COVID-19 Weekly Newsletter
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Contents: Excess-mortality study: Country by country / Global trend / National trends – Deaths,
Cases & Vaccination / US States trends / Today's images: Mallorca / [Notes]

Excess-mortality study:
These past two weeks I've focused on the excess-mortality study published in *The Lancet* [1] last
month. Last week I broke the data down by continent. One of the graphs – ratio of the number of
deaths estimated via excess mortality (E) to those reported (R) – indicated the scale of under-
reporting on the six continents:
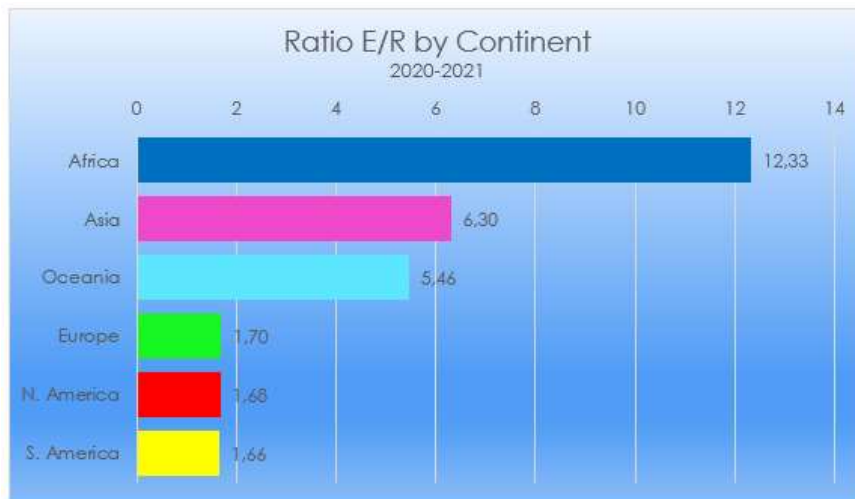
One might have expected considerable under reporting in Africa & Asia, but not on the scale
revealed by the study. (The high ratio for Oceania is entirely due to the large number of unreported
