

**[2] Global infection, hospitalization and mortality trends**

This section analyzes COVID infections and mortality reported to local, federal and intergovernmental agencies, and are heavily influenced by testing rates and differences in government reporting standards and capabilities. Serology tests suggest that the *true* number of COVID infections may be much higher than the number of *reported* infections. However, trends in reported infections are still important to monitor, since they influence government policy and the behavior of citizens and companies.

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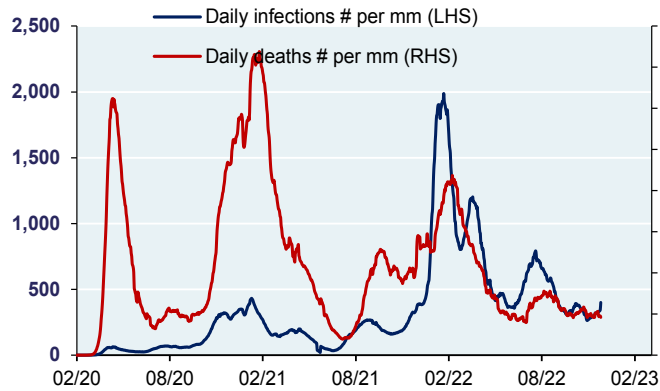
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On data sources. We generally use infection and mortality data from Johns Hopkins, with any exceptions noted in chart sources. While JHU data usually match sources such as covidtracking.com and Worldometers, this is not always the case. Any large differences usually work themselves out over time; even so, such differences are a warning against over-extrapolating any short term trends seen in the data. There are also patterns in some countries in which tests and infections drop over the weekend, only to rise the following week. Other anomalies: countries and US states sometimes make large one-time additions or subtractions to infections or deaths data to reflect over- or underestimations made over the course of the entire pandemic. JHU and other data providers do not amortize such adjustments over time and simply reflect them on the day they are made; we do the same.



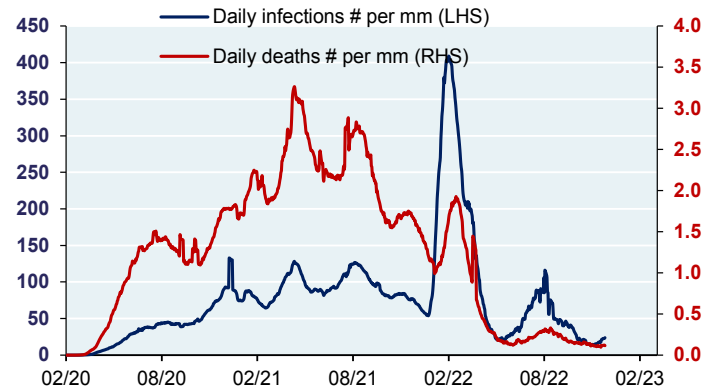
Summary of infection, hospitalization and mortality trends by region

Developed regions



Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

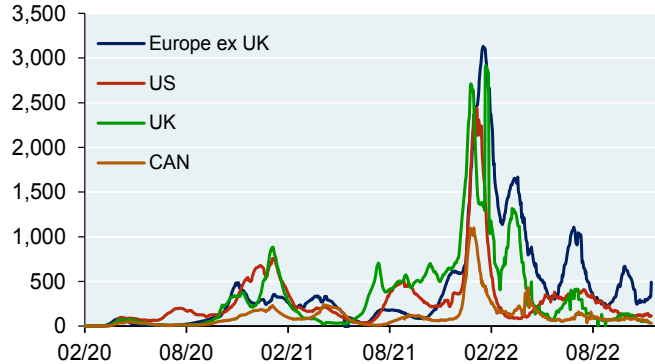
EM (LatAm, E Eur, EM Asia ex C/I, M East)



Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

US Canada Europe

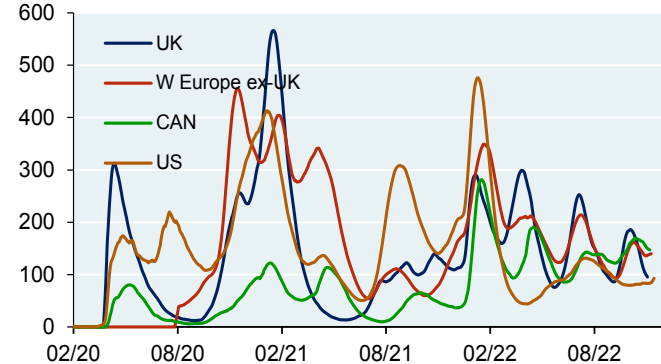
Daily infections, # per mm, smoothing = 7 days



Source: Johns Hopkins University, IMF, JPMAM. Nov 29, 2022.

US Canada Europe

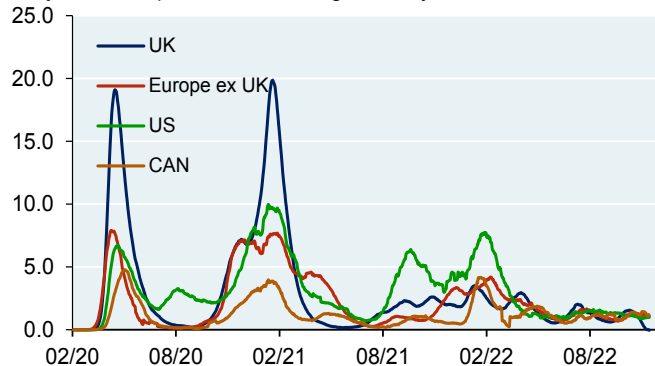
Current hospitalizations, # per mm, smoothing = 7 days



Source: various country sources, IMF, JPMAM. Nov 29, 2022.

US Canada Europe

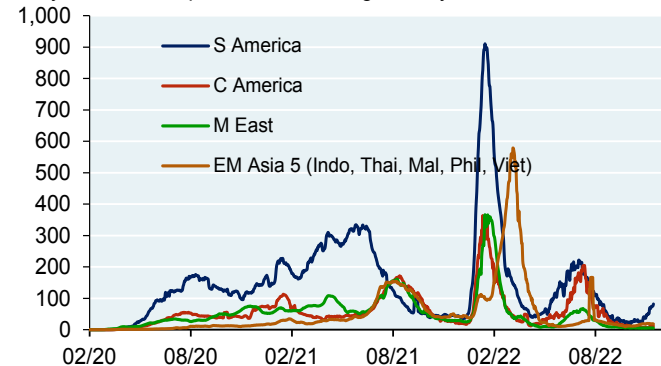
Daily deaths, # per mm, smoothing = 14 days



Source: Johns Hopkins University, IMF, JPMAM. Nov 29, 2022.

EM regions

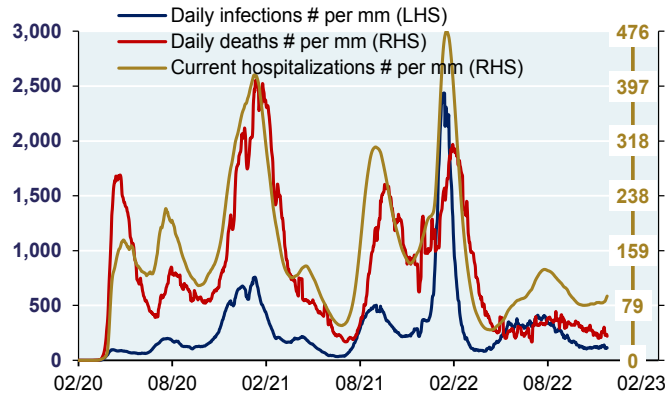
Daily infections, # per mm, smoothing = 7 days



Source: Johns Hopkins University, IMF, JPMAM. Nov 29, 2022.

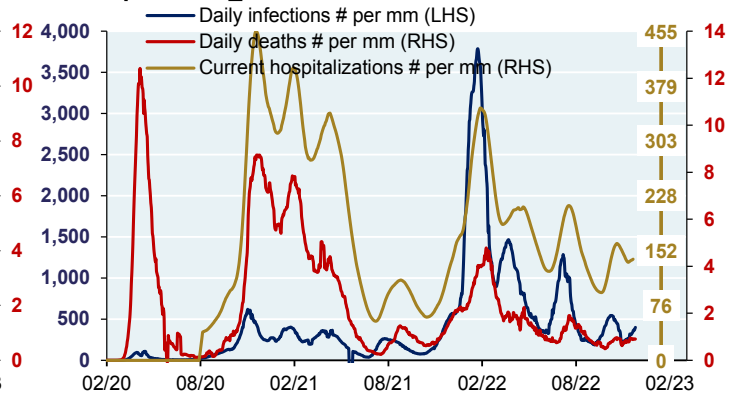


US



Source: JHU, IMF, HHS, JPMAM. Nov 29, 2022. 7 day smoothing.

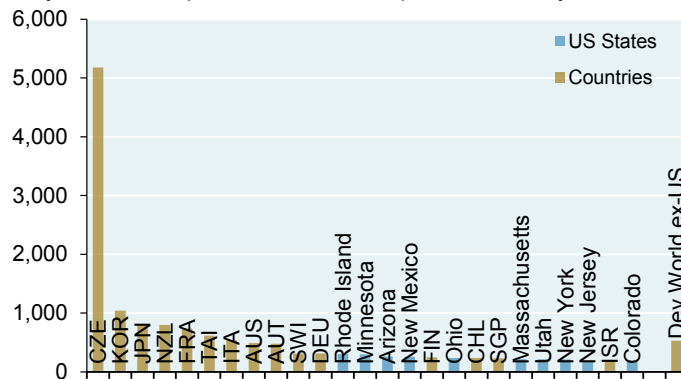
W Europe ex-UK_H



Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

25 highest infection rates vs Dev World ex-US

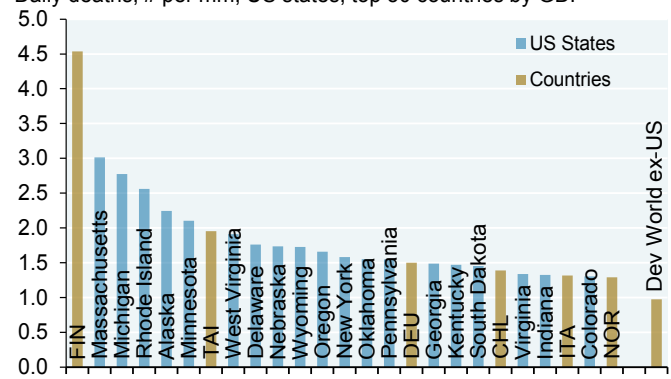
Daily infections, # per mm; US states, top 50 countries by GDP



Source: JHU, IMF, JPMAM. November 29, 2022. 7 day smoothing.

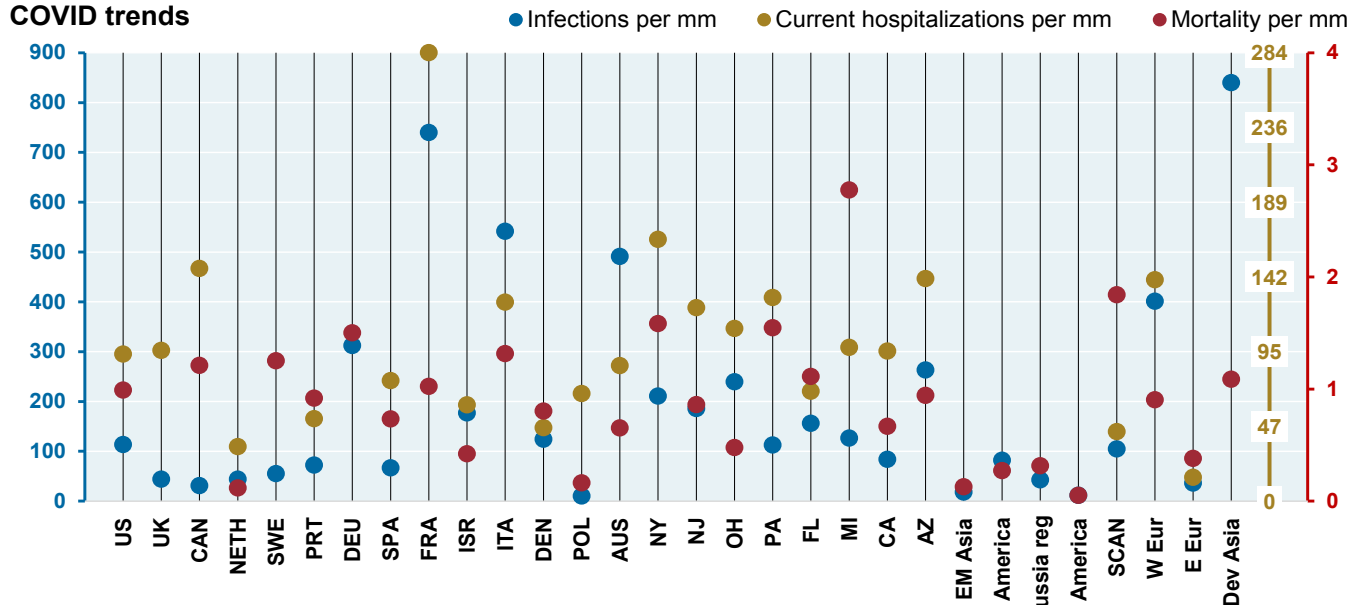
25 highest mortality rates vs Dev World ex-US

Daily deaths, # per mm; US states, top 50 countries by GDP



Source: JHU, IMF, JPMAM. November 29, 2022. 14 day smoothing.

COVID trends



Source: John Hopkins University, IMF, various country sources, JPMAM. November 29, 2022.

