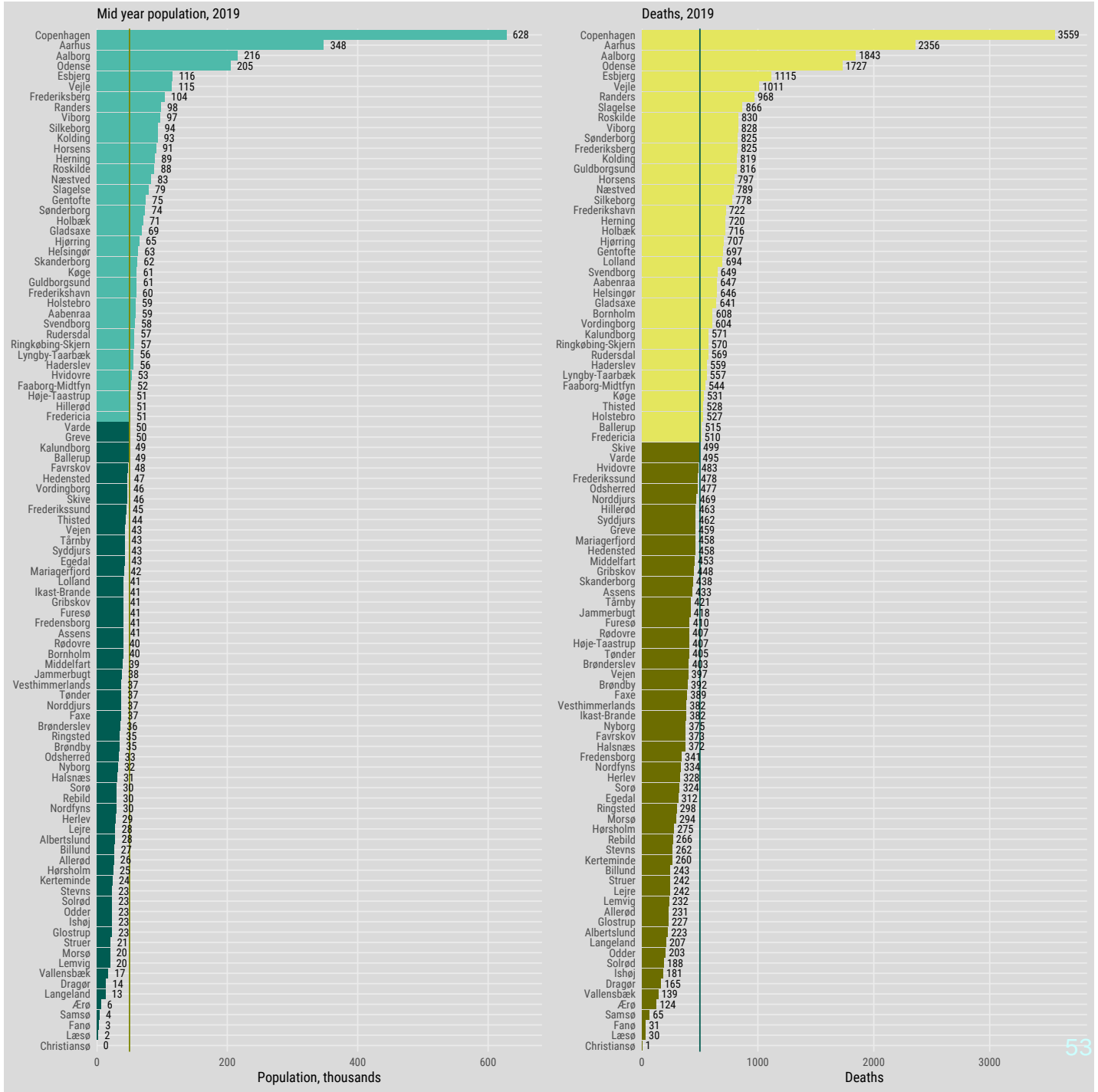

100,000
75,000
50,000
25,000
0
Period life table survival, lx
Sweden
Denmark
0
25
50
75
100


Period life table survival, lx
100,000
75,000
50,000
25,000
0
0
25
50
75
100
Sweden
Denmark
96.8k
96.5k
89.9k
86.8k
100,000
95,000
90,000
85,000
50
55
60
65

Danish municipalities are small

About half of them are less than **50K** people

and see less than **500** deaths per year



TOPALS to construct LTs

De Beer, J. (2011). A new relational method for smoothing and projecting age-specific fertility rates: TOPALS. Demographic Research, 24, 409–454. doi.org/10.4054/DemRes.2011.24.18