deaths in Papua New Guinea.) Somewhat to my surprise, reporting in S. America was as reliable as
that in Europe & N. America.

In this issue I'll analyse the data provided by the study on a country-by-country basis.

According to the study, the number of countries that have suffered over 1000 deaths attributable to
the pandemic is 153 (cf. 127 when based on reported statistics). In order to present the various data
for all of these countries with the tools at my disposal, I've had to use 3 graphs for each presentation.
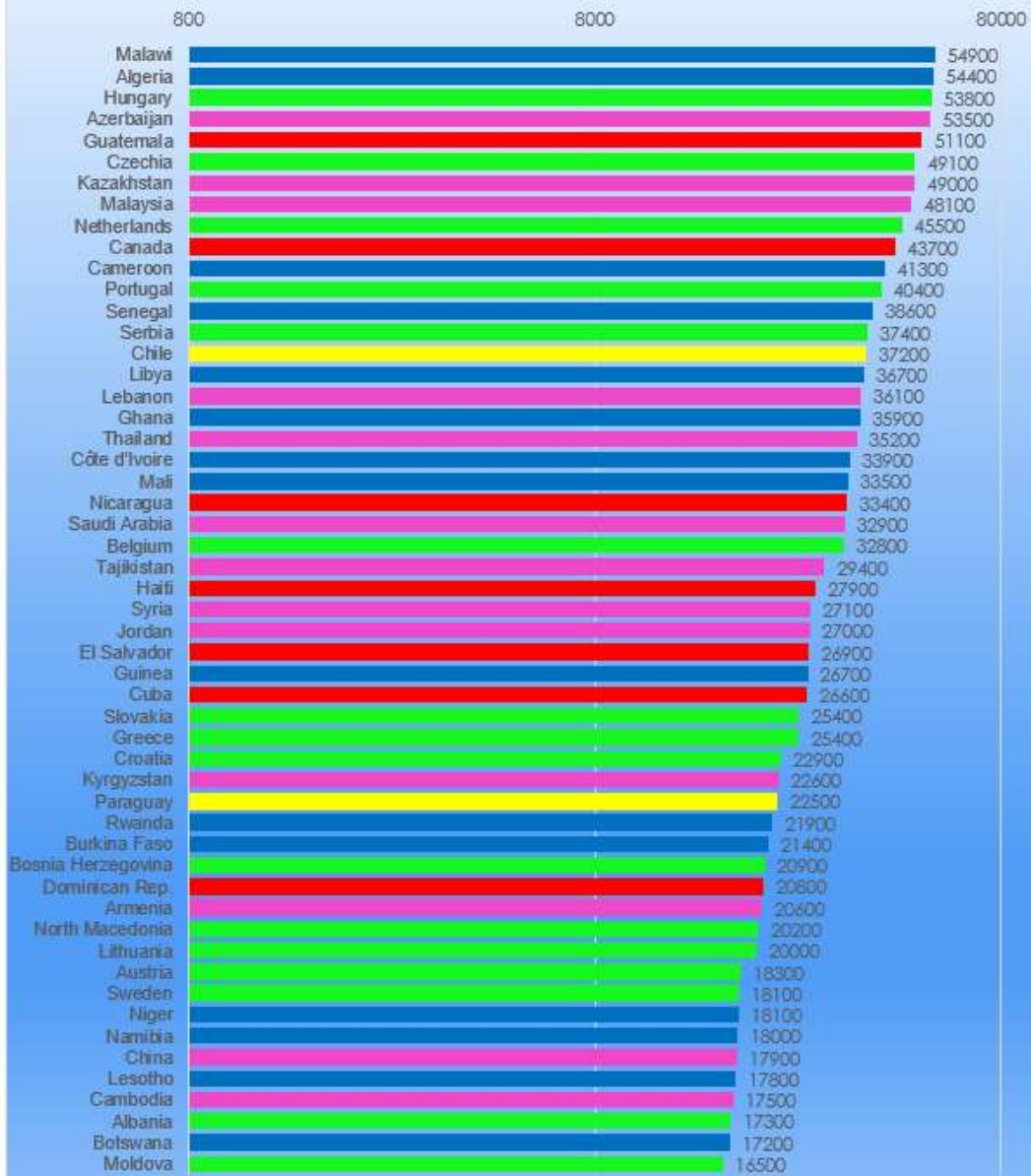
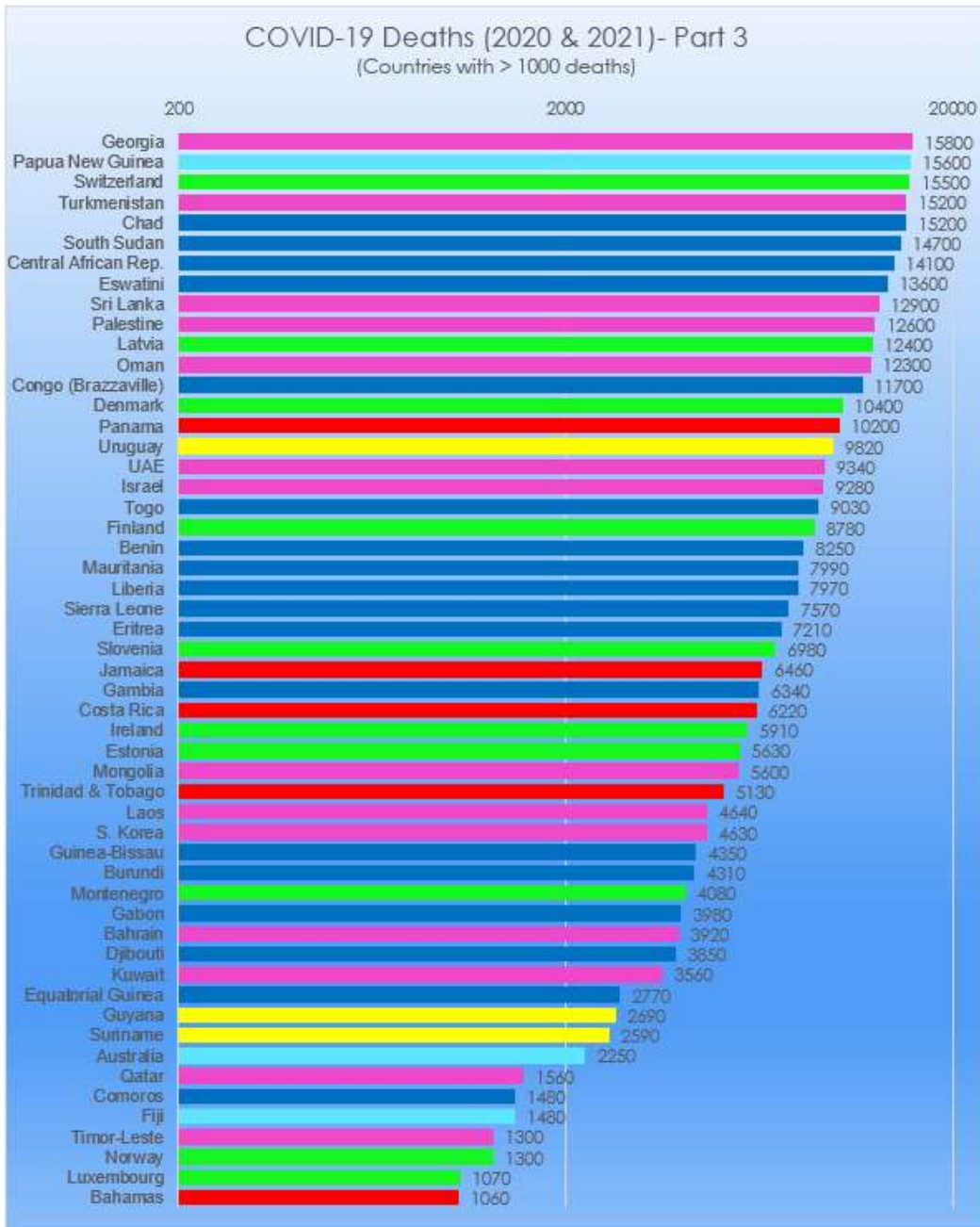First, here is the estimated COVID-19 death toll by country (from 01/01/20 to 31/12/21):
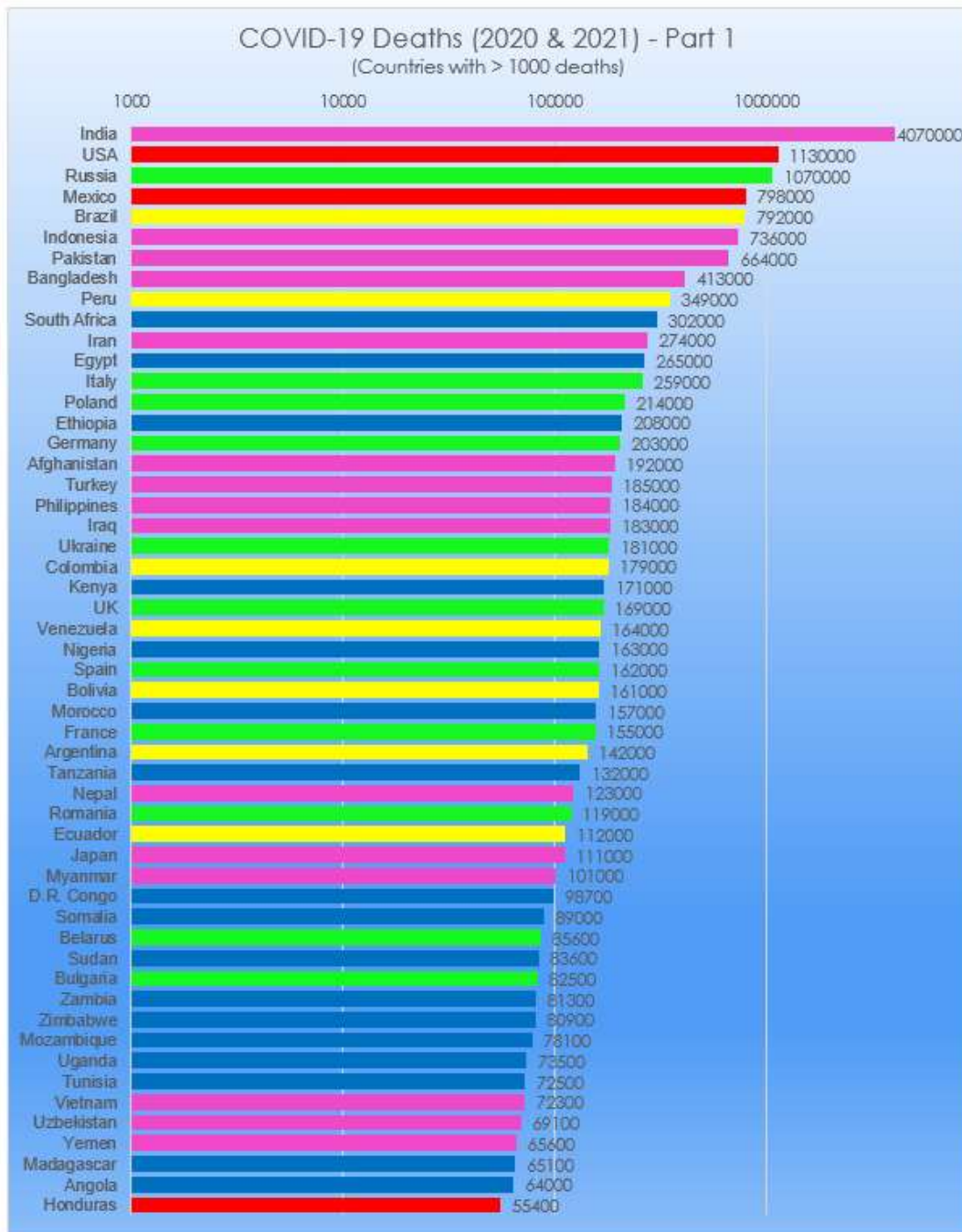
Far more African and Asian countries than in the equivalent graph I've presented in the past.