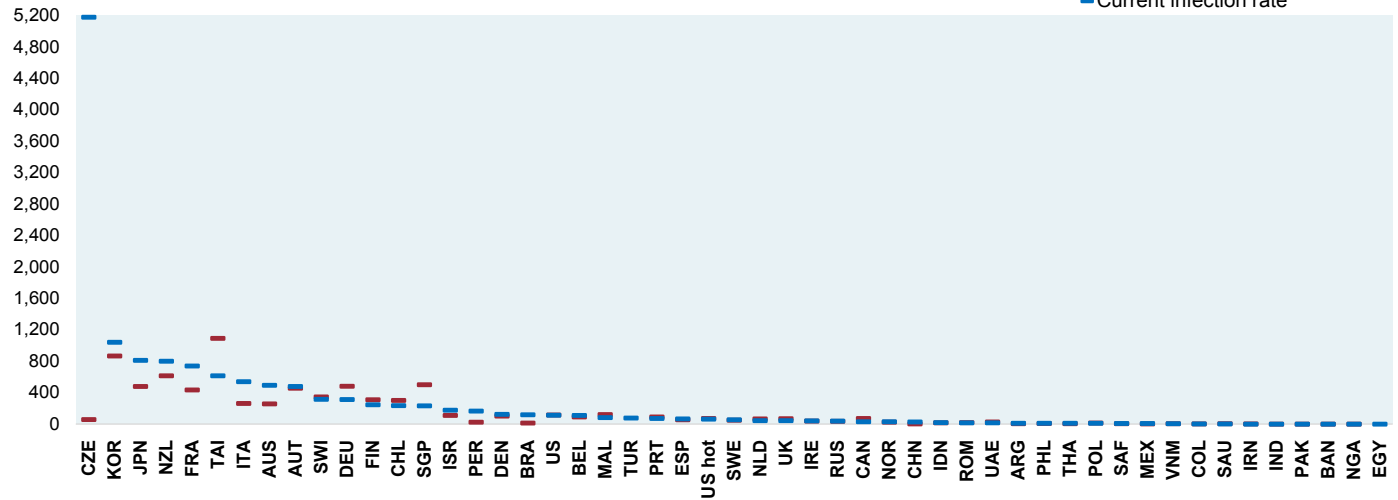


Infection, mortality and hospitalization snapshots

The charts below show current rates of infection and mortality compared to the rate 21 days ago and the case fatality rate for the 50 largest countries based on GDP. These countries represent 94% of global GDP.

Infection levels for the largest 50 countries based on GDP

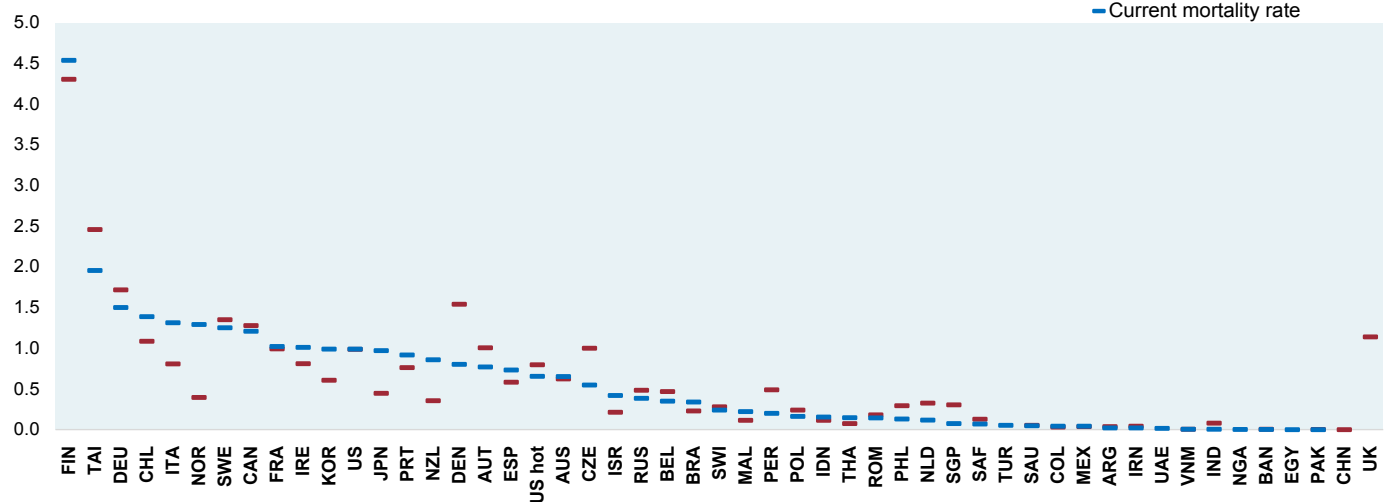
Sorted by trailing 7 day average infection rate per mm people



Source: Johns Hopkins University, IMF, JPMAM. Countries shown represent 94% of World GDP. November 29, 2022.

Mortality levels for the largest 50 countries based on GDP

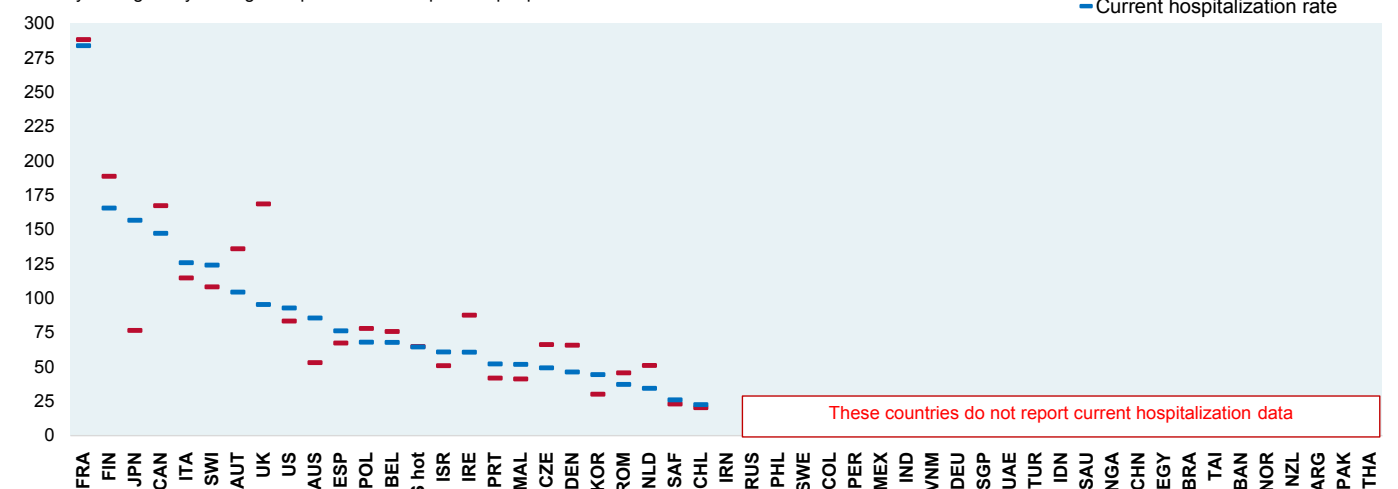
Sorted by trailing 14 day average mortality rate per mm people



Source: Johns Hopkins University, IMF, JPMAM. Countries shown represent 94% of World GDP. November 29, 2022.

Hospitalization rates for the largest 50 countries based on GDP

Sorted by trailing 7 day average hospitalization rate per mm people



Source: Johns Hopkins University, ECDC, IMF, JPMAM. Countries shown represent 94% of World GDP. November 29, 2022.

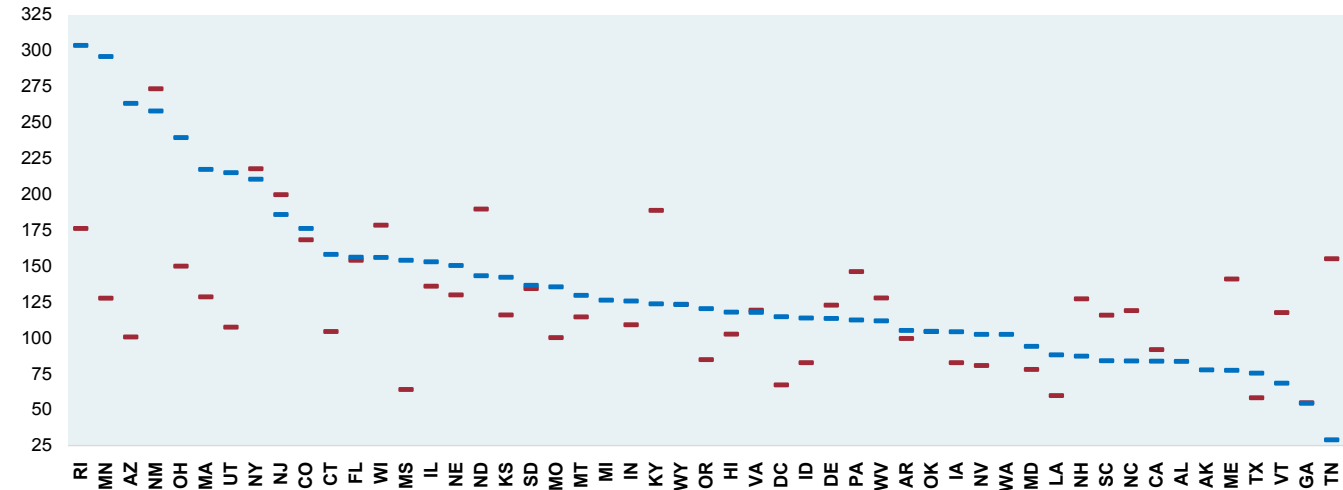


The charts below show current rates of infection, mortality and hospitalization compared to the rate 21 days ago for the 50 US states and DC.

Infection levels for US states

Sorted by trailing 7 day average infection rate per mm people

— Infection rate 21 days ago
— Current infection rate

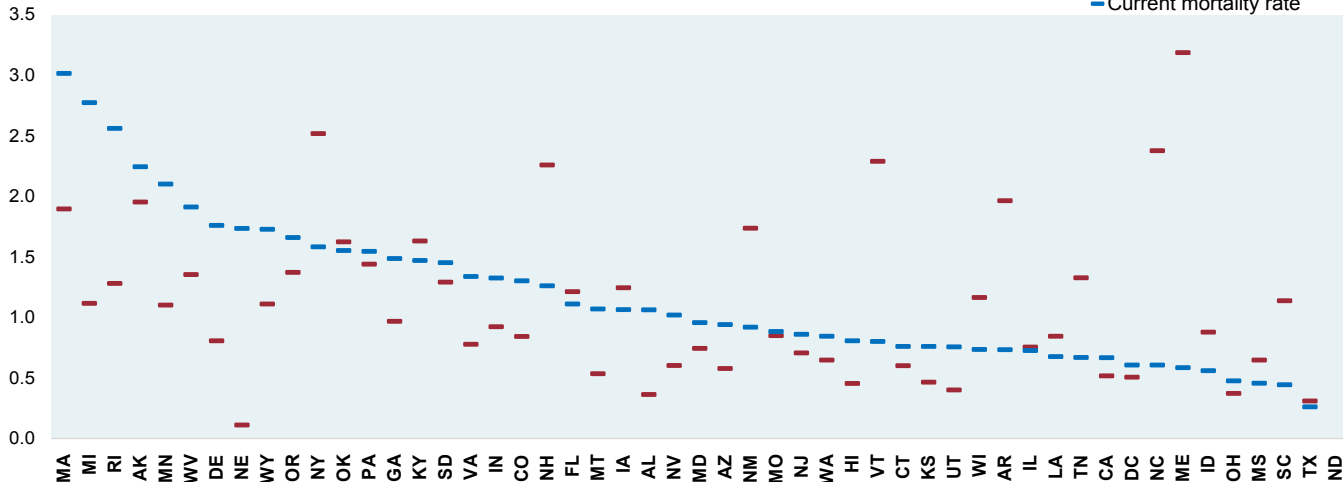


Source: Johns Hopkins University, IMF, JPMAM. November 29, 2022.

Mortality levels for US states

Sorted by trailing 14 day average mortality rate per mm people

— Mortality rate 21 days ago
— Current mortality rate

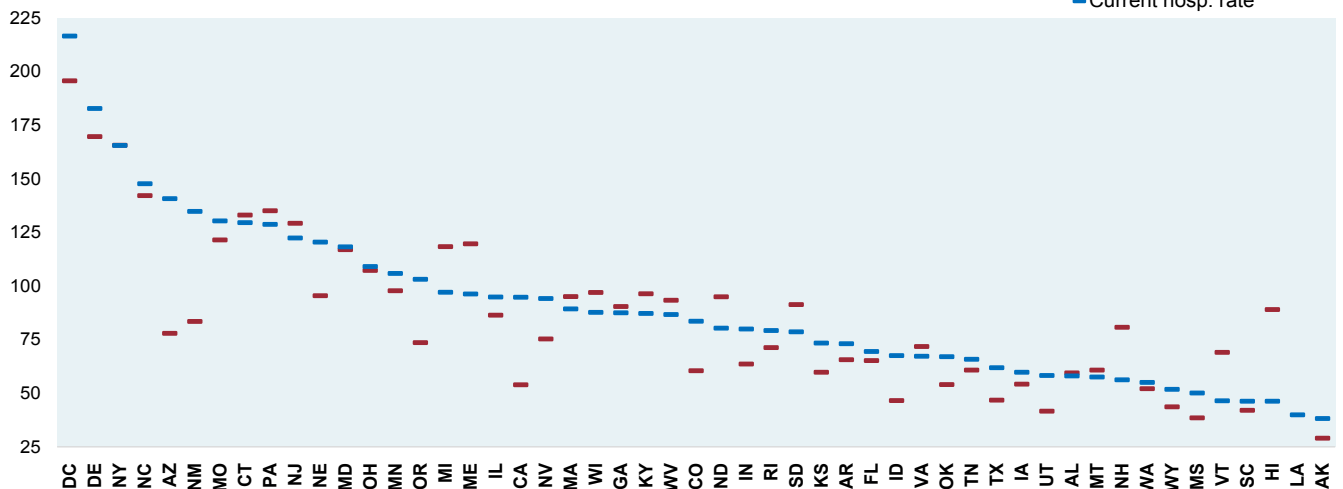


Source: Johns Hopkins University, IMF, JPMAM. November 29, 2022.

Hospitalization levels for US states

Sorted by trailing 7 day average current hospitalizations per mm people

— Hosp. rate 21 days ago
— Current hosp. rate



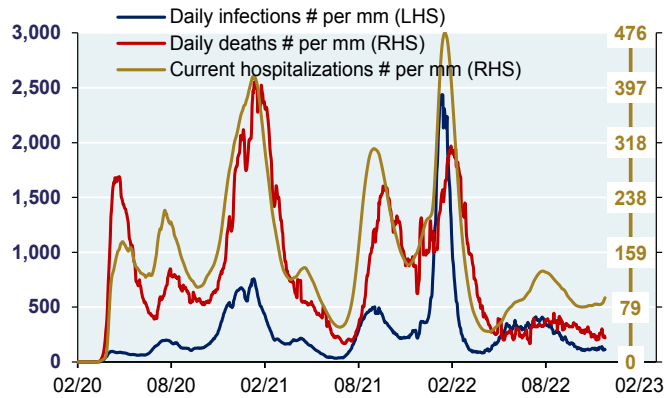
Source: HHS, IMF, JPMAM. November 29, 2022.



