

## Episode 206 : Peru and children

Dear colleagues,

Today, I will turn my attention to Peru and discuss some more general aspects of COVID in developing countries. In a second part, I ask your attention for some interesting studies from UK en US on children.

### Peru and wider perspective on developing countries

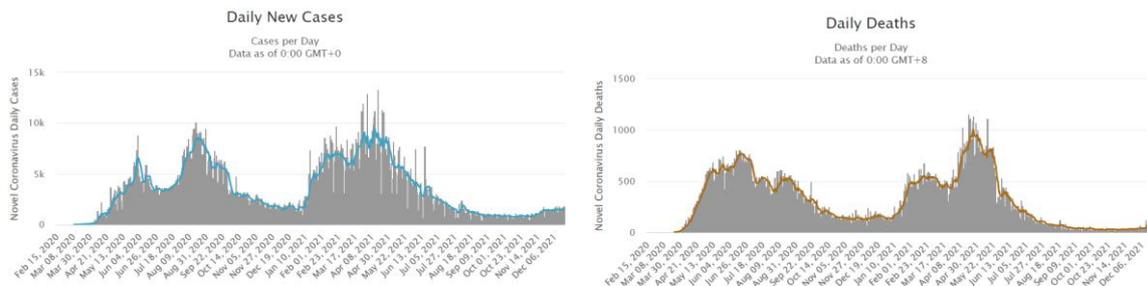
Peru is one of the hardest hit countries in the world : it ranks number 1 for mortality with over 6,000 COVID deaths per million, but only number 95 with regard to officially registered cases: 67,000 per million. Hence a case fatality rate (CFR) of about 9 %. Compared to other countries of our interest:

Country	Cases per million	Deaths per million	CFR
Belgium	171,500	2,400	1.40
Brazil	103,500	2,900	2.80
<b>Peru</b>	<b>67,300</b>	<b>6,000</b>	<b>8.90</b>
Kenya	4,700	96	2.00
South-Africa	54,500	1,500	2.75

Obviously, these differences cannot be directly interpreted, because of different test strategies etc... In Ep 204, we have seen that the apparent differences between Kenya and South-Africa f.i. are much smaller, if you conduct in-depth studies.

In any case, Peru has been hit very hard. These are the epidemic curves:

Daily New Cases in Peru



Clearly there has been a biphasic “Wuhan” wave from March-Sept/Oct 2020 and a new wave between Jan and June 2021, with lambda and gamma VOC.

Remember that Peru is in the Southern hemisphere and has 3 major geographical parts: the thin coast with capital Lima; the Andes with Cusco and the Amazon area with Iquitos. See map below

Ep 206-1: Seroprevalence in **Lambayeque** (Northern region) in June-July 2020: already **29.4 %** with higher % in younger than older people and big differences amongst the districts up to 57 % coastal and only 4.5 % in a jungle area.

This overall seroprevalence was already the **highest reported in the world at that time**. The reasons for the differences amongst districts is not clear.

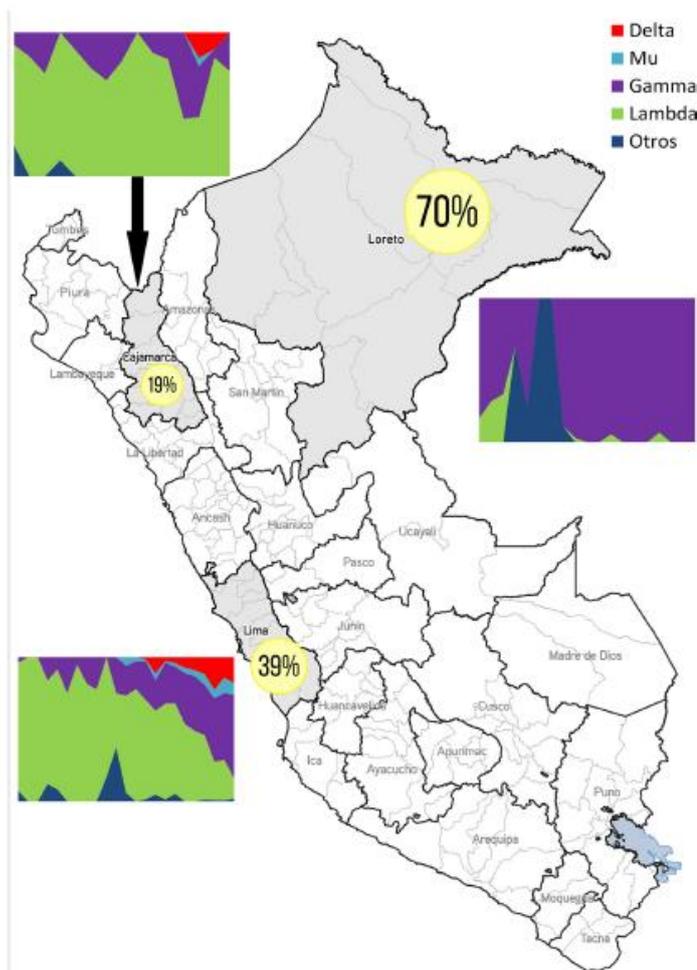
Ep 206-2: **Lima** megacity in June-July 2020 noted a prevalence of **25 %**. While there was no clear difference according to age and sex, **lower socio-economical status and overcrowding** living conditions were clearly associated with higher prevalence:

Ep 206-3: Seroprevalence in **Iquitos** (area in the jungle) in July-August 2020 was even higher: **65 %**. No difference between rural and urban or men vs women, but some age-related effects. Despite this high prevalence, the second wave with gamma VOC in 2021 would hit hard as well.