COVID-19 Deaths (2020 & 2021)- Part 2
(Countries with > 1000 deaths)

COVID-19 Deaths (2020 & 2021)- Part 3
(Countries with > 1000 deaths)

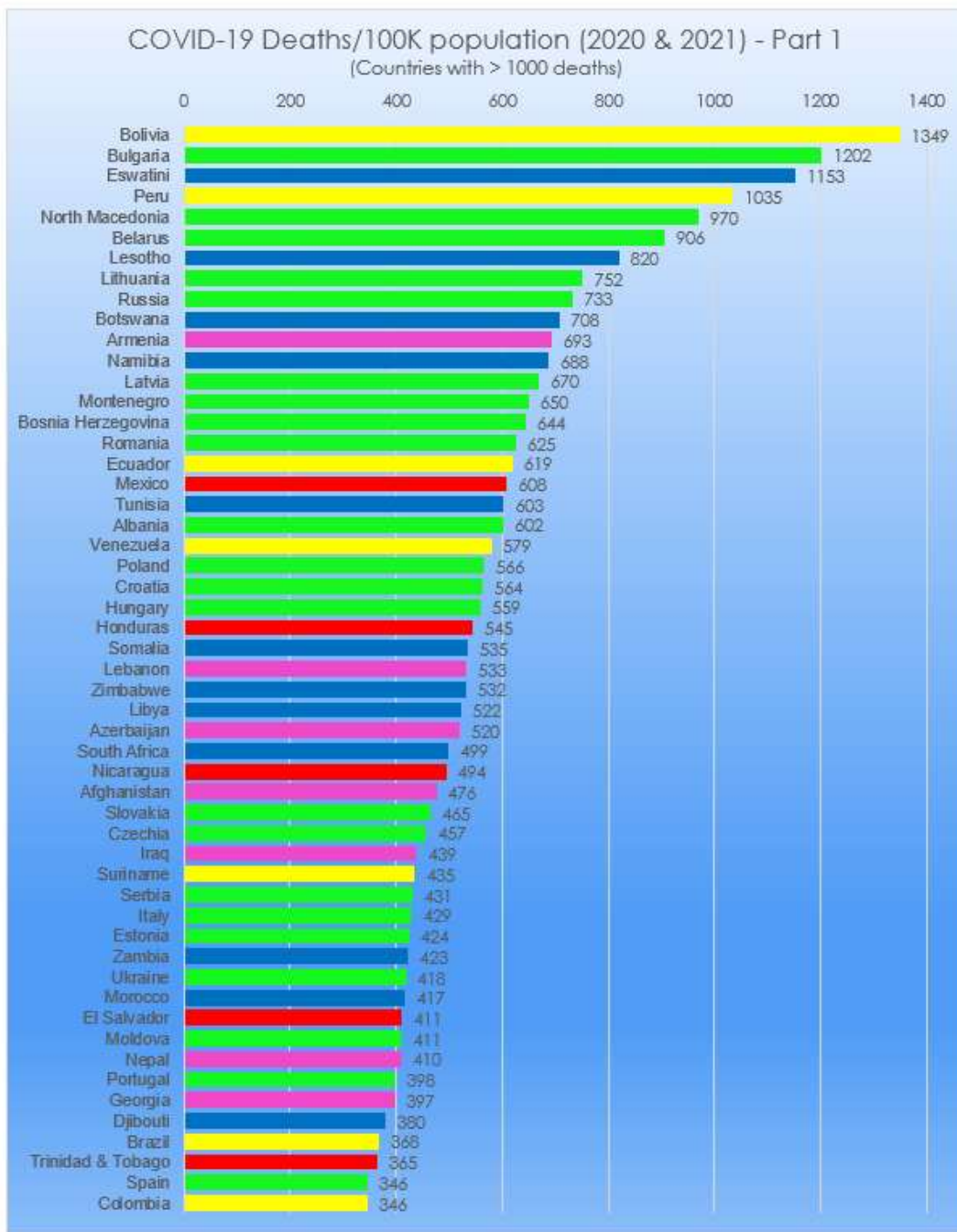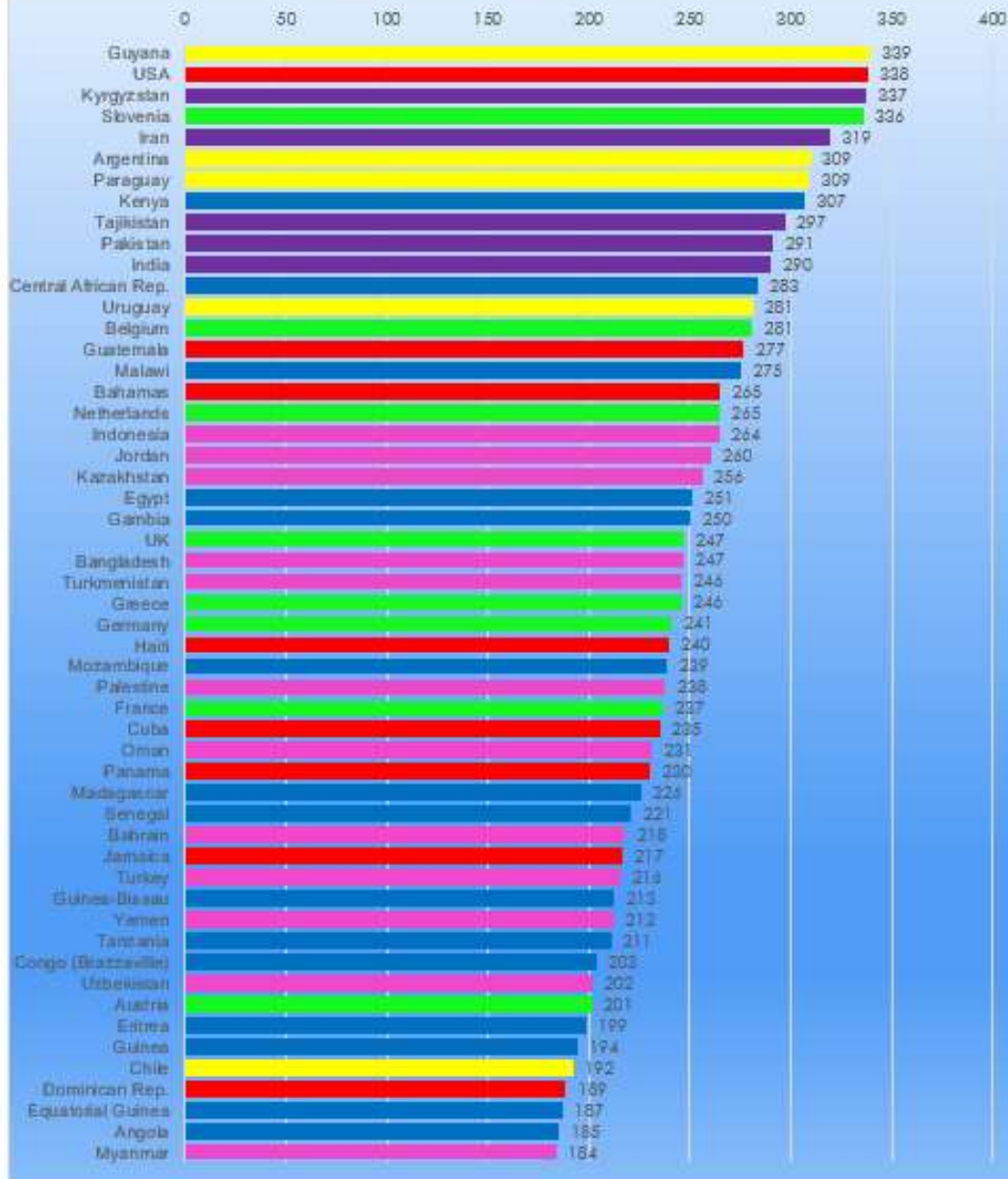| Country	Deaths
Georgia	15800
Papua New Guinea	15600
Switzerland	15500
Turkmenistan	15200
Chad	15200
South Sudan	14700
Central African Rep.	14100
Eswatini	13600
Sri Lanka	12900
Palestine	12600
Latvia	12400
Oman	12300
Congo (Brazzaville)	11700
Denmark	10400
Panama	10200
Uruguay	9820
UAE	9340
Israel	9280
Togo	9030
Finland	8780
Benin	8250
Mauritania	7990
Liberia	7970
Sierra Leone	7570
Eritrea	7210
Slovenia	6980
Jamaica	6460
Gambia	6340
Costa Rica	6220
Ireland	5910
Estonia	5630
Mongolia	5600
Trinidad & Tobago	5130
Laos	4640
S. Korea	4630
Guinea-Bissau	4350
Burundi	4310
Montenegro	4080
Gabon	3980
Bahrain	3920
Djibouti	3850
Kuwait	3560
Equatorial Guinea	2770
Guyana	2690
Suriname	2590
Australia	2250
Qatar	1560
Comoros	1480
Fiji	1480
Timor-Leste	1300
Norway	1300
Luxembourg	1070
Bahamas	1060

In this last graph, the figures I present for Ireland, Australia & Norway are **reported** figures.
The study found a **deficit** of deaths in 2020-21 for these countries, not an excess. (In Australia's case it was a huge deficit of over 18 000 deaths!)
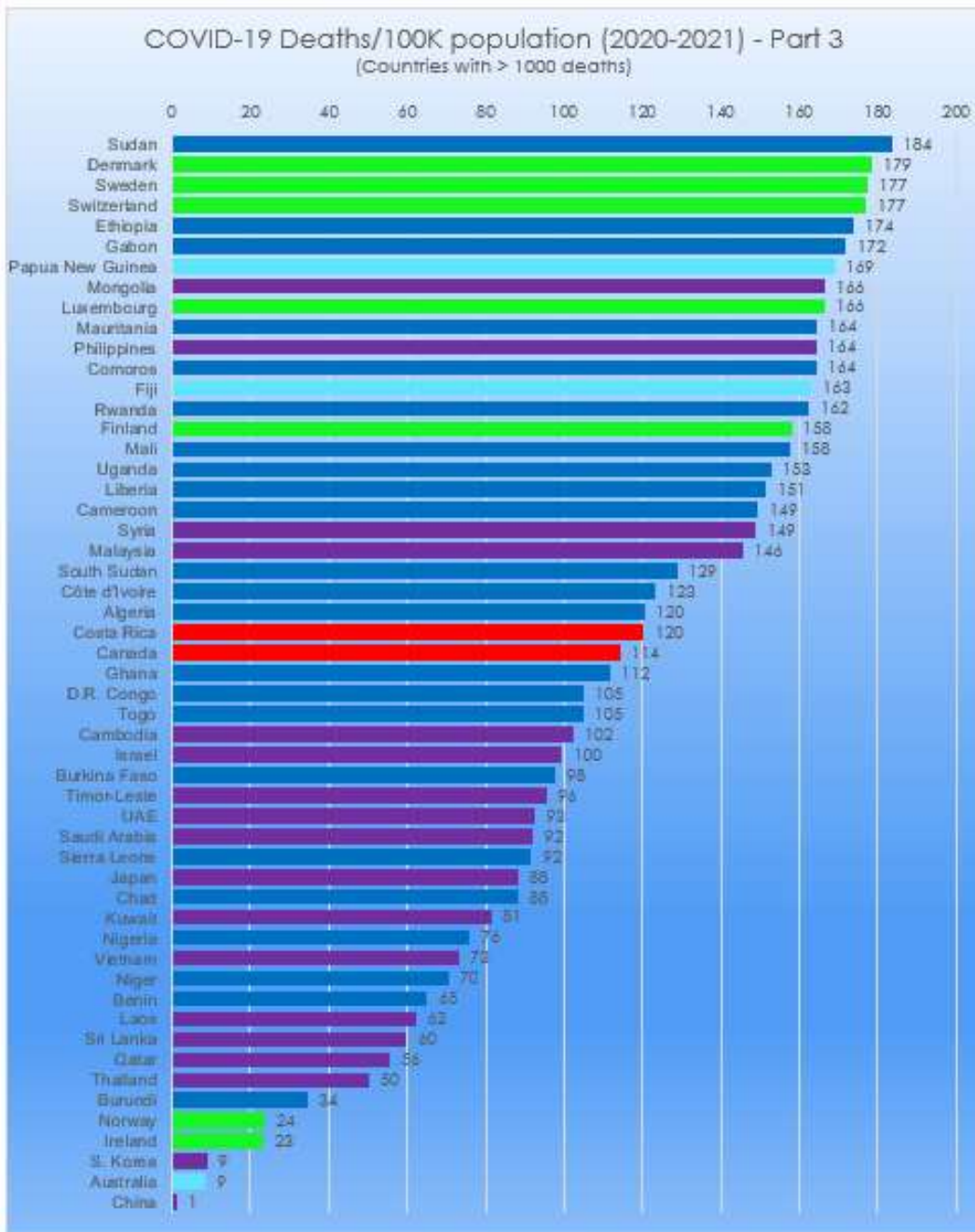
Now let's look at the per-capita rate by country:

COVID-19 Deaths/100K population (2020 & 2021) - Part 1
(Countries with > 1000 deaths)