What's new: US

Note: Hotspots determined based on level and change in hospitalization data per capita

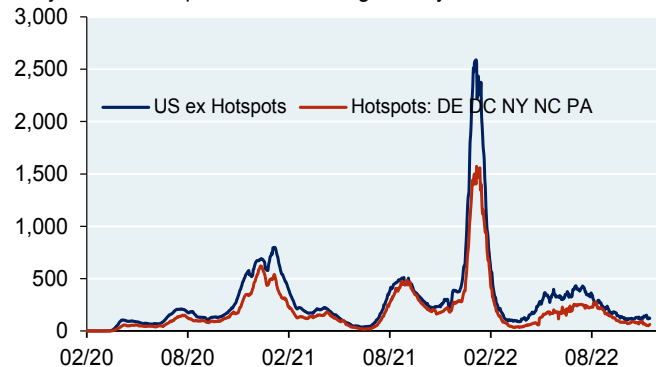
US



Source: JHU, IMF, HHS, JPMAM. Nov 29, 2022. 7 day smoothing.

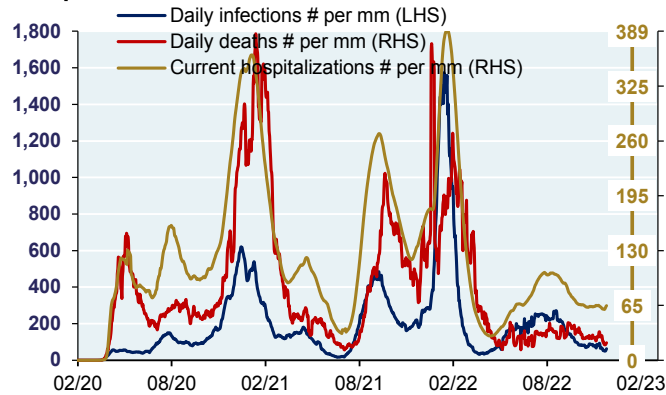
US hotspot states

Daily infections, # per mm, smoothing = 7 days



Source: Johns Hopkins University, IMF, JPMAM. Nov 29, 2022.

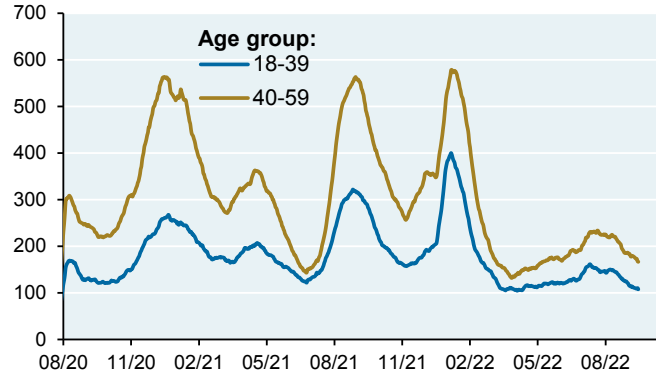
Hotspots: DE DC NY NC PA



Source: JHU, IMF, HHS, JPMAM. Nov 29, 2022. 7 day smoothing.

Hotspots: DE DC NY NC PA: hosp by age

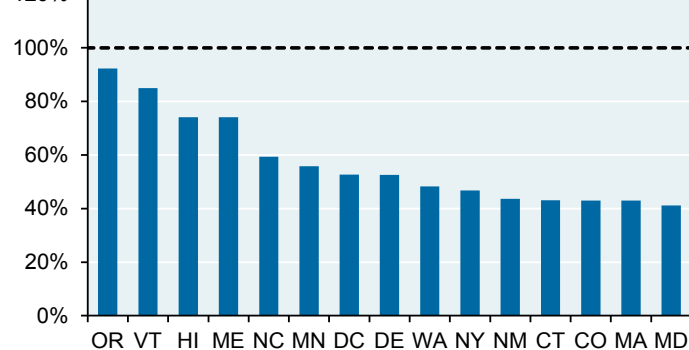
Prior day admissions, 14 day average



Source: HHS, JPMAM. November 29, 2022.

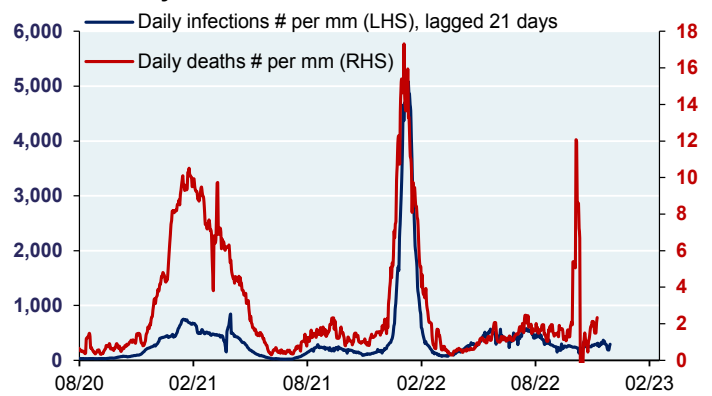
Current hospitalization levels vs winter 2020/2021 average

15 largest ratios



Source: HHS, IMF, JPMAM. November 29, 2022.

New York CityNew York

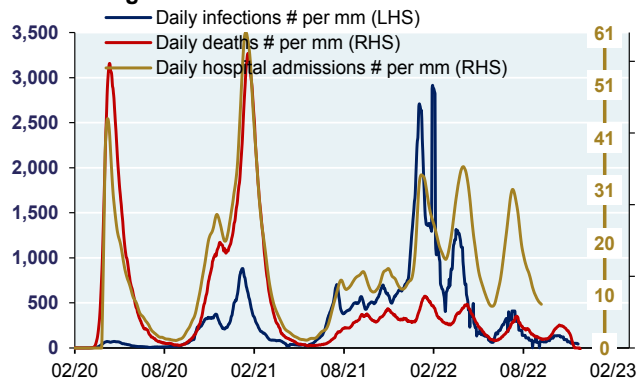


Source: JHU, IMF, HHS, JPMAM. Nov 29, 2022. 7 day smoothing.



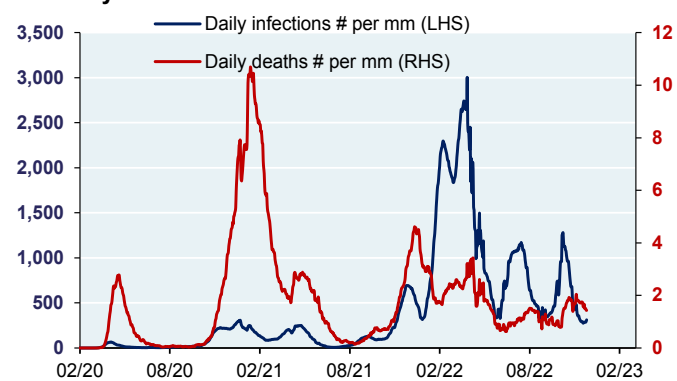
What's new: Europe

United Kingdom



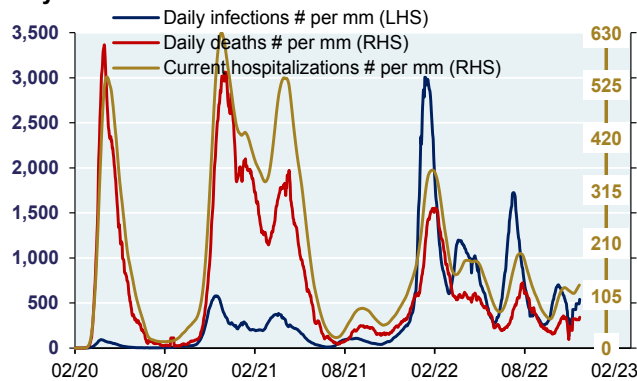
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Germany



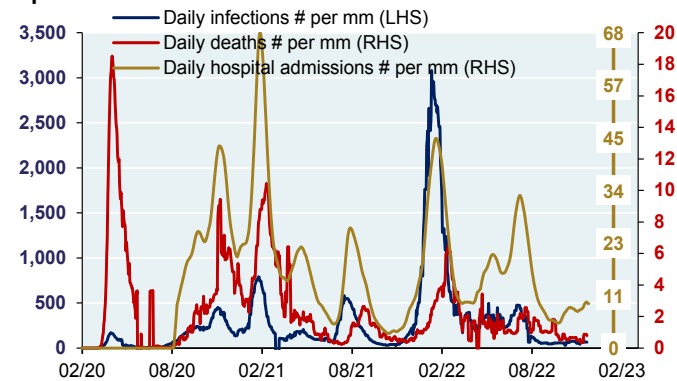
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Italy



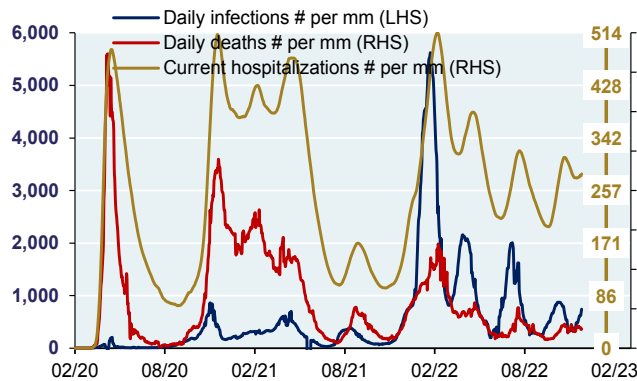
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Spain



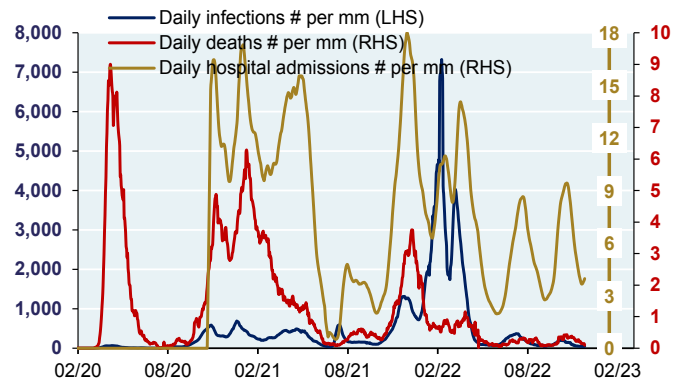
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

France



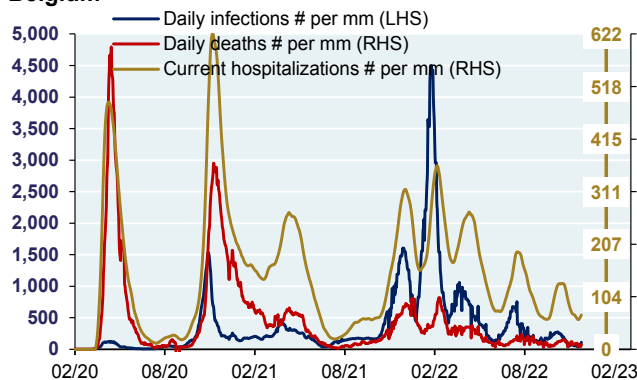
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Netherlands



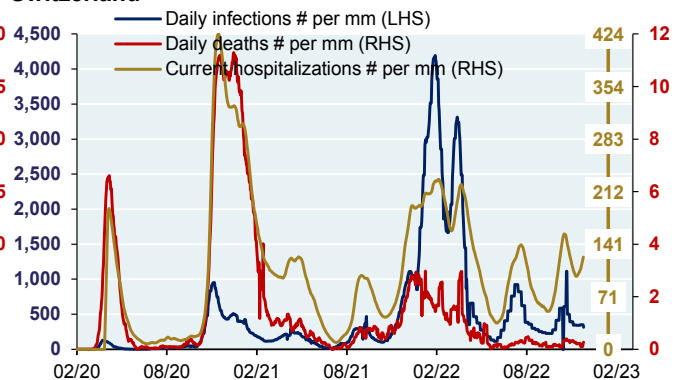
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Belgium

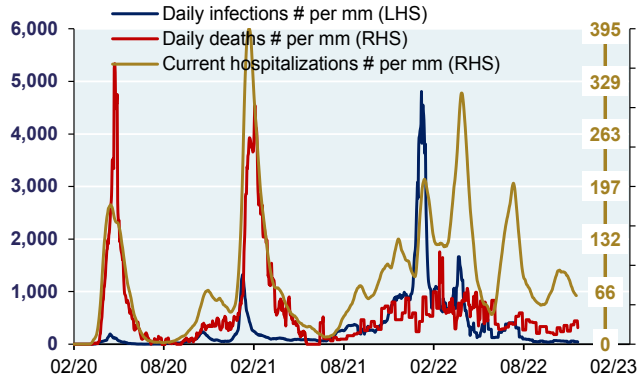


Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

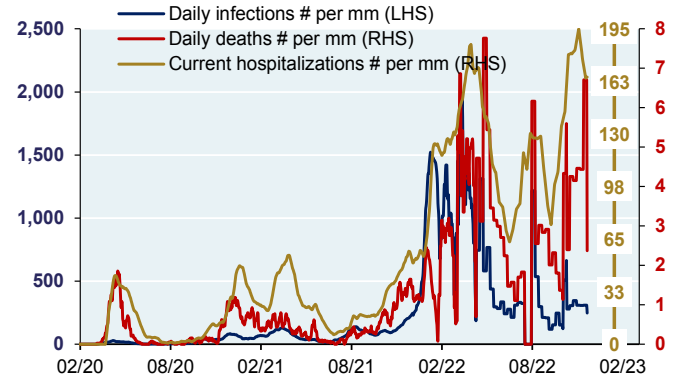
Switzerland



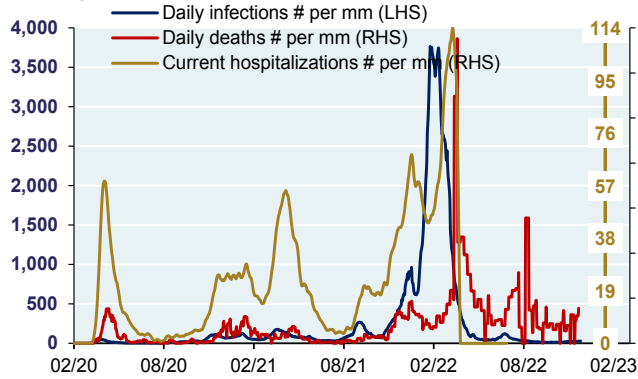
Source: JHU, IMF, OWID, JPMAM. Nov 29, 2022. 7 day smoothing.

