

Excess mortality in Rajasthan during the COVID-19 pandemic: A factsheet¹

What death registration data is available?

Monthly registered deaths from Rajasthan's "Pehchaan" portal from Jan 2018 to May 2021 are [available on github](#). The data was reported in [The Hindu](#). The data is recorded according to date of death.

What do we know about delays in registration?

According to the [2019 CRS report](#), 79% of registrations occurred within 21 days, and 81% within 30 days. There were thus significant delays in registration in pre-pandemic times.

What do we know about registration coverage and trends in the state/within this system?

According to the 2019 CRS report, Rajasthan saw an estimated 98.1% of deaths registered in 2018, and an estimated 98.6% in 2019. Data in the Pehchaan system captured 49% of registered deaths during both 2018 and 2019. Totals in 2018 and 2019 in the Pehchaan system are 216370 and 219814 respectively (a rise of 1.6%), suggesting fairly stable registration within this system.

Are there risks of bias in using this data?

The fact that only around half of all death registrations during 2018 and 2019 are in this system poses some risks. Without further contextual data, we cannot be sure whether registered deaths in other systems saw the same level of increase during the pandemic period as in this system.

Were there unusual fluctuations in registration during the early part of 2020?

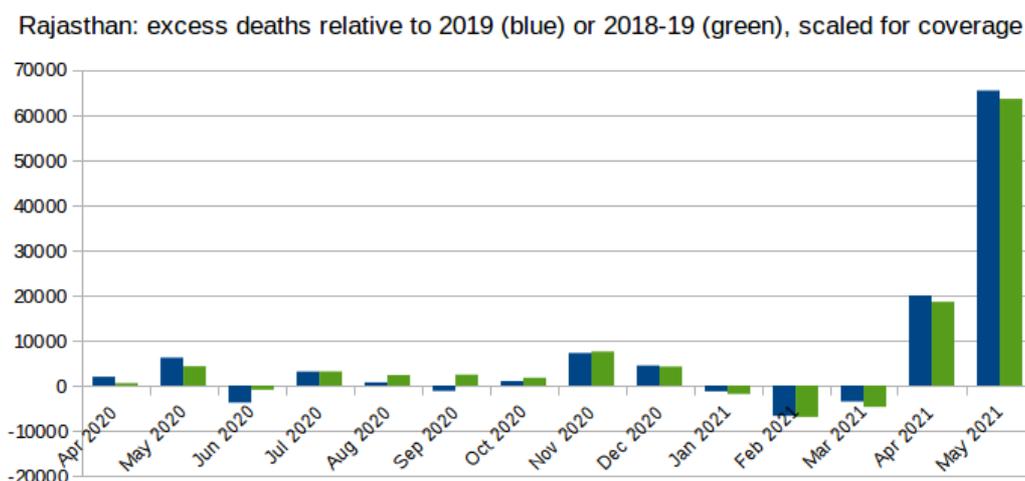
There were no obviously unusual fluctuations in registration within this system during the early part of 2020. Deaths registered in this system during January-April 2020 are almost exactly equal to the average of deaths registered in the system during this period in 2018 and 2019.

What are possible choices for baseline deaths and hence excess deaths?

2019 values or the 2018-19 average can give baseline expectations for registered deaths during the pandemic. Excess registered deaths calculated against such a baseline can then be rescaled again to account for registration coverage in the Pehchaan system.

What do monthly excess deaths look like relative to various baselines?

Below is a plot of excess deaths relative to a 2019 baseline, and a 2018-19 average baseline, scaled for coverage.



¹ Prepared on 22nd August 2021, by Murad Banaji and Aashish Gupta.

The choice between these baselines makes little difference to total excess deaths. However, there are reasons to prefer the 2018-19 average as a baseline, discussed below.

What is the scale of first and second wave excess deaths relative to various baselines?

We have the following estimates (official COVID-19 deaths are from covid19india.org):

	excess deaths (to nearest 1000)		excess deaths per 1000 population		surge relative to baseline		ratio of excess deaths to official COVID-19 deaths	
	2019 baseline	2018-19 baseline	2019 baseline	2018-19 baseline	2019 baseline	2018-19 baseline	2019 baseline	2018-19 baseline
Apr 2020-Feb 2021	12	17	0.1	0.2	3%	4%	4.2	5.9
March-May 2021	82	78	1.0	1.0	76%	69%	14.6	13.8
Apr 2020-May 2021	94	94	1.2	1.2	18%	18%	11.2	11.2