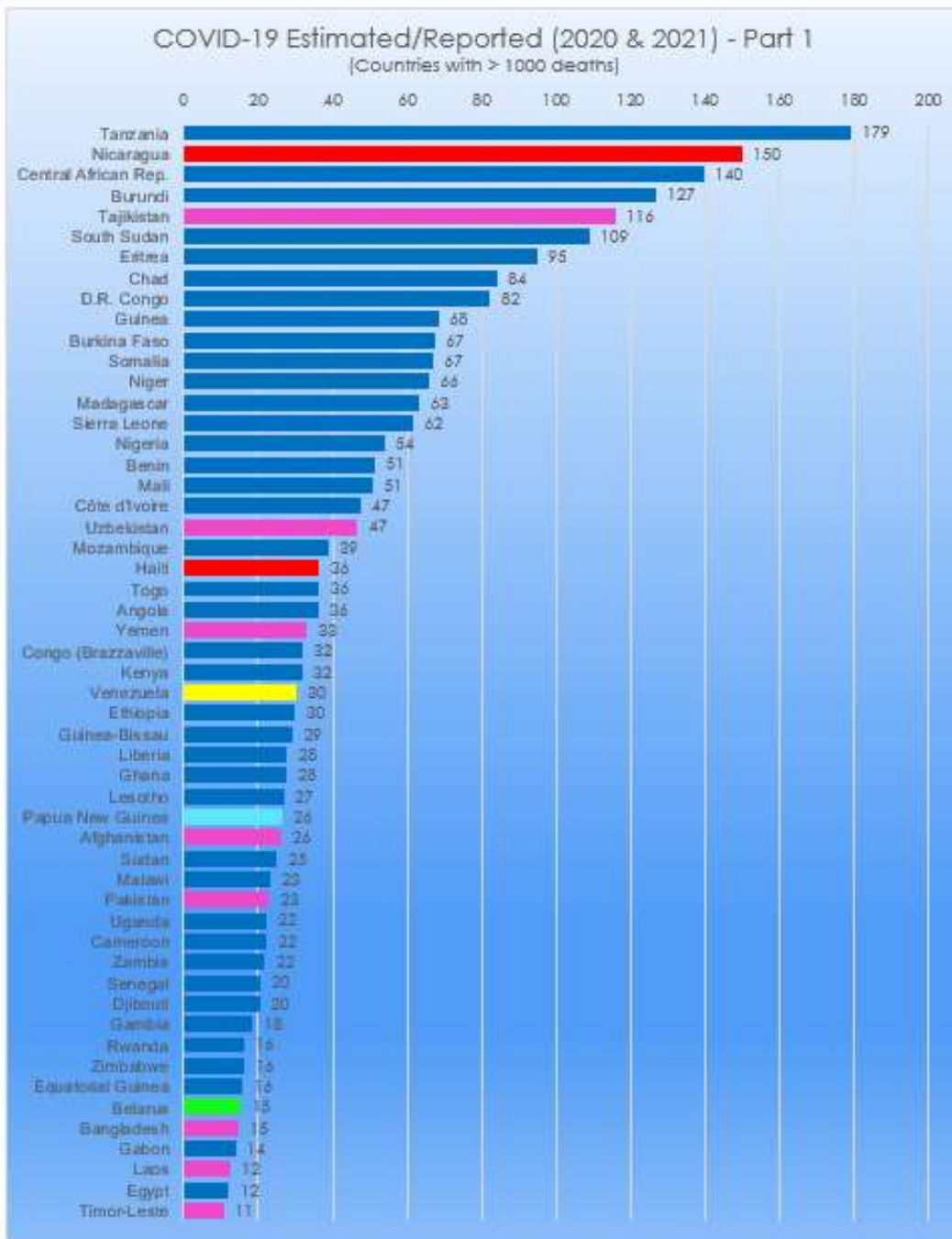| Country	Value
Bolivia	1349
Bulgaria	1202
Eswatini	1153
Peru	1035
North Macedonia	970
Belarus	906
Lesotho	820
Lithuania	752
Russia	733
Botswana	708
Armenia	693
Namibia	688
Latvia	670
Montenegro	650
Bosnia Herzegovina	644
Romania	625
Ecuador	619
Mexico	608
Tunisia	603
Albania	602
Venezuela	579
Poland	566
Croatia	564
Hungary	559
Honduras	545
Somalia	535
Lebanon	533
Zimbabwe	532
Libya	522
Azerbaijan	520
South Africa	499
Nicaragua	494
Afghanistan	476
Slovakia	465
Czechia	457
Iraq	439
Suriname	435
Serbia	431
Italy	429
Estonia	424
Zambia	423
Ukraine	418
Morocco	417
El Salvador	411
Moldova	411
Nepal	410
Portugal	398
Georgia	397
Djibouti	380
Brazil	368
Trinidad & Tobago	365
Spain	346
Colombia	346

In the equivalent graph based on reported deaths, Peru was in first position with 630 deaths/100k. Again, a lot more African & Asian countries appear here than they did in the equivalent graph in previous Newsletters.

COVID-19 Deaths/100K population (2020 & 2021) - Part 2
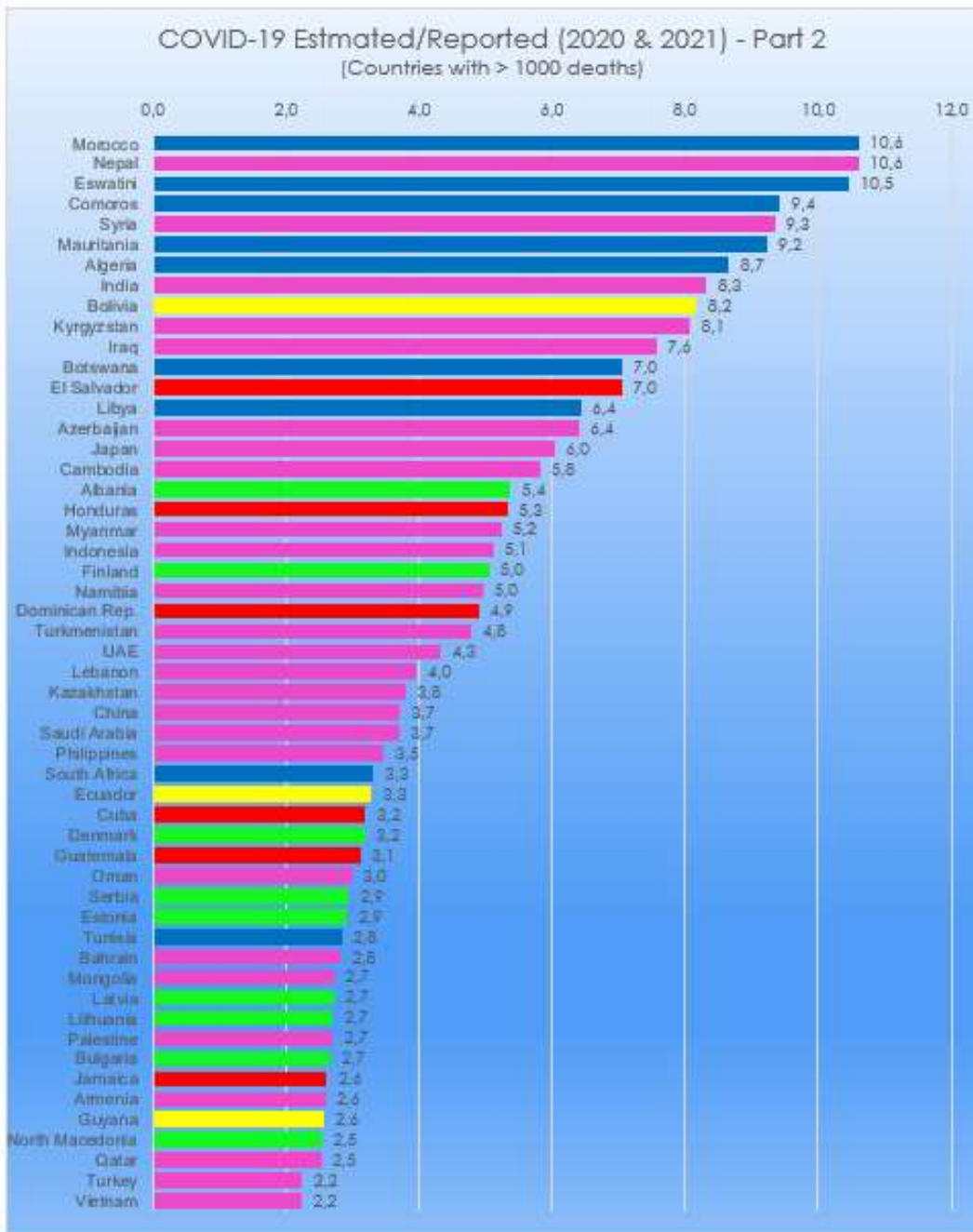## (Countries with > 1000 deaths)

Country	Deaths/100K
Guyana	339
USA	338
Kyrgyzstan	337
Slovenia	336
Iran	319
Argentina	309
Paraguay	309
Kenya	307
Tajikistan	297
Pakistan	291
India	290
Central African Rep.	283
Uruguay	281
Belgium	281
Guatemala	277
Malawi	275
Bahamas	265
Netherlands	265
Indonesia	264
Jordan	260
Kazakhstan	256
Egypt	251
Gambia	250
UK	247
Bangladesh	247
Turkmenistan	246
Greece	246
Germany	241
Haiti	240
Mozambique	239
Palestine	238
France	237
Cuba	235
Oman	231
Panama	230
Madagascar	224
Senegal	221
Bahrain	218
Jamaica	217
Turkey	214
Guinea-Bissau	213
Yemen	212
Tanzania	211
Congo (Brazzaville)	203
Uzbekistan	202
Austria	201
Eritrea	199
Guinea	194
Chile	192
Dominican Rep.	189
Equatorial Guinea	187
Angola	185
Myanmar	184