**Ireland**

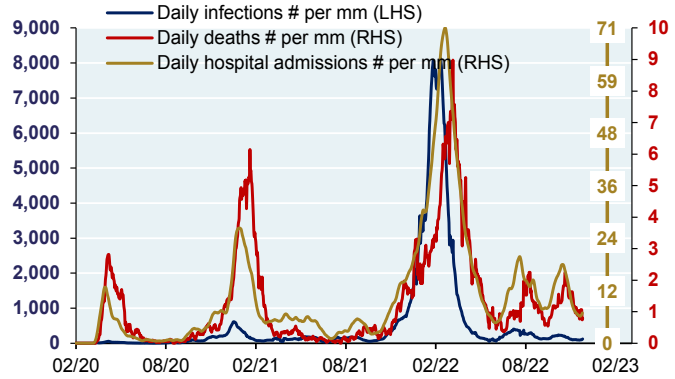
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Finland

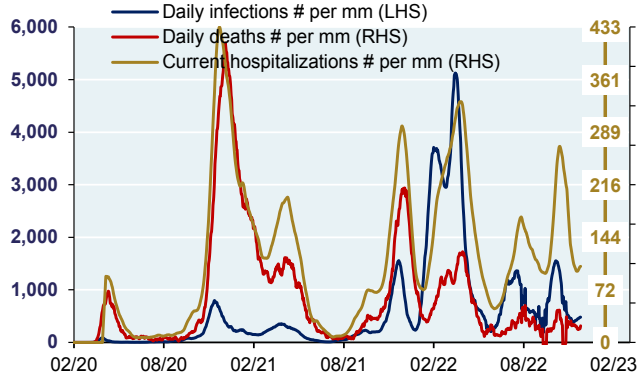
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Norway

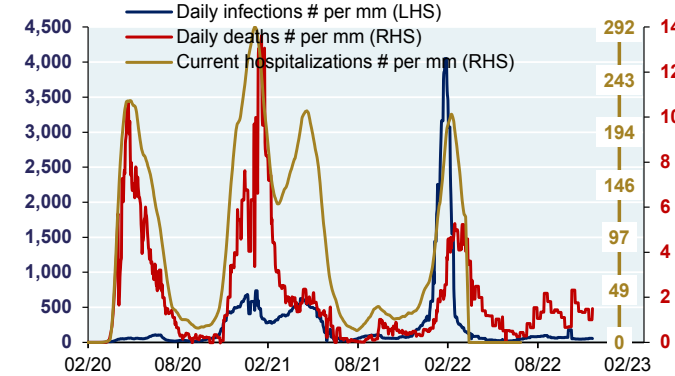
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Denmark

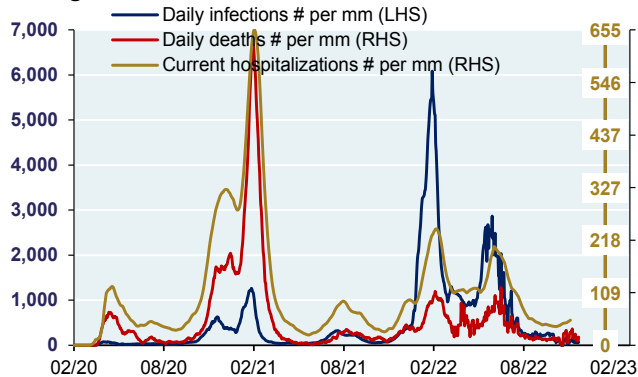
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Austria

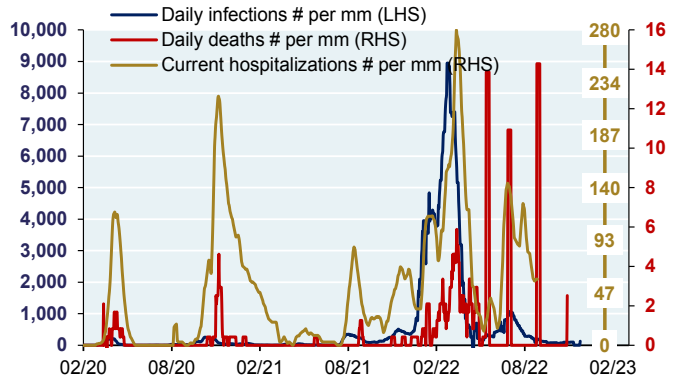
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Sweden

Source: JHU, IMF, OWID, JPMAM. Nov 29, 2022. 7 day smoothing.

Portugal

Source: JHU, IMF, ECDC, OWID, JPMAM. Nov 29, 2022. 7 day smoothing.

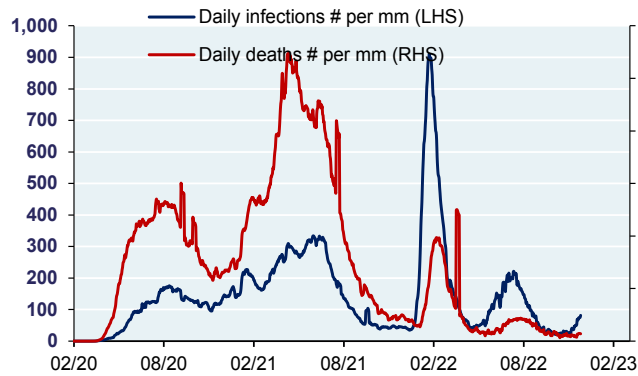
Iceland

Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.



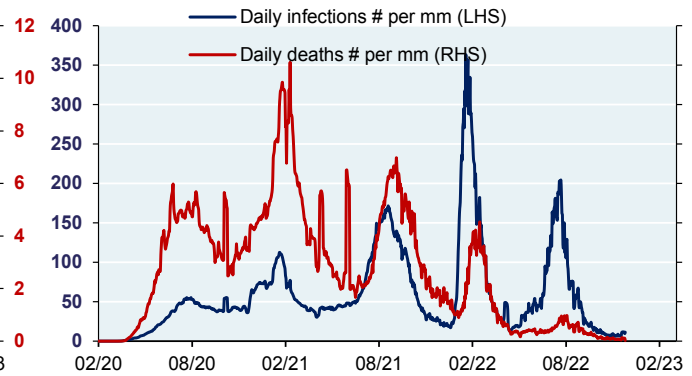
What's new: South America, Central America, Caribbean

S America



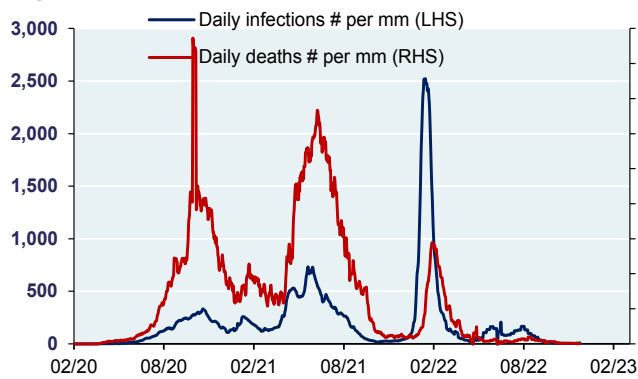
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

C America



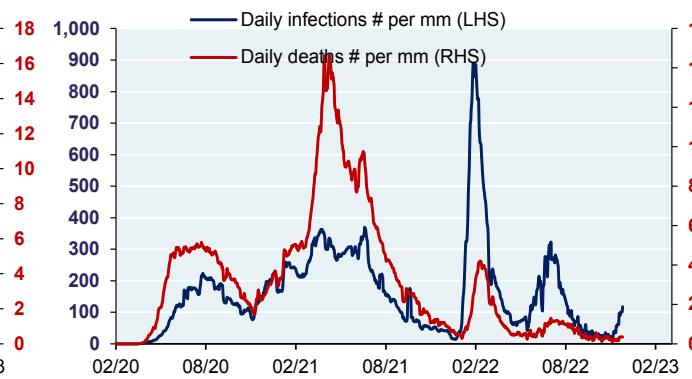
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Argentina



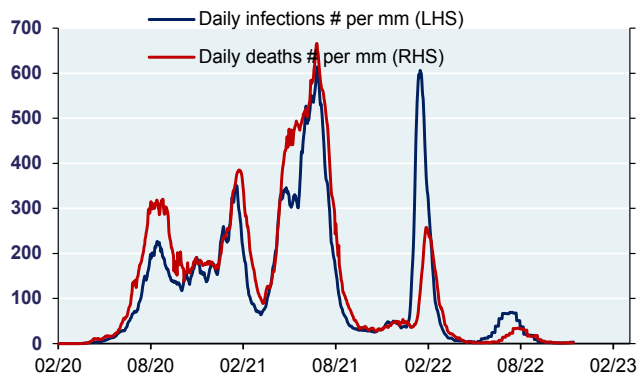
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Brazil



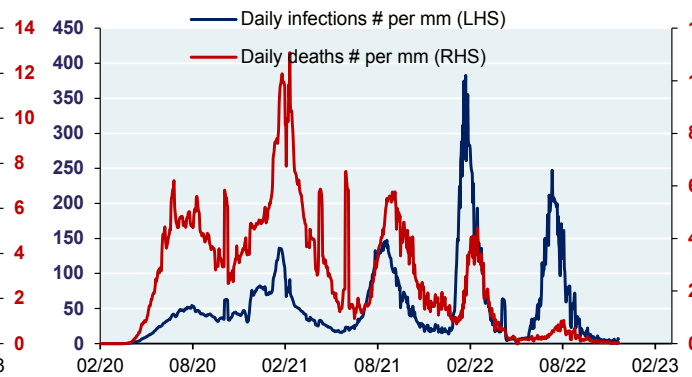
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Colombia



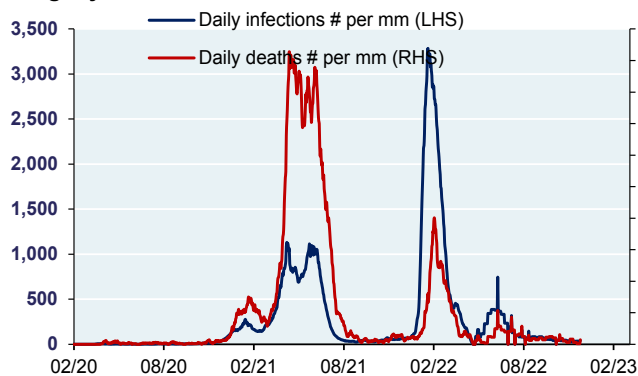
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Mexico



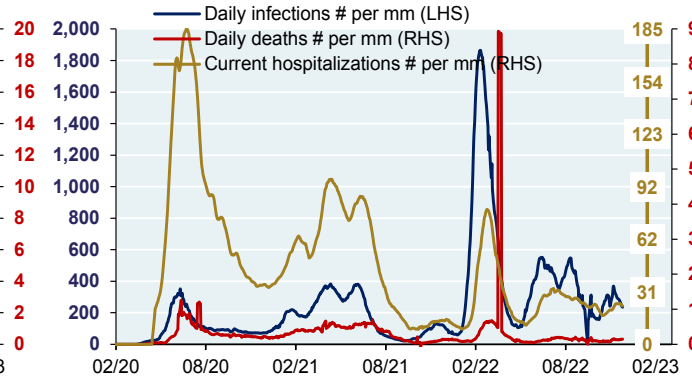
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Uruguay

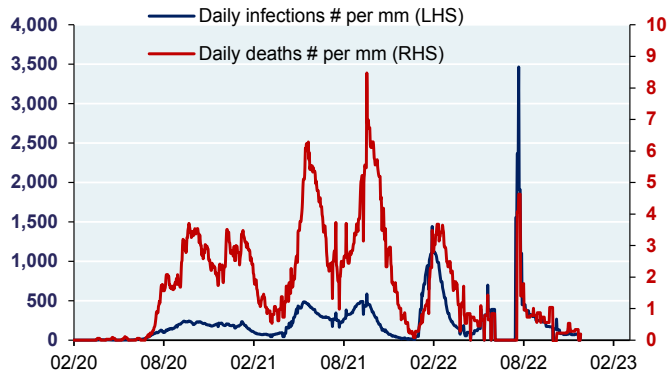


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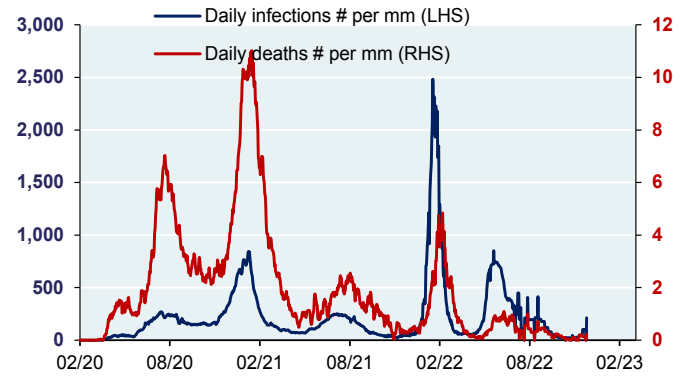
Chile



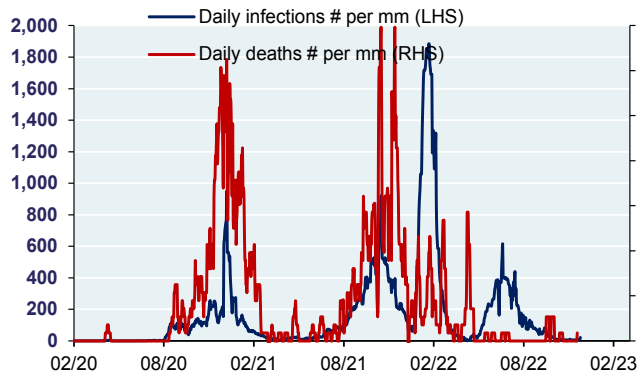
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

**Costa Rica**

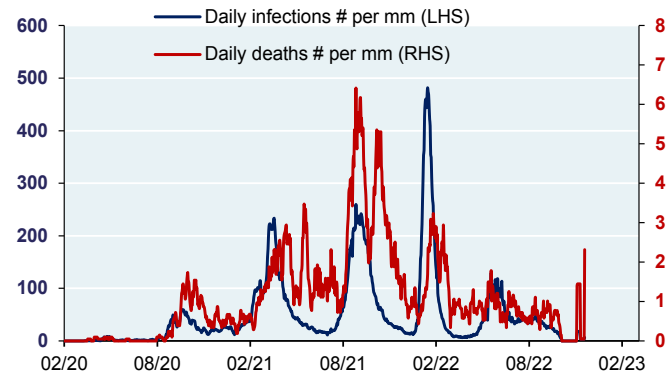
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Panama