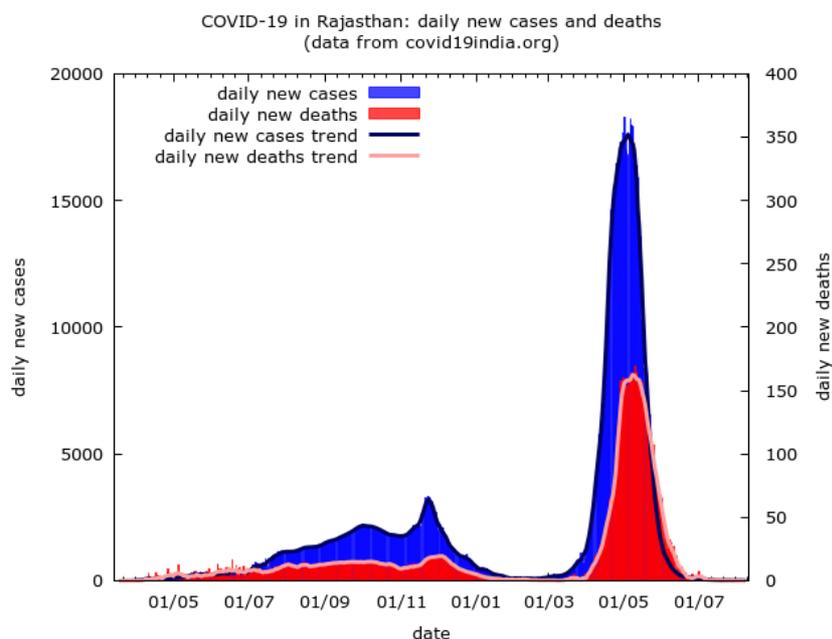
With either choice of baseline, we see that the second wave up to May 2021 accounted for 80-90% of the excess mortality during the pandemic period upto May. Rajasthan appears to be a state hit much worse during the second wave. It also appears that recording of COVID-19 deaths got worse during the second wave. Both of these effects could be exaggerated if, indeed, there was a drop in registration in the portal during the pandemic period (see next point).

Are there other notable features in the death registration data?

Using either baseline, there are negative excesses during January-March 2021: these months saw 10% fewer death registrations compared to the same period during 2019. There may be reasons why registrations dropped during this period. If so, this would lead to an underestimation of excess mortality, particularly during the first wave.

What are the broad features of the state's COVID-19 epidemic so far?

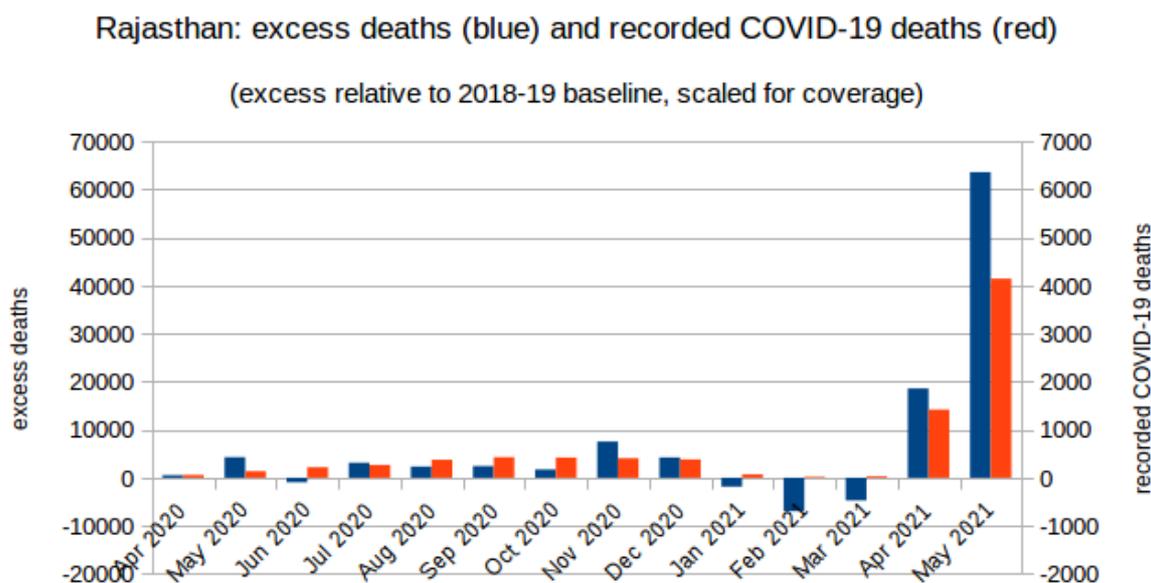
The trajectory of recorded COVID-19 cases and deaths, using data from covid19india.org, is shown below.



The first wave peak in daily cases at around 3200 daily cases, occurred around Nov 24, 2020. It came after a long slow rise in cases and fatalities over several months. A sharp second wave peak at around 17600 daily cases occurred around May 5, 2021. Both official case and COVID-19 fatality data suggest a second wave many times larger than the first, consistent with excess deaths data.

How does the mortality data align with official COVID-19 data?

Excess deaths relative to 2018-19 values, alongside recorded COVID-19 deaths from covid19india.org, are plotted below.



If we use 2019 as a baseline, then during April 2020 to February 2021, there is a weak correlation between monthly excess deaths and official COVID-19 deaths: the correlation coefficient is 0.39. This rises to 0.98 over the whole period from April, 2020 to May, 2021. If we use the 2018-19 average as a baseline, we get a higher correlation coefficient during April 2020 to February 2021 of 0.68. This rises to 0.99 over the whole period from April, 2020 to May, 2021.

The 2018-19 baseline thus appears to give better alignment between official COVID-19 deaths and excess deaths during the first wave.

Other notes

Given delays in registration and the continuing epidemic, it is likely that there were significant excess deaths in June 2021 too.