COVID-19 Deaths/100K population (2020-2021) - Part 3
(Countries with > 1000 deaths)

Country	Value
Sudan	184
Denmark	179
Sweden	177
Switzerland	177
Ethiopia	174
Gabon	172
Papua New Guinea	169
Mongolia	166
Luxembourg	166
Mauritania	164
Philippines	164
Comoros	164
Fiji	163
Rwanda	162
Finland	158
Mali	158
Uganda	153
Liberia	151
Cameroon	149
Syria	149
Malaysia	146
South Sudan	129
Côte d'Ivoire	123
Algeria	120
Costa Rica	120
Canada	114
Ghana	112
D.R. Congo	105
Togo	105
Cambodia	102
Israel	100
Burkina Faso	98
Timor-Leste	96
UAE	93
Saudi Arabia	92
Sierra Leone	92
Japan	86
Chad	86
Kuwait	81
Nigeria	76
Vietnam	72
Niger	70
Benin	66
Laos	62
Sri Lanka	60
Qatar	56
Thailand	50
Burundi	34
Norway	24
Ireland	23
S. Korea	9
Australia	9
China	1

Finally, the answer to the question: Where were the greatest number of unreported deaths?
Here's the ratio of the number of deaths estimated via excess mortality (E) to those reported (R):
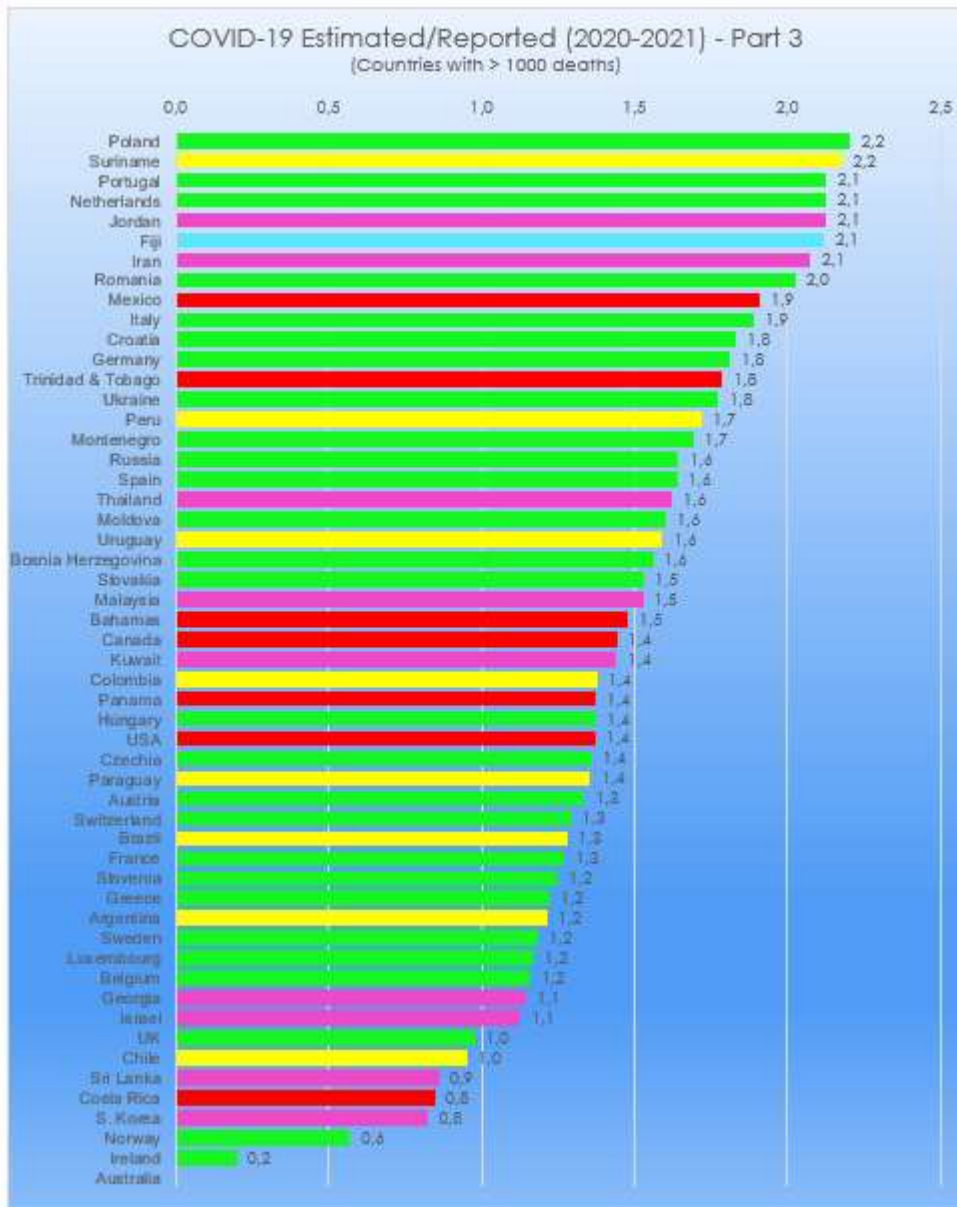
COVID-19 Estimated/Reported (2020 & 2021) - Part 1
(Countries with > 1000 deaths)

Country	Value
Tanzania	179
Nicaragua	150
Central African Rep.	140
Burundi	127
Tajikistan	116
South Sudan	109
Eritrea	95
Chad	84
D.R. Congo	82
Guinea	68
Burkina Faso	67
Somalia	67
Niger	66
Madagascar	63
Sierra Leone	62
Nigeria	54
Benin	51
Mali	51
Côte d'Ivoire	47
Uzbekistan	47
Mozambique	39
Haiti	36
Togo	36
Angola	36
Yemen	33
Congo (Brazzaville)	32
Kenya	32
Venezuela	30
Ethiopia	30
Guinea-Bissau	29
Liberia	28
Ghana	28
Lesotho	27
Papua New Guinea	26
Afghanistan	26
Sudan	25
Malawi	23
Pakistan	23
Uganda	22
Cameroon	22
Zambia	22
Senegal	20
Djibouti	20
Gambia	18
Rwanda	16
Zimbabwe	16
Equatorial Guinea	16
Belarus	15
Bangladesh	15
Gabon	14
Laos	12
Egypt	12
Timor-Leste	11

As expected from the continent data, African countries dominate.

COVID-19 Estmated/Reported (2020 & 2021) - Part 2
(Countries with > 1000 deaths)

Country	Value
Morocco	10,6
Nepal	10,6
Eswatini	10,5
Comoros	9,4
Syria	9,3
Mauritania	9,2
Algeria	8,7
India	8,3
Bolivia	8,2
Kyrgyzstan	8,1
Iraq	7,6
Botswana	7,0
El Salvador	7,0
Libya	6,4
Azerbaijan	6,4
Japan	6,0
Cambodia	5,8
Albania	5,4
Honduras	5,3
Myanmar	5,2
Indonesia	5,1
Finland	5,0
Namibia	5,0
Dominican Rep.	4,9
Turkmenistan	4,8
UAE	4,3
Lebanon	4,0
Kazakhstan	3,8
China	3,7
Saudi Arabia	3,7
Philippines	3,5
South Africa	3,3
Ecuador	3,3
Cuba	3,2
Denmark	3,2
Guatemala	3,1
Oman	3,0
Serbia	2,9
Estonia	2,9
Tunisia	2,8
Bahrain	2,8
Mongolia	2,7
Latvia	2,7
Lithuania	2,7
Palestine	2,7
Bulgaria	2,7
Jamaica	2,6
Armenia	2,6
Guyana	2,6
North Macedonia	2,5
Qatar	2,5
Turkey	2,2
Vietnam	2,2

The Asian countries show up in Part II.

COVID-19 Estimated/Reported (2020-2021) - Part 3
(Countries with > 1000 deaths)

Country	Value
Poland	2,2
Suriname	2,2
Portugal	2,1
Netherlands	2,1
Jordan	2,1
Fiji	2,1
Iran	2,1
Romania	2,0
Mexico	1,9
Italy	1,9
Croatia	1,8
Germany	1,8
Trinidad & Tobago	1,8
Ukraine	1,8
Peru	1,7
Montenegro	1,7
Russia	1,6
Spain	1,6
Thailand	1,6
Moldova	1,6
Uruguay	1,6
Bosnia Herzegovina	1,6
Slovakia	1,5
Malaysia	1,5
Bahamas	1,5
Canada	1,4
Kuwait	1,4
Colombia	1,4
Panama	1,4
Hungary	1,4
USA	1,4
Czechia	1,4
Paraguay	1,4
Austria	1,3
Switzerland	1,3
Brazil	1,3
France	1,3
Slovenia	1,2
Greece	1,2
Argentina	1,2
Sweden	1,2
Luxemburg	1,2
Belgium	1,2
Georgia	1,1
Israel	1,1
UK	1,0
Chile	1,0
Sri Lanka	0,9
Costa Rica	0,8
S. Korea	0,8
Norway	0,6
Ireland	0,2
Australia	

And the European, the populous N. American & the S. American countries in the last graph.

Back now to the shorter version of the traditional Newsletter.

Global trend: [2]
Since last time:
  – The global daily death rate continues falling steeply.