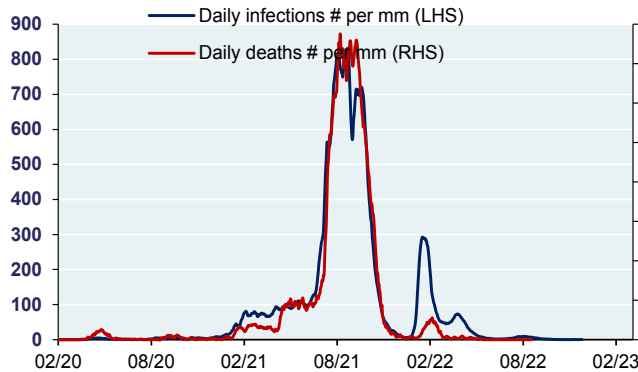
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Belize

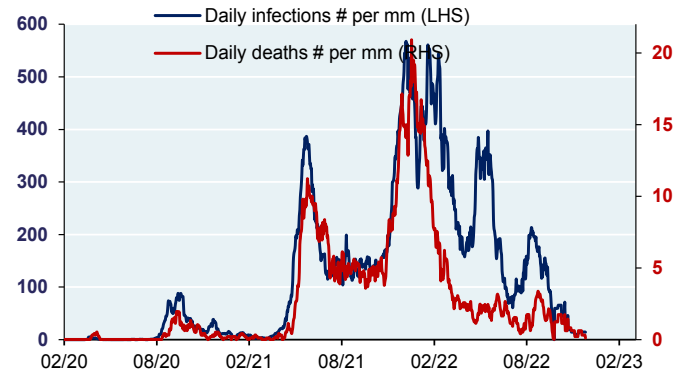
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Jamaica

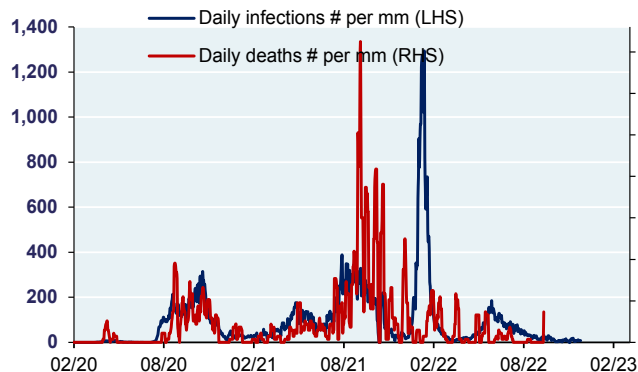
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Cuba

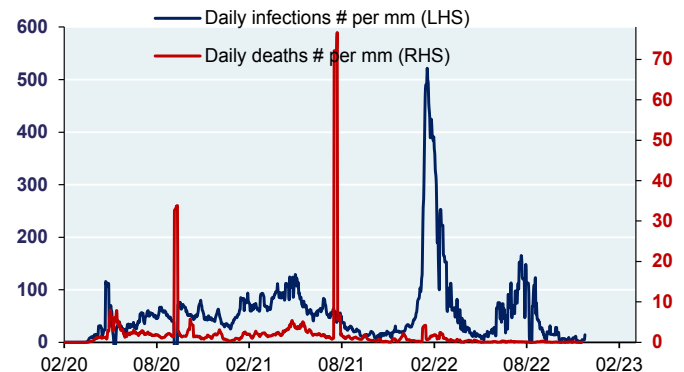
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Trinidad and Tobago

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Bahamas

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

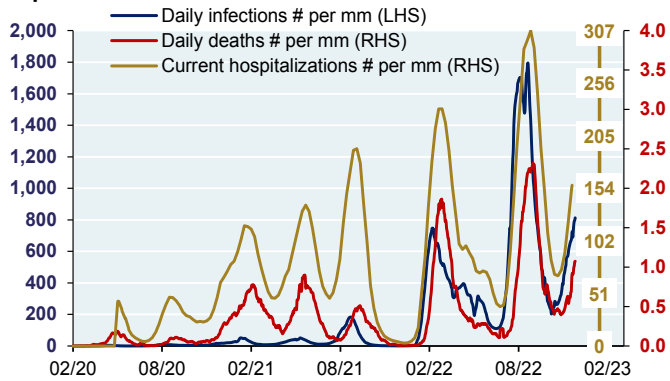
Ecuador

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.



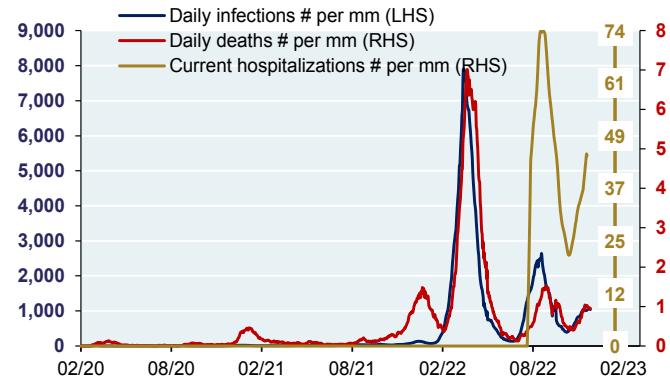
What's new: Asia

Japan



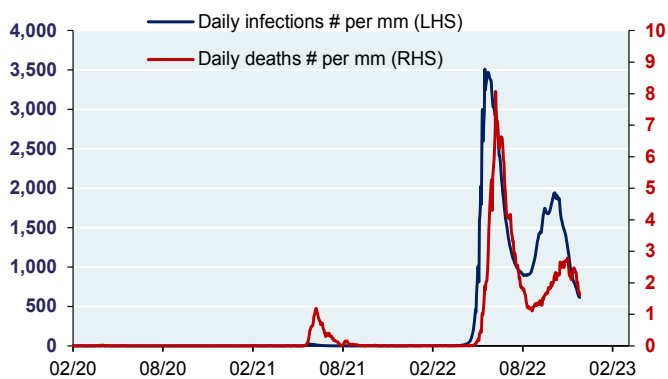
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

South Korea



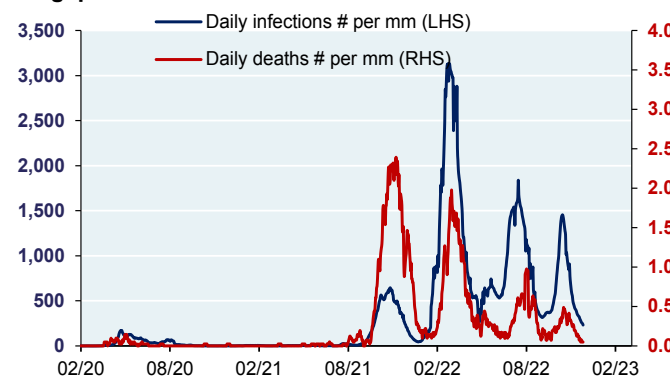
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Taiwan*



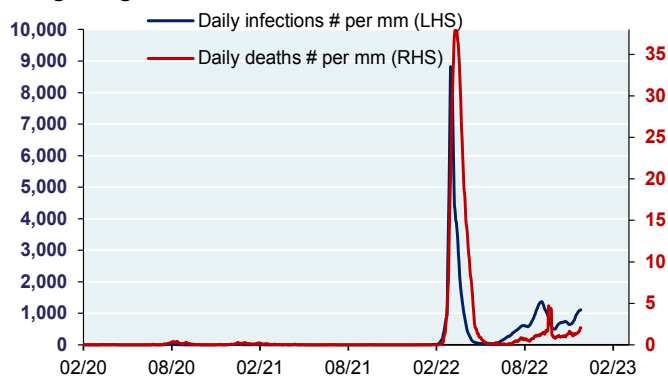
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Singapore



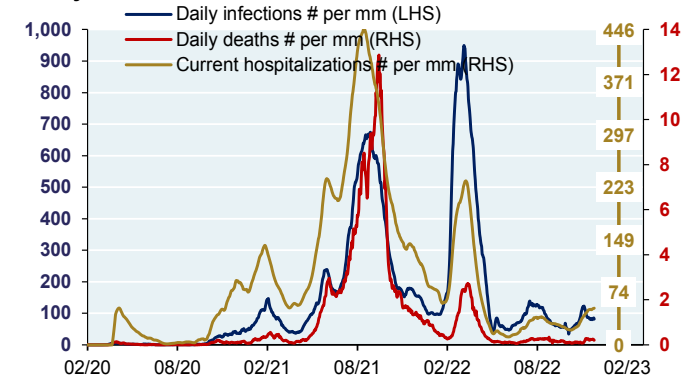
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Hong Kong



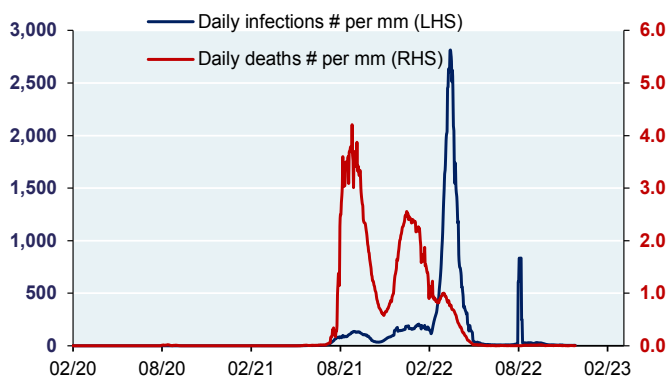
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Malaysia



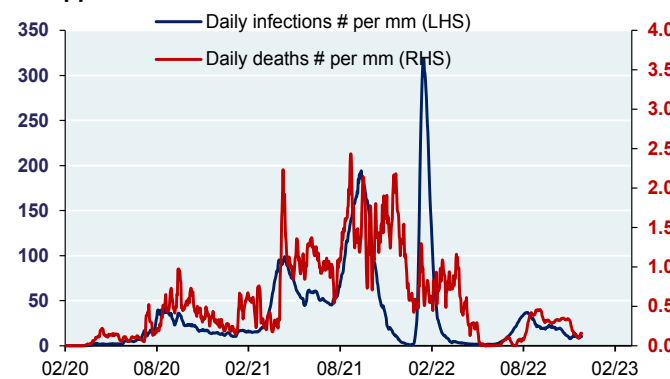
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Vietnam

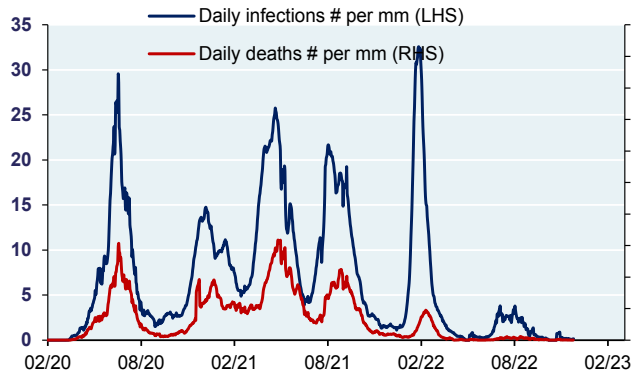


Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

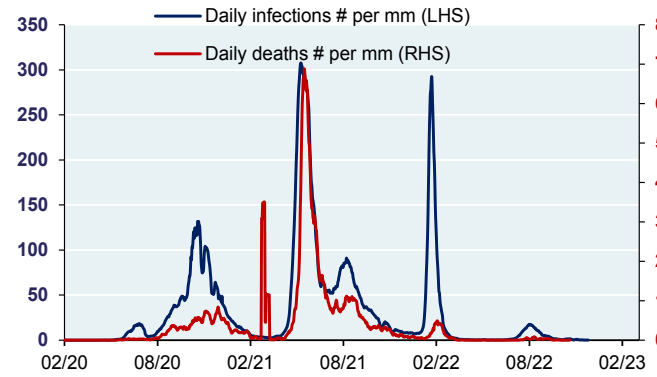
Philippines



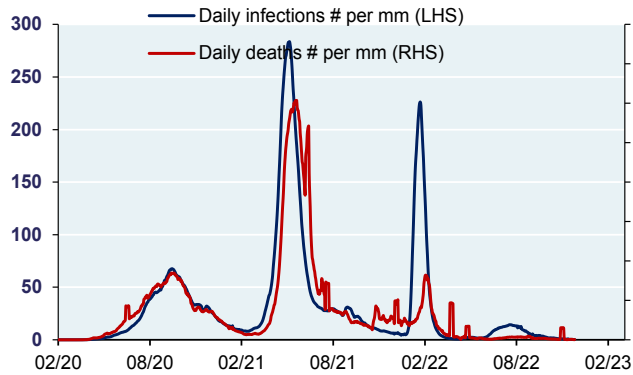
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

**Pakistan**

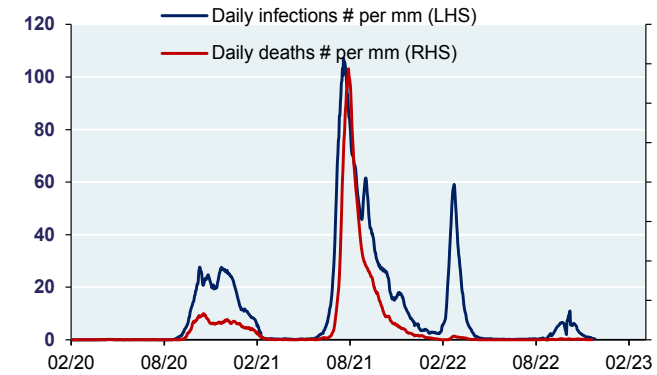
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Nepal

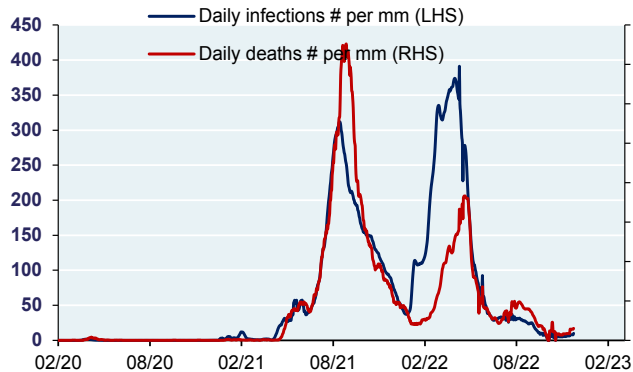
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India