TOPALS to construct LTs

Table 2: **Goodness of fit (measured by root mean square error, RMSE) of the logarithms of age-specific probabilities of death in 26 European countries, 2006**

	Men			Women		
	TOPALS	Heligman-Pollard	Brass	TOPALS	Heligman-Pollard	Brass
	RMSE (x 10^{-3})					
Austria	191	184	197	223	255	232
Belarus	144	255	284	214	192	249
Belgium	157	154	164	208	248	218
Bulgaria	164	145	206	255	184	353
Czech Republic	145	260	167	231	244	229
Denmark	201	190	207	232	234	271
Estonia	319	355	347	427	418	417
Finland	334	283	343	307	319	296
France	67	136	133	95	212	135
Germany	91	95	117	100	176	132
Hungary	143	433	324	232	327	302
Ireland	275	247	297	341	306	330
Italy	105	108	118	106	172	112
Latvia	364	343	408	411	369	419
Lithuania	188	201	308	222	222	265
Netherlands	148	110	222	173	192	184
Norway	268	268	291	360	362	350
Poland	67	171	162	116	170	159
Portugal	128	170	200	210	214	247
Russia	72	126	255	93	88	246
Slovakia	232	236	246	262	235	322
Spain	129	131	130	106	214	142
Sweden	188	292	221	228	298	229
Switzerland	196	217	214	274	299	282
Ukraine	126	102	251	122	92	253
United Kingdom	76	91	94	90	116	117
Average	174	204	227	217	237	250

De Beer, J. (2011). A new relational method for smoothing and projecting age-specific fertility rates: TOPALS. Demographic Research, 24, 409–454. doi.org/10.4054/DemRes.2011.24.18