World Daily Deaths

Peak1: 18/04/20
Peak2: 9/08/20
Peak3: 26/01/21
Peak4: 3/05/21
Peak5: 25/08/21
Peak6: 09/02/22

18.2 million dead

National trends (selected countries)

Normalized daily death rates (7-day moving mean) for the last 30 days:

Normalized Daily Deaths
(7-day moving mean)
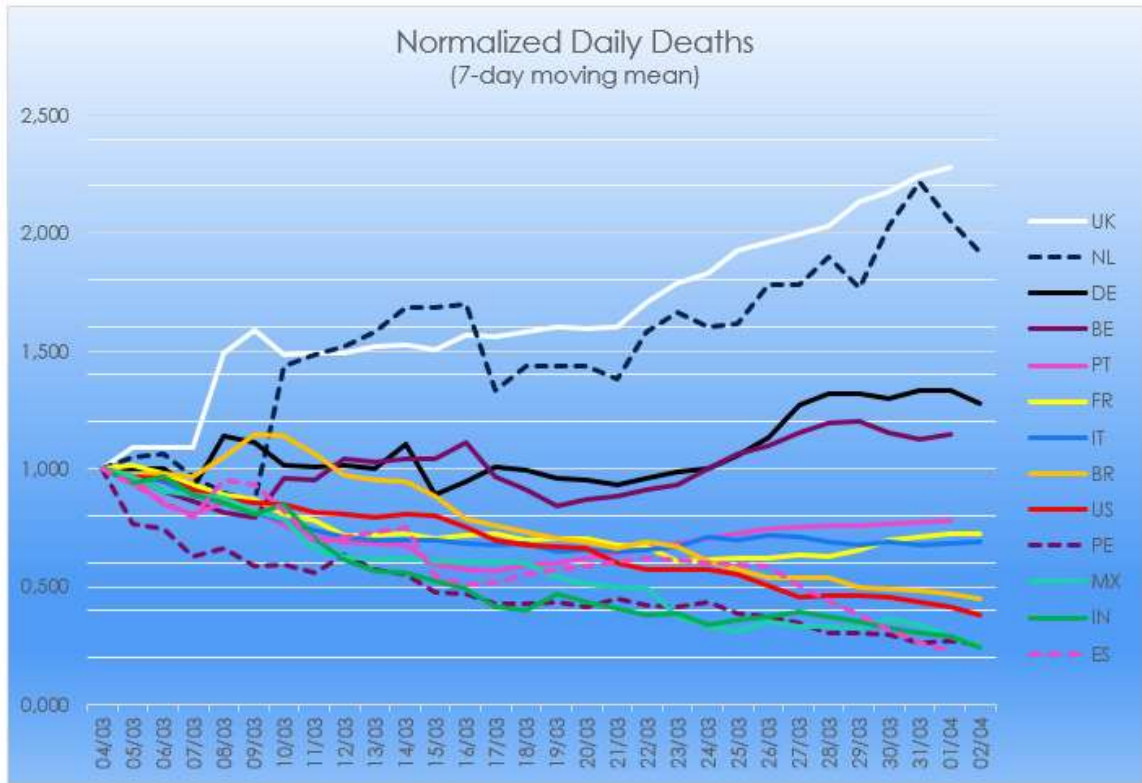
[3]

What I have done here is normalize the data to the initial data point at the beginning of the month.
- UK, NL, and to a lesser degree BE & BE stand out with daily deaths increasing throughout the month.

− The other countries show declining death rates, with some BR, US, PE, MX, IN & ES – dropping to <u>half the rate</u> at the beginning of the period.

Tendencies: Comparison of doubling times [4]

<mark style="background:red">Double digits</mark>, <mark style="background:orange">triple+shortening,</mark> <mark style="background:yellow">triple</mark>, <mark style="background:lime">quadruple</mark>

Country	1st death	Doubling time (7-day fits)			
		02 Apr	26 Mar	19 Mar	12 Mar
IT	21 Feb 20	718 days	692 days	771 days	715 days
FR	15 Feb 20	713 days	837 days	724 days	707 days
ES	03 Mar 20	2498 days	685 days	813 days	522 days
US	29 Feb 20	1185 days	1030 days	803 days	581 days
UK	05 Mar 20	556 days	646 days	796 days	831 days
NL	06 Mar 20	779 days	887 days	1093 days	906 days
DE	09 Mar 20	322 days	320 days	377 days	356 days
BE	11 Mar 20	935 days	865 days	1131 days	906 days
BR	17 Mar 20	1978 days	1643 days	1277 days	909 days
PT	16 Mar 20	709 days	745 days	1037 days	660 days
IN	12 Mar 20	7257 days	4394 days	3617 days	2708 days
MX	19 Mar 20	3307 days	2467 days	1374 days	1222 days
World	11 Jan 20	1092 days	923 days	781 days	647 days

- Mostly improvement.
- Deterioration for <mark style="background:lime">UK</mark>, <mark style="background:lime">PT</mark>, <mark style="background:lime">FR</mark> & <mark style="background:lime">NL</mark>.
- Worst case is still <mark style="background:lime">DE</mark> but a very slight improvement from last week.

This is how doubling times have been evolving over the past year:
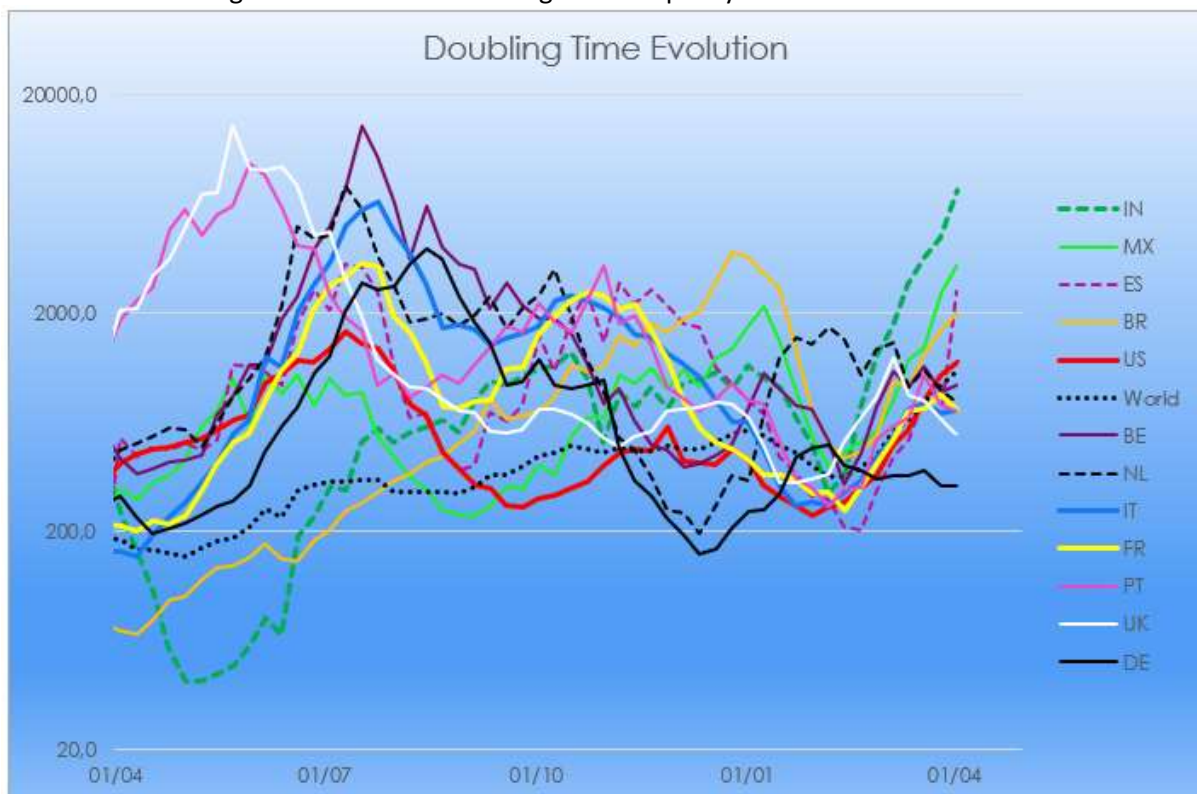
(Log y scale. Remember: Shorter doubling times equate to a faster evolution of the disease.)