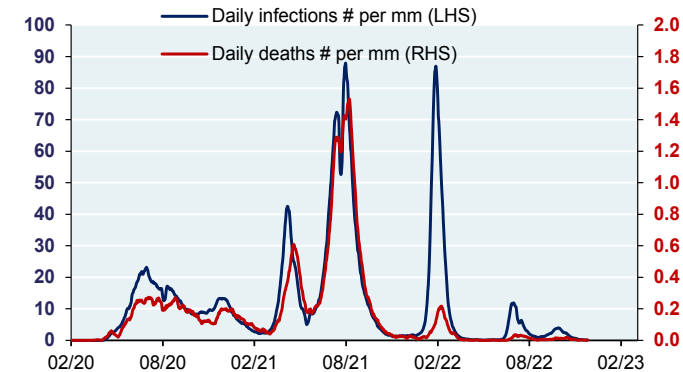
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Myanmar

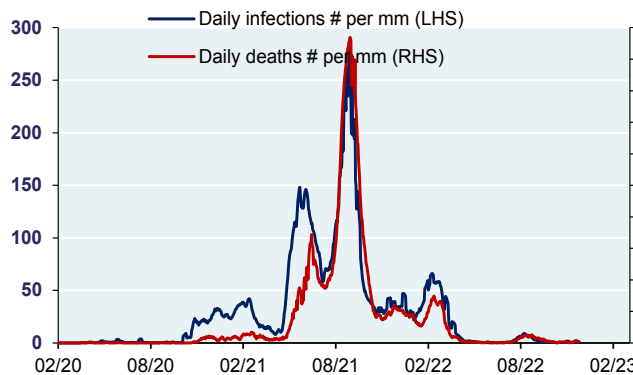
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Thailand

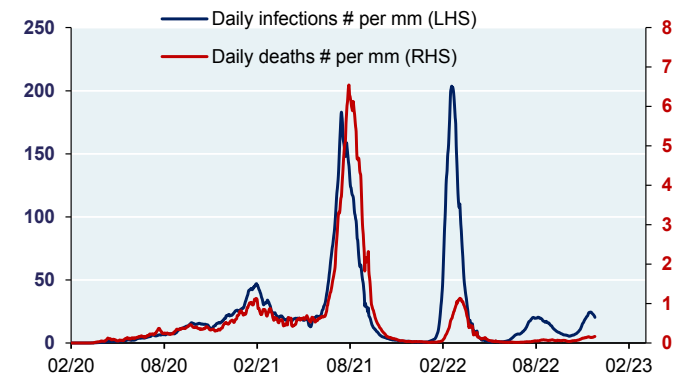
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Bangladesh

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Sri Lanka

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

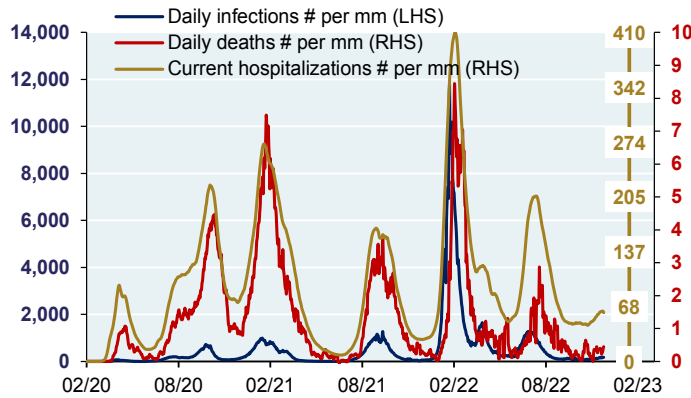
Indonesia

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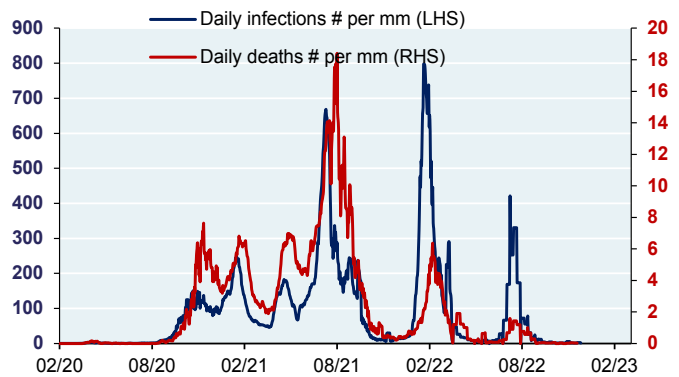


What's new: MidEast, Africa

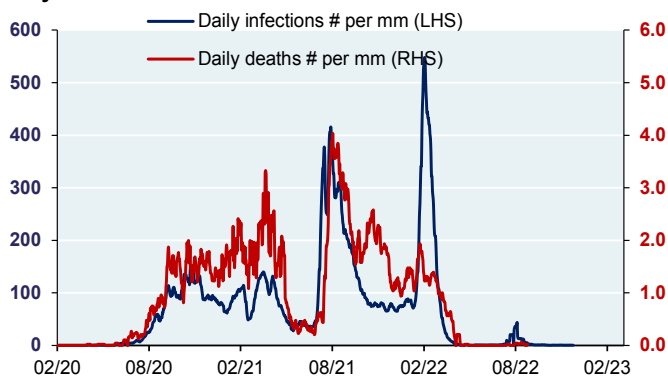
Israel



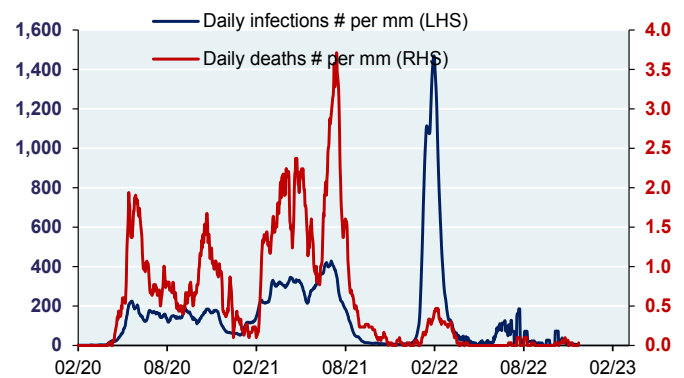
Tunisia



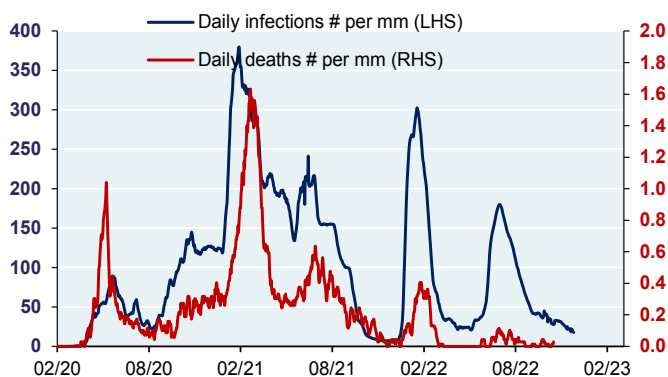
Libya



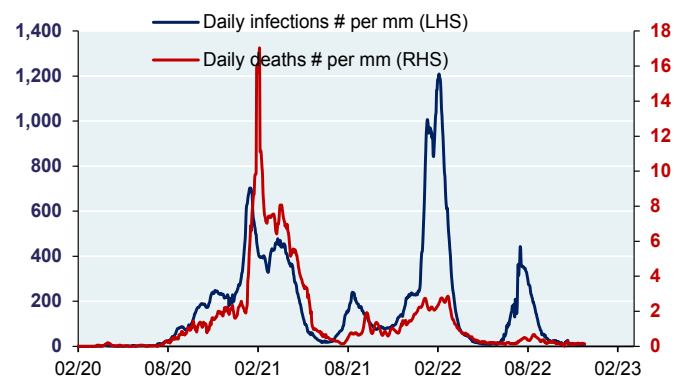
Kuwait



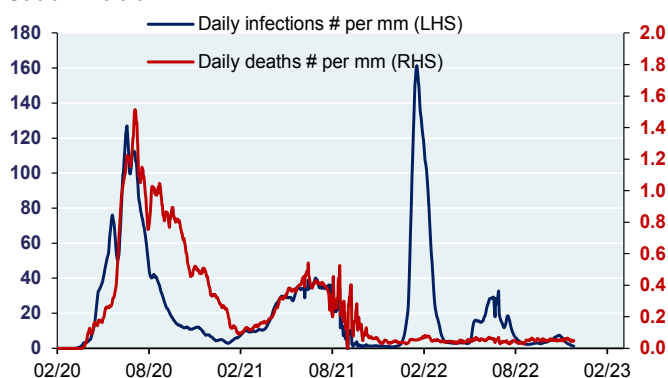
United Arab Emirates



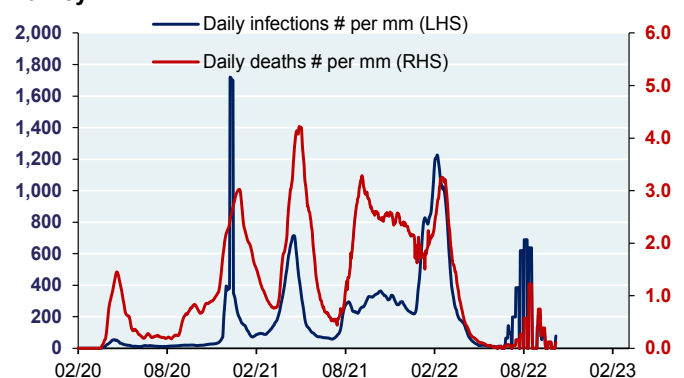
Lebanon

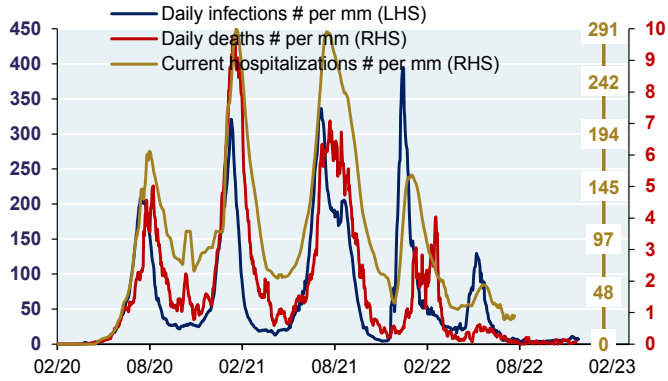


Saudi Arabia

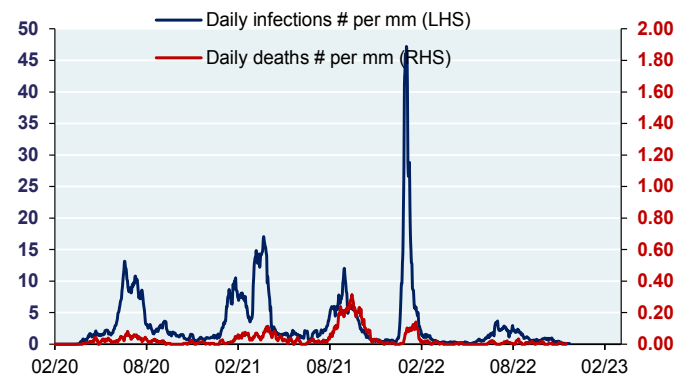


Turkey

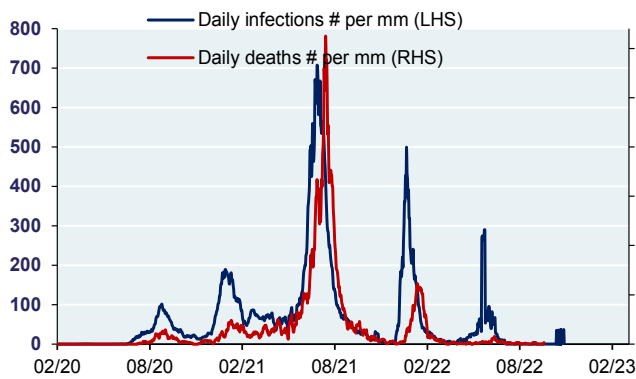


**South Africa**

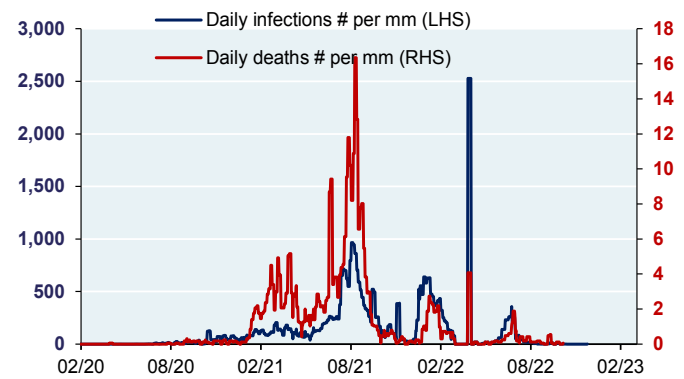
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Cote d'Ivoire

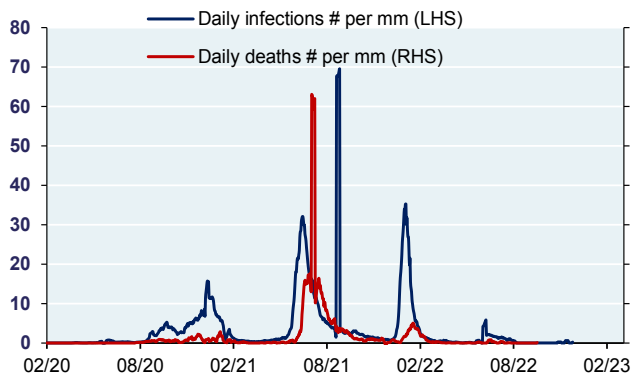
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Namibia

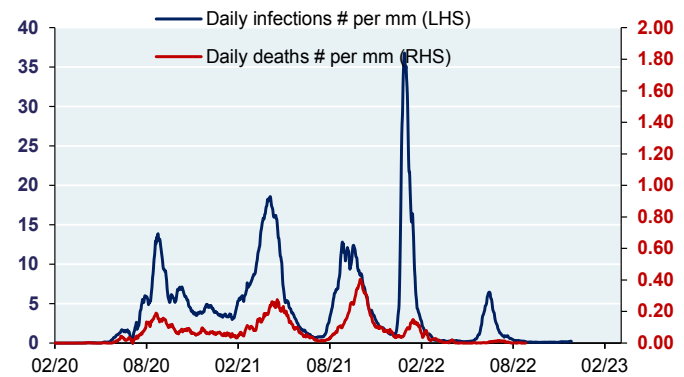
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Botswana