Ep 206-4: In the area of **Cusco** (Southern Andes) in Sept 2020, the seroprevalence was about **39 %** in Cusco city, 34 % in the periphery of Cusco and “only” **20 %** in a more rural town.

Ep 206-5: A study in the **rural area of San Martin** (east of Lambayeque in the Eastern Andes and Western Amazon) in March 2021 (2<sup>nd</sup> wave) showed a seroprevalence between **41 and 72 %**. As potential reasons for these high numbers: limited access to health care and test avoidance because of mandatory quarantine.

Ep 206-6: A short comment on different seroprevalences at the end of 2020 and the dynamins of VOC early 2021, with Lambda dominant in coastal and Andes, while Gamma (from Brazil) was dominant in the Amazon area.



**Fig. 2.** Map of Peru showing COVID-19 seroprevalence during the last months of 2020, and their variants distributions March-August 2021 for three Regions (Lima, Loreto, Cajamarca)

Ep 206-7: Lewin in medRxiv Dec 2021 discussing the impact of COVID in developing countries:

## Results:

- **Seroprevalence**
  - o In many places of developing countries **much higher** than in high-income countries.
  - o Among older adults similar to that of younger age underscoring the limited capacity that these nations have to protect older age groups
- **Age-specific Infection fatality rate** roughly **2x higher** than in high-income countries

## Conclusion:

- **COVID burden far higher** in developing countries reflecting a combination of
  - o elevated transmission to middle-aged and older adults
  - o limited access to adequate healthcare.
- **Critical need to accelerate the provision of vaccine doses to developing countries.**

Also an interesting table on underreporting of COVID deaths

**Table 3 – Ratio of Excess Mortality to Reported COVID-19 Deaths**

Country	Location	Ratio (95% CI)
Argentina	Buenos Aires City	1.07 (CI: 1.0, 1.5)
Argentina	Municipality of Hurlingham	1.07 (CI: 1.0, 1.5)
Brazil	Maranhao	1.41 (CI: 1.0, 2.4)
Brazil	Sao Paulo City	1.02 (CI: 1.0, 1.3)
Brazil	Cuiaba, Mato Grosso	1.00 (CI: 1.0, 1.0)
Brazil	Varzea Grande, Mato Grosso	1.00 (CI: 1.0, 1.0)
Ecuador	Cuenca (Azuay)	1.01 (CI: 1.0, 1.1)
Hungary	National Study	1.04 (CI: 1.0, 1.4)
India	Karnataka	<b>4.89 (CI: 2.6, 8.2)</b>
India	Chennai	<b>4.80 (CI: 2.7, 7.9)</b>
Jordan	National Study	1.57 (CI: 1.0, 3.0)
Kenya	Nairobi County	<b>13.29 (CI: 7.1, 23.1)</b>
Paraguay	Asuncion + Central Department	1.10 (CI: 1.0, 1.6)
Peru	Lambayeque	1.09 (CI: 1.0, 1.6)
Peru	Lima (Metropolitana) + Callao	1.09 (CI: 1.0, 1.6)
Peru	Iquitos, Loreto	1.09 (CI: 1.0, 1.6)

Source: IHME (2)

Clearly, in this series, Kenya and India are underreporting, but not most South-American countries.

Ep 206-8: Omicron has penetrated in Kenya (27 recent cases), but not yet in Peru...

## Children

Ep 206-9: Hardelid analyzes the hospital admissions of children and young people (CYP) under 23 in Scotland over the year 2020 (Wuhan D614G strain) in medRxiv 17 Dec 2021:

Amongst a cohort of 1.2 million CYP, **19,000 positive PCR** were recorded and **346 were hospitalized**.

- Hence over 1/5 of CYP in Scotland had at least one SARS-CoV-2 PCR test during 2020, and

**1.5% had a PCR-confirmed infection.**

- COVID-19 related hospital admissions were uncommon (< 3 per 10,000 CYP)

→ **Infants** (< 1 year old) and those with multiple types of **chronic conditions** showed highest COVID-19 related-admission rates = not surprising.

→ Nevertheless: **almost 90 % of the hospitalized children had NO chronic condition !**

Unfortunately, this study does not provide details on type and severity of disease presentation (ARDS, MIS-C...) or death rate.

Ep 206-10: Westbrook analyzes the presenting symptoms with positive predictive value for SARS-CoV-2 positivity amongst children < 18 yrs during the Delta wave of July-Oct in Georgia US (medRxiv 17 Dec).

- Children with isolated symptoms were as likely as those with multiple symptoms to test positive for COVID-19.
- Isolated fever, cough, sore throat, or headache, but not congestion/rhinorrhea, offered highest predictive value.

Ep 206-11: Woodhouse emphasized the **importance of TESTING in school** setting over “bubbles” to mitigate the SARS-CoV-2 outbreaks and school absence. (medRxiv 16 Dec).

Best wishes,

Guido