EU Case-rate Comparisons [5]

The dispersion in E/R ratios for the countries shown here is sufficiently small that this graph remains indicative of the progress of COVID-19 in each country. (Especially since this is a log plot.)
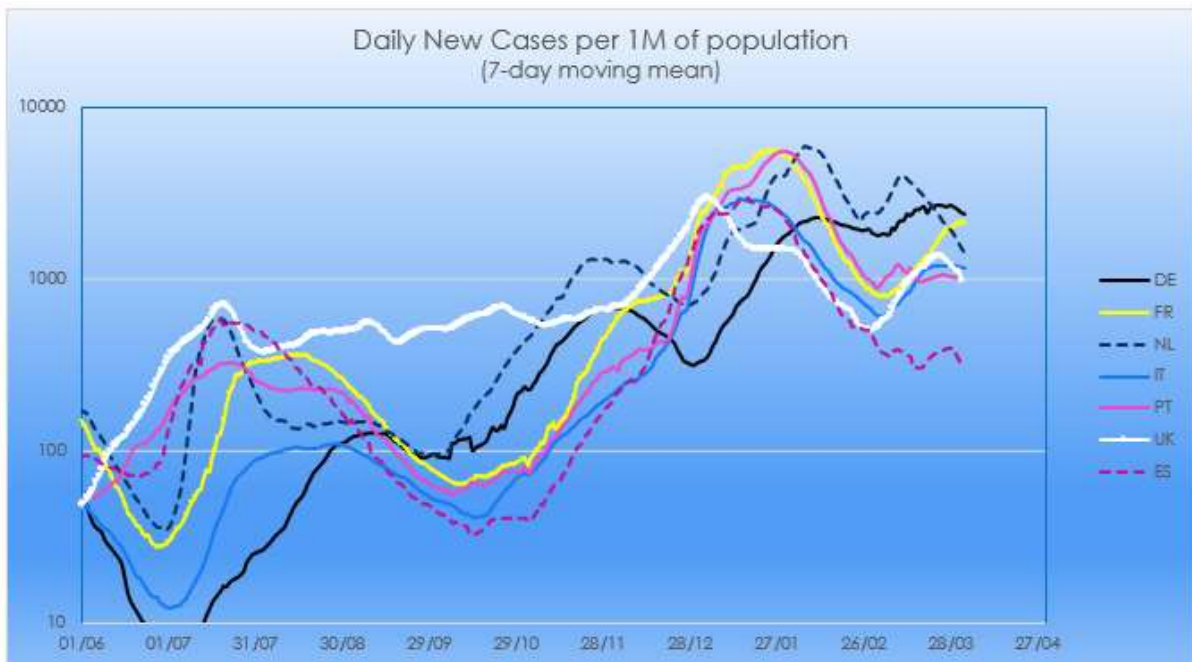
DE remains high but FR has caught up.
Strong progression of the disease in FR. Static or falling rates elsewhere.

Vaccinations against COVID-19 [6]
64.5% of the world population has received at least one dose of a vaccine. (**64.3%** last week)
11.29 billion doses have been administered globally. (**11.17 billion** last week)
18.7 million are now administered daily. (**11.17 billion** last week)
Only **14.5%** of people in low-income countries have received at least one dose. (**14.4%** last week)

Share of people vaccinated against COVID-19, Mar 31, 2022

■ Share of people with a complete initial protocol ■ Share of people only partly vaccinated

Country	Complete	Partly	Total
United Arab Emirates	96%		99%
Portugal	93%		95%
Cuba	88%	6.4%	94%
Chile	90%		93%
Singapore	91%		92%
China	86%		88%
Canada	82%	3.9%	86%
Brazil	75%	9.6%	85%
Italy	79%	4.8%	84%
Vietnam	79%		81%
Japan	80%		81%
France	78%		80%
Thailand	72%	7.6%	79%
United Kingdom	72%	4.9%	77%
Bangladesh	67%	10%	77%
United States	66%	11%	77%
Germany	75%		76%
Iran	67%	8.3%	75%
Indonesia	58%	13%	71%
India	60%	11%	71%
Turkey	62%	5.6%	68%
Mexico	61%	4.5%	66%
World	58%	6.5%	64%
Pakistan	51%	7.3%	59%
Russia	50%	4.9%	55%
Egypt	30%	12%	43%
Ethiopia	18%	3%	21%
Nigeria	4.5%	5.4%	10%

0%   20%   40%   60%   80%

BD has overtaken US.

COVID-19 vaccine boosters administered per 100 people

Total number of vaccine booster doses administered, divided by the total population of the country. Booster doses are doses administered beyond those prescribed by the original vaccination protocol.

LINEAR LOG

Italy
Belgium
Portugal
Germany
United Kingdom
France
Netherlands
Spain

Brazil
Peru

United States

World

Russia

India

Dec 29, 2020   Jun 4, 2021   Sep 12, 2021   Dec 21, 2021   Mar 31, 2022
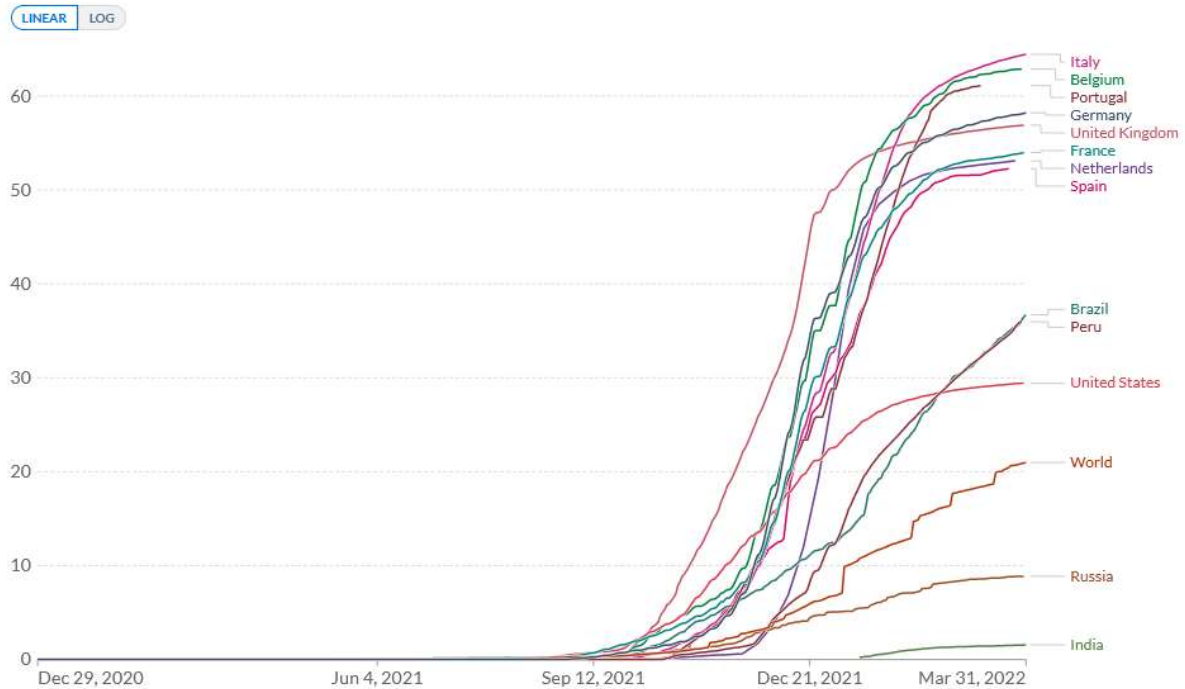
Source: Official data collated by Our World in Data   CC BY

No changes in rankings.

US States' Trends [7]

<u>Normalized</u> daily death rates (7-day moving mean) for the last 30 days:
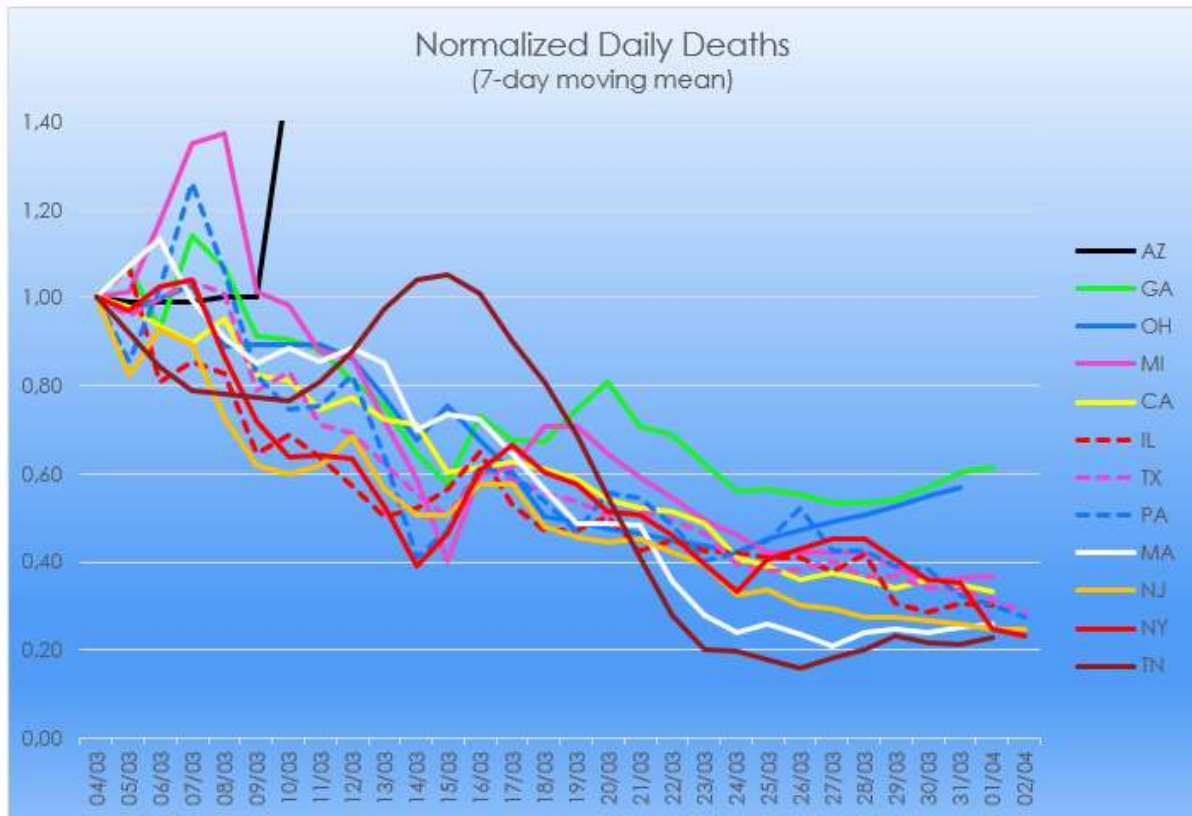
(Linear y scale.)