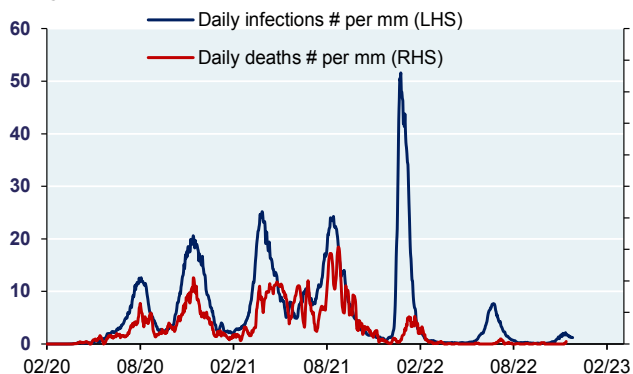
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Uganda

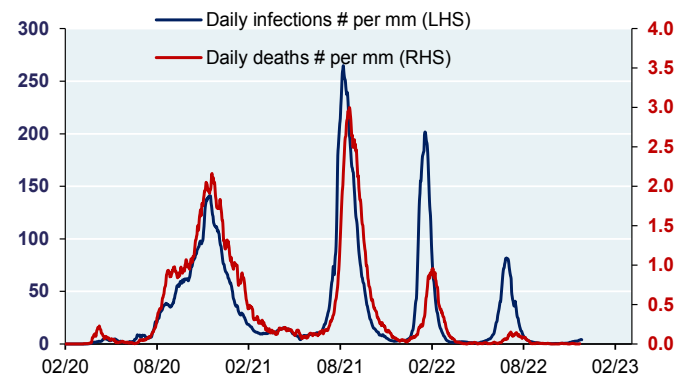
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Ethiopia

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Kenya

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

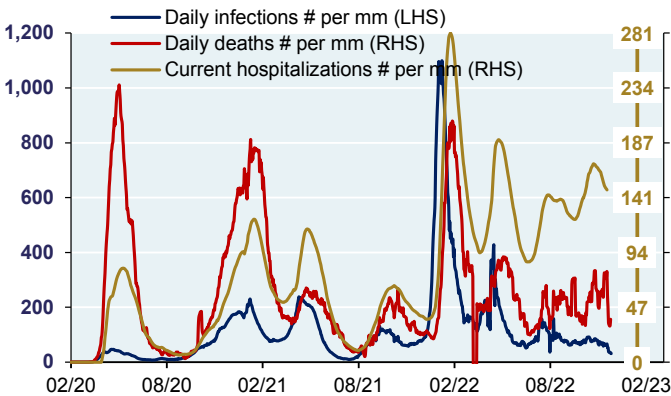
Morocco

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.



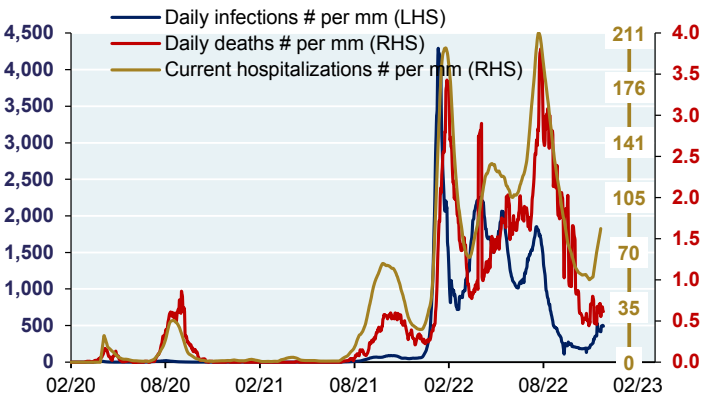
What's new: Canada, Australia and New Zealand

Canada



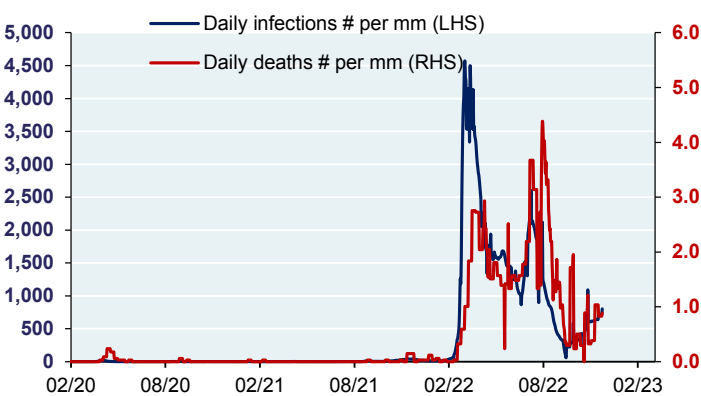
Source: JHU, IMF, Esri Canada, JPMAM. Nov 29, 2022. 7 day smoothing.

Australia



Source: JHU, IMF, aucovid19data, JPMAM. Nov 29, 2022. 7 day smoothing.

New Zealand

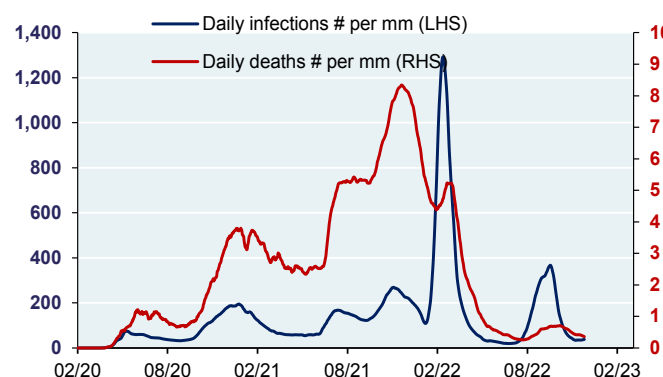


Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.



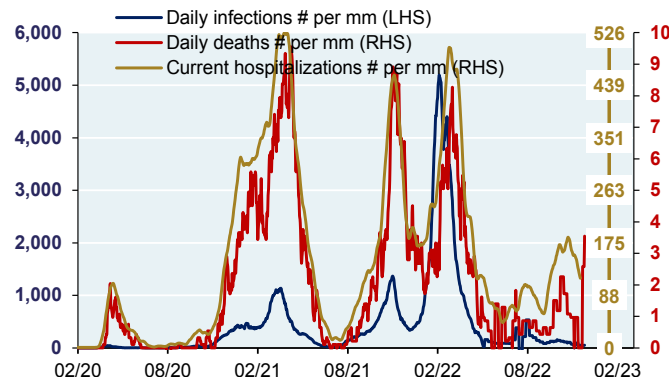
What's new: Russia and Eastern Europe

Russia



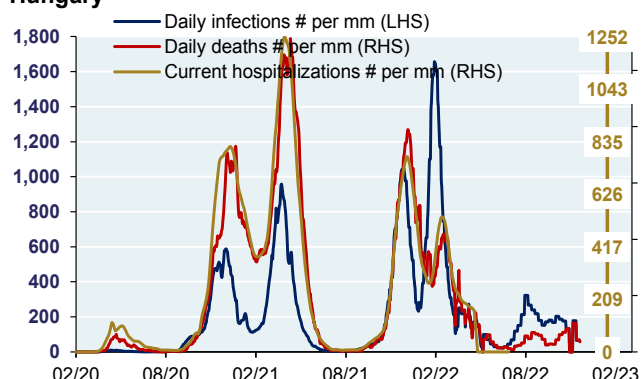
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Estonia



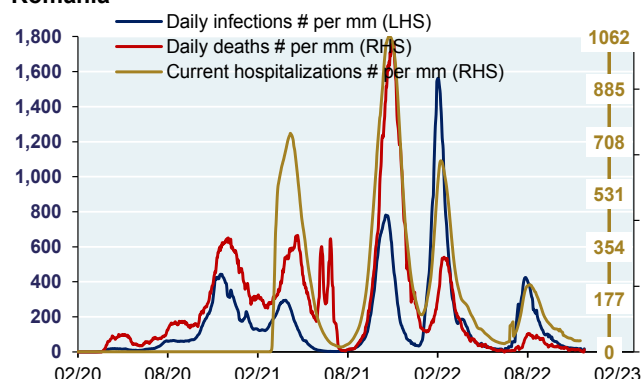
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Hungary



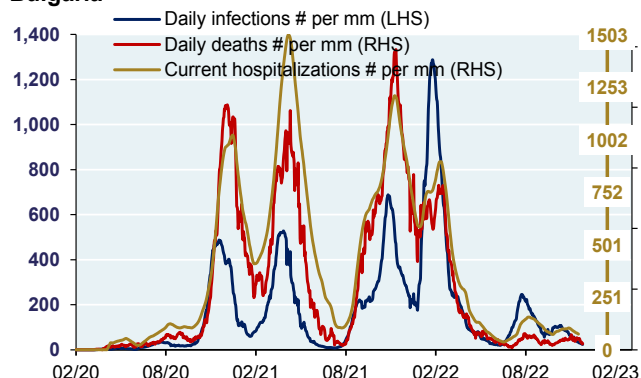
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Romania



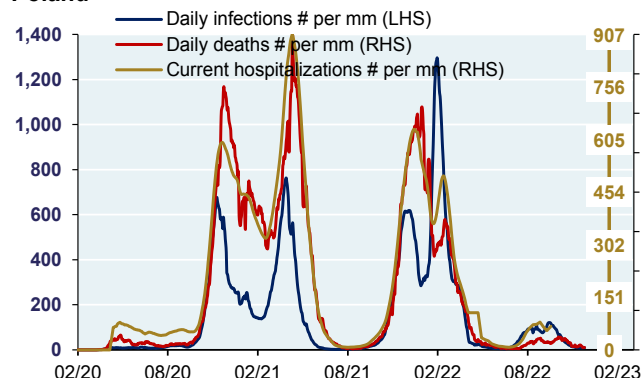
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Bulgaria



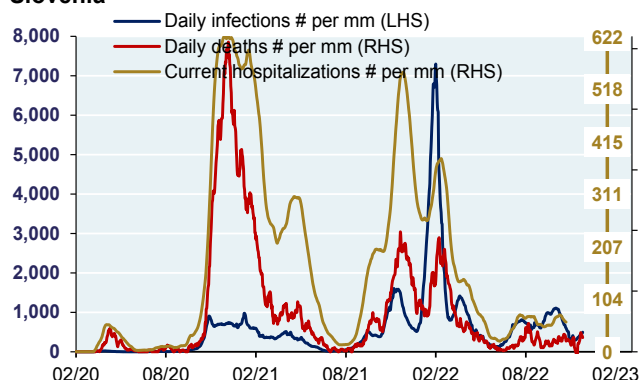
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Poland



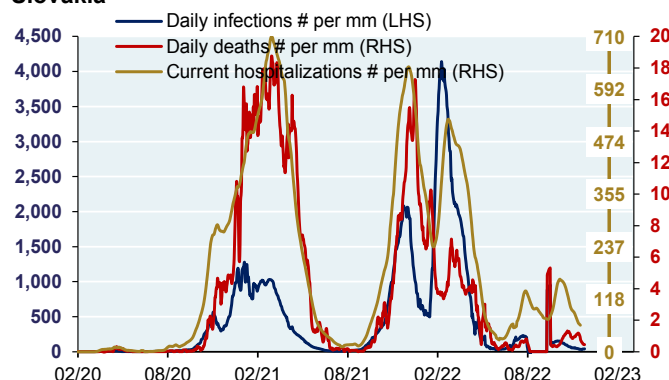
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Slovenia

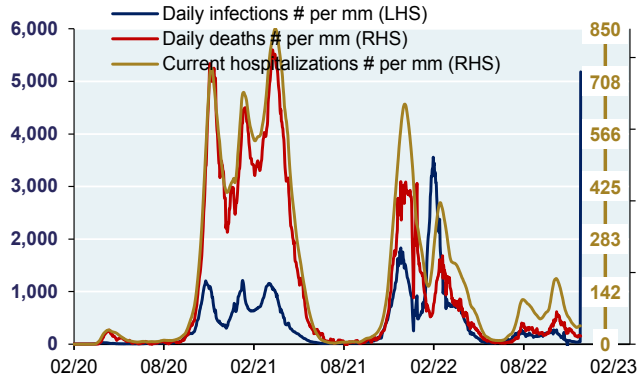


Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

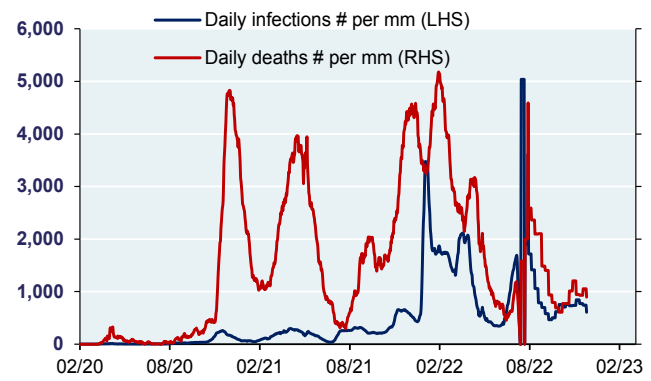
Slovakia



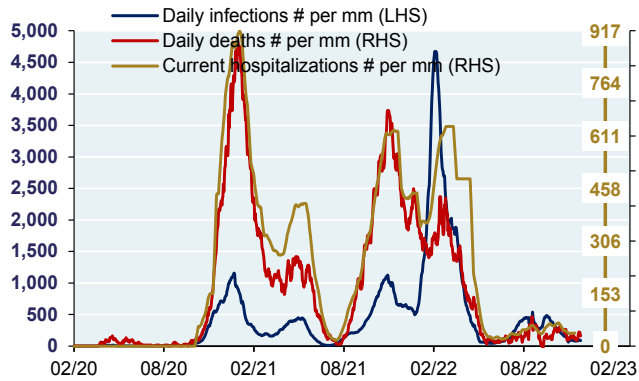
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

**Czechia**

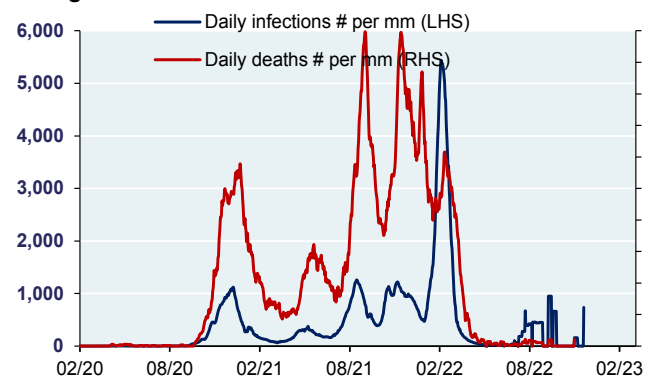
Source: JHU, IMF, ECDC, JPMAM. Nov 29, 2022. 7 day smoothing.