TOPALS to construct LTs

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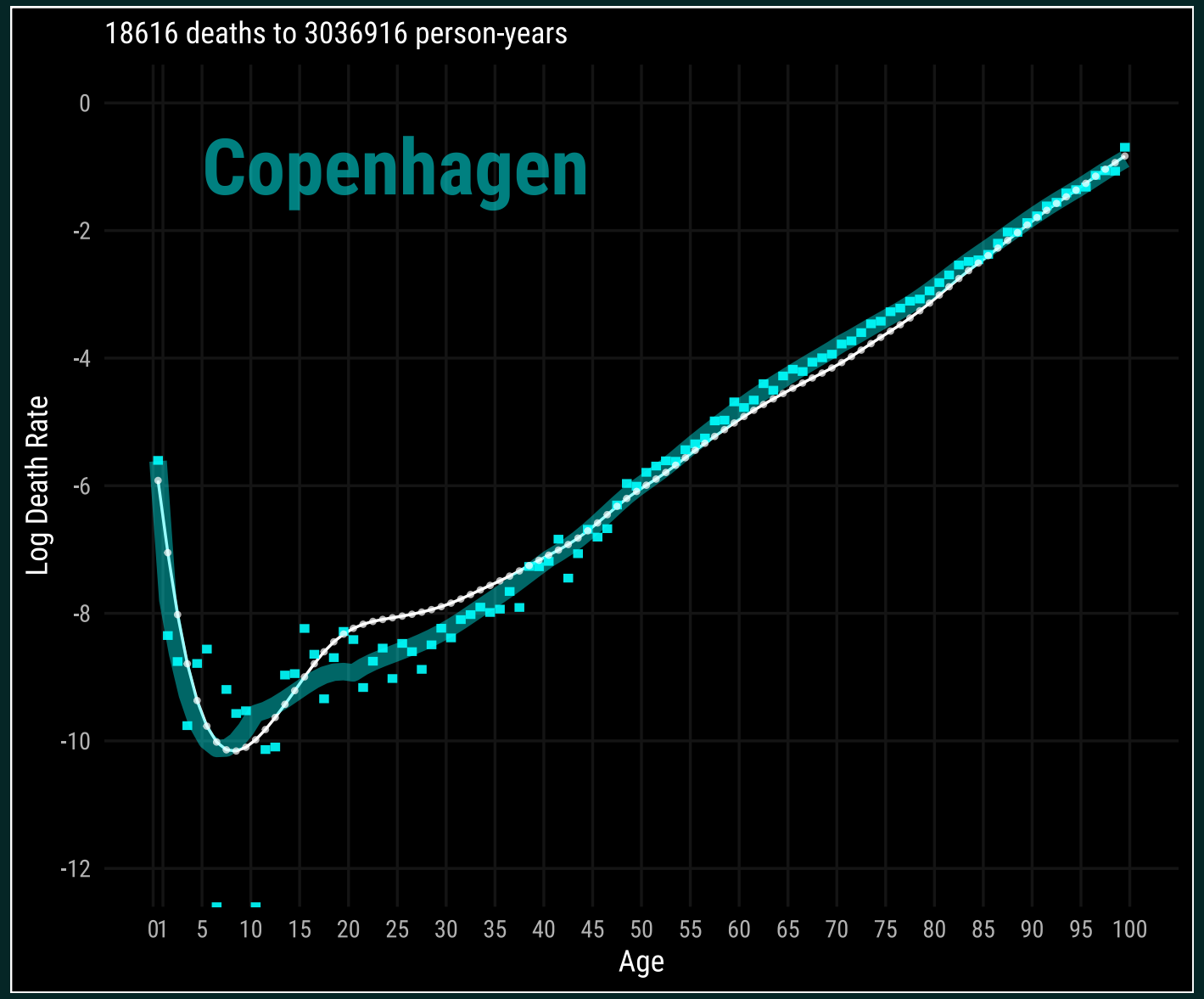
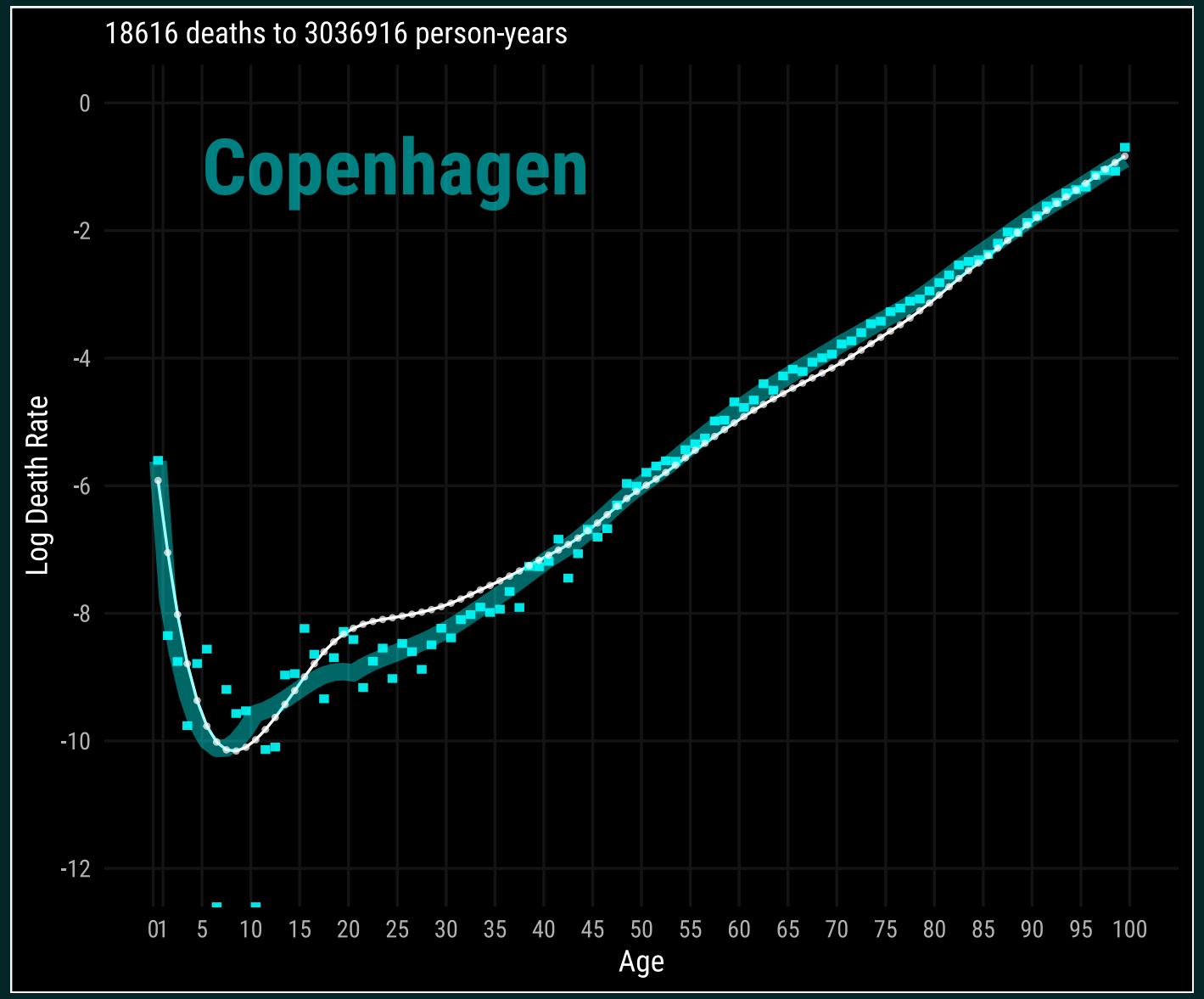
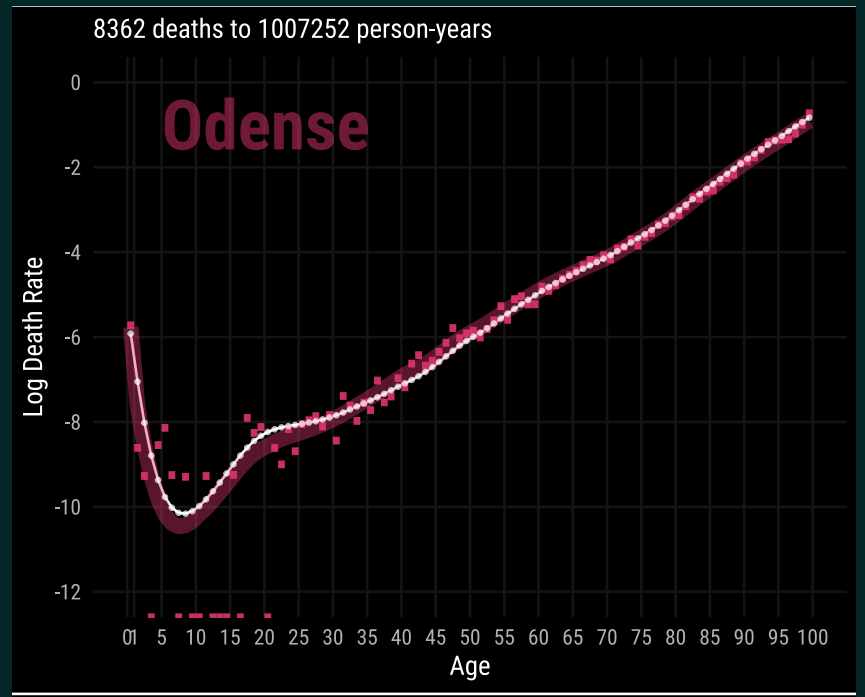
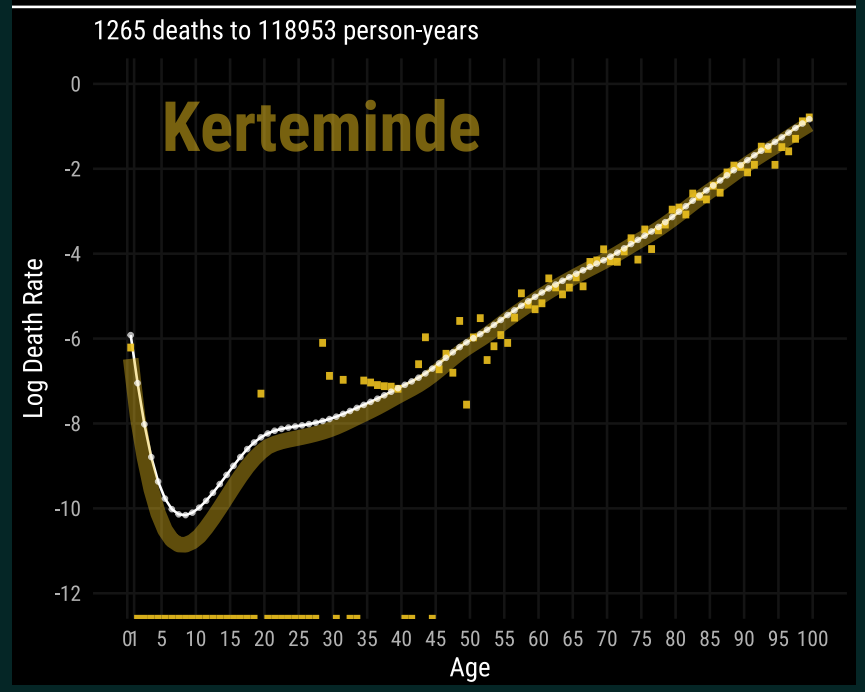
TOPALS to construct LTs



TOPALS to construct LTs








BRIGHT FUTURE
COVID-19

Andrijevic, M., Schleussner, C.-F., Gidden, M. J., McCollum, D. L., & Rogelj, J. (2020). COVID-19 recovery funds dwarf clean energy investment needs. ***Science***, 370(6514), 298–300. https://doi.org/10.1126/science.abc9697