All states falling except in the case of AZ (this state's data have been very patchily reported).

(As before, FL statistics are not credible in my opinion.)

Tendencies: Comparison doubling times [4, 8]

Double digits, triple+shortening, triple, quadruple

State	1st death	Doubling time (7-day fits)			
		02 Apr	26 Mar	19 Mar	12 Mar
AZ	20 Mar 20	368 days	416 days	299 days	505 days
CA	04 Mar 20	915 days	862 days	557 days	478 days
GA	14 Mar 20	527 days	632 days	401 days	384 days
IL	17 Mar 20	1390 days	1016 days	863 days	846 days
MA	20 Mar 20	1693 days	2002 days	857 days	770 days
MI	18 Mar 20	839 days	715 days	483 days	465 days
NJ	10 Mar 20	4271 days	3539 days	2233 days	1939 days
NY	14 Mar 20	5828 days	2557 days	1977 days	2819 days
OH	18 Mar 20	743 days	969 days	789 days	495 days
PA	18 Mar 20	1678 days	1073 days	786 days	869 days
TN	22 Mar 20	1169 days	1465 days	339 days	259 days
TX	16 Mar 20	1325 days	966 days	684 days	633 days

Doubling rates improving in most states.

Deterioration in AZ, GA & OH.

Worst case: Still AZ.

This is how doubling time have been evolving in the past year:

Doubling Time Evolution

(Log plot! – Remember, longer doubling times are preferable.)
General improvement becoming ever more apparent.

Next update next Sunday (or, perhaps, next Monday)

Keep well & keep safe!

David

Today's images: Some lovely views sent in by **Sioned** & **Robert** of their walk along Mallorcan beaches from Betlem to Platja des Calo :

Please keep sending me your images for this space…

Notes

[1] The statistics on COVID-19 mortality that I have been presenting in these newsletters are data that are based on **individual deaths** reported **as they occur** by various government agencies (reports that are analysed, validated and aggregated by **worldometer** [0]).

For a variety of reasons, mortality statistics collected in this way may not provide accurate figures of true COVID-19 mortality:

- Different countries use different definitions of what constitutes a COVID-19 death.
- The collection of mortality statistics may be incomplete in a country.
- Some countries may intentionally under report COVID-19 deaths for their own purposes.
- Simple errors such as oversights and typing errors may give misleading results.
- And so on… reliability of the statistics varies greatly between locations and over time.

An alternative way to estimate a potentially more accurate estimate of true COVID-19 mortality is to compare the total number of deaths during the pandemic (deaths from whatever cause) with the total number of deaths during a period prior to the pandemic: **excess mortality**.

On March 10th just such a study was published in The Lancet:

Estimating excess mortality due to the COVID-19 pandemic: a systematic analysis of COVID-19-related mortality, 2020-21

This extremely authoritative study was the work of 96 authors from 36 institutions scattered throughout the world.

Many thanks to **Bob** for bringing this to my attention!

The only other study on this scale was one performed under the aegis of *The Economist* magazine:

Tracking COVID-19 excess deaths across countries

Both studies agree remarkably well.

[2] The national COVID-19 data are taken from the **worldometer** website which reproduces the data collected from Official Websites of Ministries of Health of other Governmental Institutions and Government authorities' social media accounts.

- Different countries use different criteria in recording COVID-19 deaths, often distinguishing between *probable* and *confirmed* cause of death.
    - Belgium appears to have the loosest criterion attributing any death to COVID-19 if there is any suspicion that COVID-19 could have been the cause.
    - The UK definition: death occurring within 28 days of a positive test for COVID-19.
      (If the patient dies 29 days after the test, it wasn't officially caused by COVID-19.)
    - China has only reported 3 COVID-19 deaths since 17th May 2020!
      One occurred on 14th January 2021. This week (19th March) there were 2 more.
- Some countries, notably the US, regularly update the entire set of historical data provided to the website.

ISO two-letter country codes used in this Update

Code	Country	Code	Country	Code	Country	Code	Country	Code	Country
All	World	CR	Costa Rica	IN	India	MW	Malawi	SI	Slovenia
AE	UAE	CU	Cuba	IQ	Iraq	MX	Mexico	SK	Slovakia
AF	Afghanistan	CZ	Czechia	IR	Iran	MY	Malaysia	SN	Senegal
AL	Albania	DE	Germany	IT	Italy	MZ	Mozambique	SO	Somalia
AM	Armenia	DK	Denmark	JM	Jamaica	NA	Namibia	SR	Suriname
AO	Angola	DO	Dominican Rep.	JO	Jordan	NG	Nigeria	SV	El Salvador
AR	Argentina	DZ	Algeria	JP	Japan	NL	Netherlands	SY	Syria
AT	Austria	EC	Ecuador	KE	Kenya	NO	Norway	SZ	Eswatini
AU	Australia	EE	Estonia	KG	Kyrgyzstan	NP	Nepal	TH	Thailand
AZ	Azerbaijan	EG	Egypt	KH	Cambodia	OM	Oman	TN	Tunisia
BA	Bosnia Herz.	ES	Spain	KR	South Korea	PA	Panama	TR	Turkey
BD	Bangladesh	ET	Ethiopia	KW	Kuwait	PE	Peru	TT	Trinidad & Tobago
BE	Belgium	FI	Finland	KZ	Kazakhstan	PH	Philippines	UA	Ukraine
BG	Bulgaria	FR	France	LB	Lebanon	PK	Pakistan	UG	Uganda
BH	Bahrain	GE	Georgia	LK	Sri Lanka	PL	Poland	UK	UK
BO	Bolivia	GH	Ghana	LT	Lithuania	PS	Palestine	US	USA
BR	Brazil	GR	Greece	LU	Luxembourg	PT	Portugal	UY	Uruguay
BW	Botswana	GT	Guatemala	LV	Latvia	PY	Paraguay	UZ	Uzbekistan
BY	Belarus	GY	Guyana	LY	Libya	RO	Romania	VE	Venezuela
CA	Canada	HN	Honduras	MA	Morocco	RoW	Rest of World	VN	Vietnam
CD	D.R. Congo	HR	Croatia	MD	Moldova	RS	Serbia	YE	Yemen
CH	Switzerland	HU	Hungary	ME	Montenegro	RU	Russia	ZA	South Africa
CL	Chile	HK	Hong Kong	MG	Madagascar	RW	Rwanda	ZM	Zambia
CM	Cameroon	ID	Indonesia	MK	North Macedonia	SA	Saudi Arabia	ZW	Zimbabwe
CN	China	IE	Ireland	MM	Myanmar	SD	Sudan		
CO	Columbia	IL	Israel	MN	Mongolia	SE	Sweden		

[3] Note on line graphs: The key on the right of all line graphs in this newsletter lists the entries in decreasing order of the value of the latest data points presented. This hopefully may help colour-blind readers to interpret the graph contents.

[4] The **doubling time** is a characteristic of exponential growth. It is the period of time over which the number doubles in value, and is an inverse measure of the gradient of the curve. A doubling time makes most sense when the curve to which it applies is close to an exponential, i.e., a straight line on a semi-logarithmic graph. For this reason. in order to follow the evolution in the number of cumulative deaths per country, I fit an exponential to the data at the end of the curve (7 days' data) and extract from this a "doubling time".
The doubling time means what it says: If the exponential tendency persists unchanged, the numbers of deaths at the end of the doubling time will be double the current number.
Example based on US data: On 29/08/2020 no. deaths was 188 900 and doubling time was 116 days. This implies no. deaths on 23/12/2020 (116 days later) will have doubled – to 377 800.
The actual number on that date was 339 422, which reveals that there was a decline in the exponential tendency – but not by that much.
Clearly, long doubling times are good; short ones are bad. The interest in presenting these doubling times is that they are to some degree predictive of future behaviour.

[5] Warning: National data on testing are not really comparable between countries, but do reveal trends in individual countries.

[6] Vaccinations against COVID-19: These data are collected from official reports by the *Our World in Data* team and can be found here.
Note: The denominator in the metrics displayed in this section is the **total** population of the country, and not the population **eligible** for vaccination (the latter is the denominator most frequently used in data published by national authorities themselves).

[7] The states I originally selected for this section were the top 12 states by cumulative deaths:

- AZ, CA, FL, GA, IL, MA, MI, NJ, NY, OH, PA & TX.

In 2022 TN entered the Top 12 displacing MA, but, since I have not recorded TN historical data, I'll continue to focus on the original Top 12.

[8] Note about FL: The reported data are very volatile and published day-to-day values keep changing erratically. For this reason, FL is excluded from doubling-time analysis.

[9] The sources of the NYC & Long Island data are not the same as the one used for national data:
Source for the 5 boroughs:
https://github.com/nychealth/coronavirus-data/blob/master/totals/group-death-by-boro.csv
Source for Nassau & Suffolk counties:
https://coronavirus.smartnews.com/us/new-york/