Greece

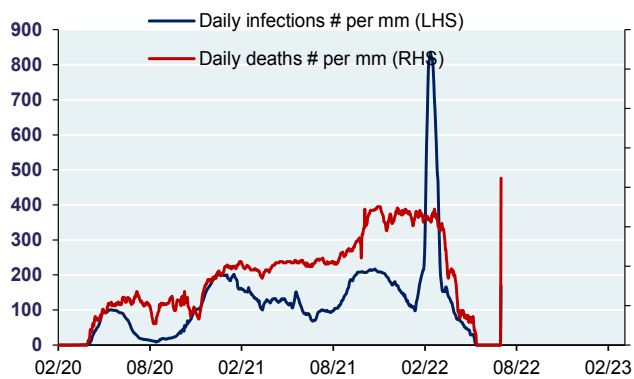
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Lithuania

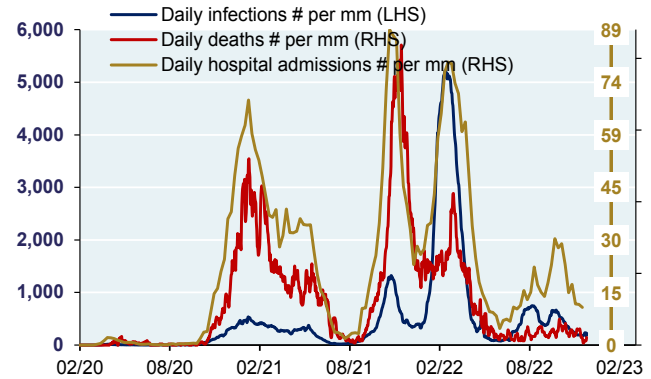
Source: JHU, IMF, OWID, JPMAM. Nov 29, 2022. 7 day smoothing.

GeorgiaSSR

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Belarus

Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.

Latvia

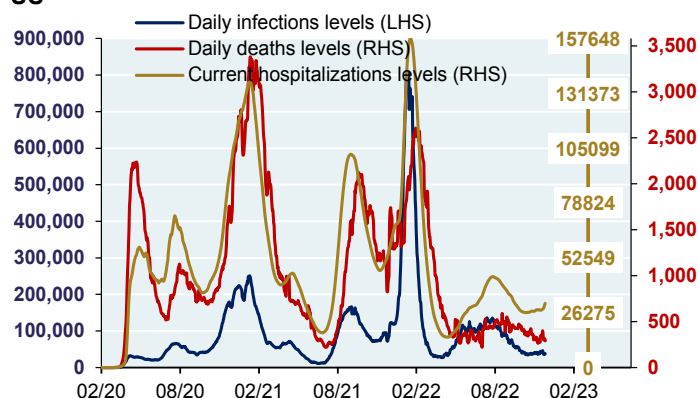
Source: JHU, IMF, JPMAM. Nov 29, 2022. 7 day smoothing.



Global testing data

The charts below track infection, hospitalization, testing¹ and mortality data for the US in aggregate as well as a comparison of testing levels across the largest 50 countries by GDP. See section 3 for a chartpack which covers the full range of infection, hospitalizations and mortality for US states.

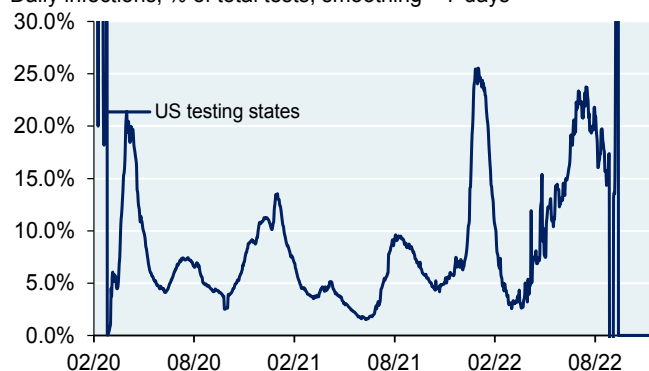
US



Source: JHU, IMF, HHS, JPMAM. Nov 29, 2022. 7 day smoothing.

Positive testing rate

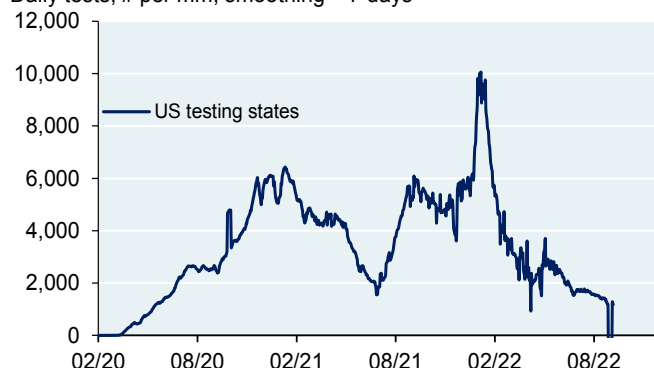
Daily infections, % of total tests, smoothing = 7 days



Source: Johns Hopkins University, JPMAM. Nov 29, 2022.

US testing: 40 testing states

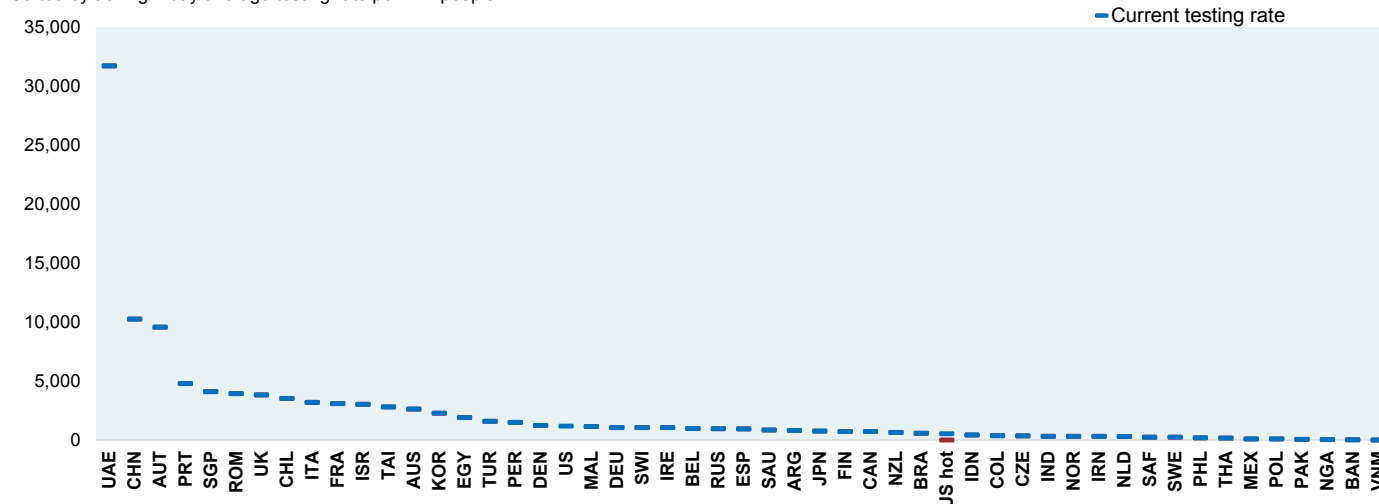
Daily tests, # per mm, smoothing = 7 days



Source: Johns Hopkins University, IMF, JPMAM. Nov 29, 2022.

Testing levels for the largest 50 countries based on GDP

Sorted by trailing 7 day average testing rate per mm people



Source: OWID, JHU, IMF, JPMAM. Countries shown represent 94% of World GDP. November 29, 2022.

¹ 40 states report the total number of “testing encounters” or “testing specimens”; the rest show the number of people tested each day that have never been tested before or include untested probable cases. We only compute testing rates for the 40 states that provide encounter or specimen data.

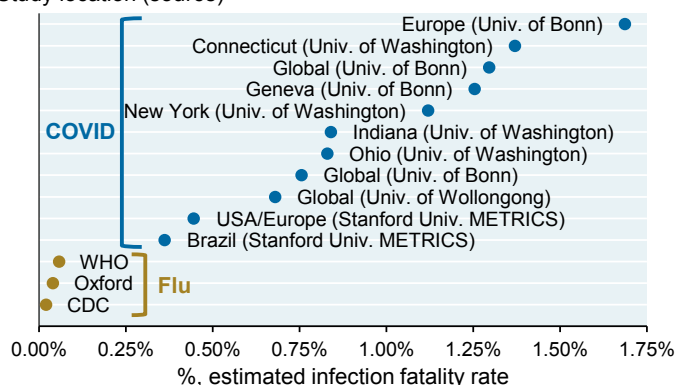


How lethal is COVID, and for whom?

Let's first compare it to the flu. A key issue to keep in mind: there's a difference between **case fatality rates** (deaths as a % of reported cases) and **infection fatality rates** (deaths as a % of all infected people, whether symptomatic or not). The latter can only be derived through antibody testing and other sampling methods involving molecular assessments of infection. The IFR of the seasonal flu is reported to be well below 0.1% with other estimates ranging from 0.02% to 0.04%. In contrast, the IFR for COVID has been estimated at 0.23% by Stanford's Metaresearch Innovation Center, and at 0.7%-0.9% by the CDC. Either way, COVID is significantly more lethal than the seasonal flu. Tracking "excess" abnormal death levels is another way to understand the incremental mortality impact of COVID (see second chart). In addition to higher mortality than the flu, COVID also appears to entail **more longer-lasting medical complications**.

Flu vs COVID-19 infection fatality rates

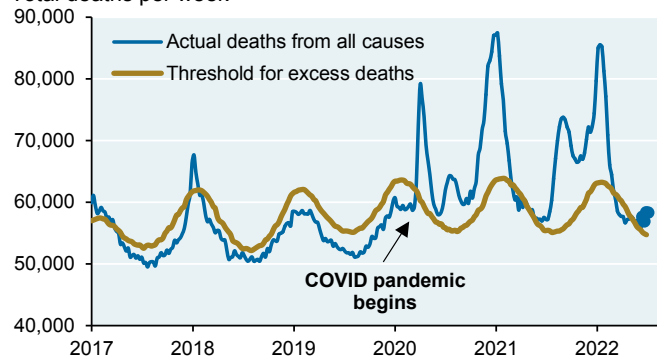
Study location (source)



Source: JPMAM. 2021.

Excess US deaths from all causes

Total deaths per week



Source: CDC, JHU, JPMAM. July 23, 2022. Dots are estimated using most recent JHU data.

Mortality by age in the US

The first section in the table below shows the distribution of US COVID deaths by age bracket. People over the age of 85 represent around 25% of all COVID fatalities to-date. However, the number of people over age 85 is much smaller than other age cohorts; as a result, fatality risks are much greater for people in this age group. The second section reflects this by showing deaths to date per mm people in each age bracket (you can divide one number by another to obtain relative mortality probabilities). The third section looks specifically at mortality risk across age brackets relative to older populations. For example, a person aged 55-64 is only around 15% as likely to die from COVID compared to someone over the age of 75, and only around 9% as likely to die as someone over the age of 85. Differences across states are generally minor.

DISTRIBUTION OF ACTUAL MORTALITY: Mortality to-date by age group, % of total mortality

	< 1 yr	1-4 yrs	5-14 yrs	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65-74 yrs	75-84 yrs	> 85
United States	0.0%	0.0%	0.0%	0.3%	1.1%	2.7%	6.5%	14.4%	22.7%	25.9%	26.3%

MORTALITY RATES FOR EACH AGE BRACKET: COVID deaths to-date per mm population in each age group

	< 1 yr	1-4 yrs	5-14 yrs	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65-74 yrs	75-84 yrs	> 85
United States	100	13	10	67	260	699	1,694	3,614	7,702	17,323	42,577

RELATIVE MORTALITY RISK: risk of dying across age brackets

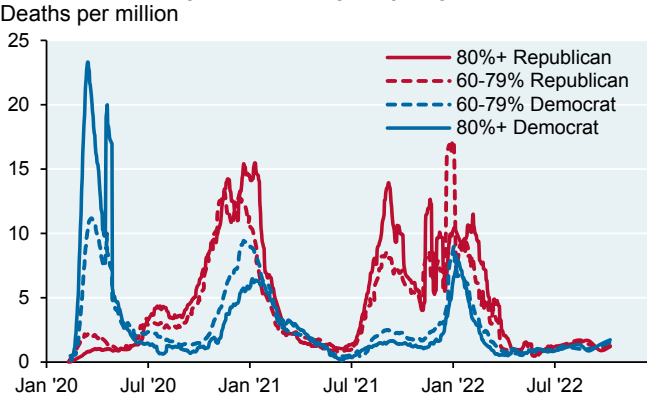
	< 1 yr	1-4 yrs	5-14 yrs	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65-74 yrs	75-84 yrs	> 85
Relative to 85+	0.2%	0.0%	0.0%	0.2%	0.6%	1.6%	4.0%	8.5%	18.1%	40.7%	100.0%
Relative to 75+	0.4%	0.1%	0.0%	0.3%	1.1%	2.8%	6.9%	14.7%	31.2%	100.0%	

Source: CDC, JPMAM. November 5, 2022.

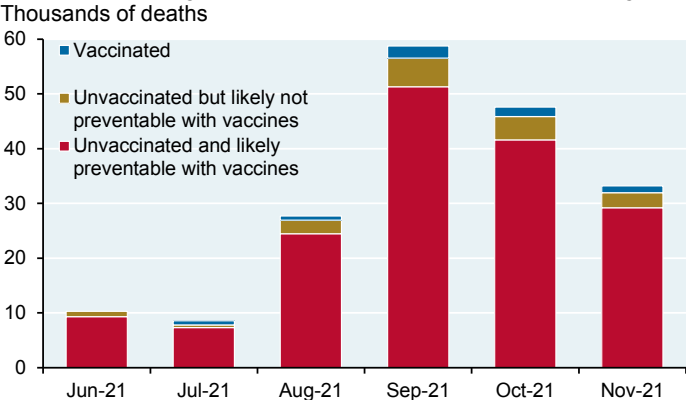


These charts speak for themselves: the political affiliations of COVID mortality and estimates of preventable deaths among vaccinated and unvaccinated people.

COVID deaths by 2020 county majority presidential vote



COVID deaths by vaccination status and preventability





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