

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

What death registration data is available?

Monthly deaths registered in Haryana's online civil registration system, from Jan 2018 to May 2021, and broken down by gender, are [available on github](#). The data was reported in [The Hindu](#). The data is recorded according to date of death, rather than date of registration.

What do we know about delays in registration?

According to the [2019 CRS report](#), 96% of registrations occurred within 21 days, and 97% within 30 days. Registration was thus prompt 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, during 2014-2019 Haryana saw complete death registration. In the online system, totals for 2018 and 2019 are 96% and 97% of the values in the 2019 CRS report respectively. Registered deaths in the online system saw a 3% increase between 2018 and 2019. There is no statistically significant trend in registrations during 2019.

Are there risks of bias in using this data?

The data in the online system appears to be relatively complete and up-to-date, without any major unexplained fluctuations. The risks appear to be low.

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

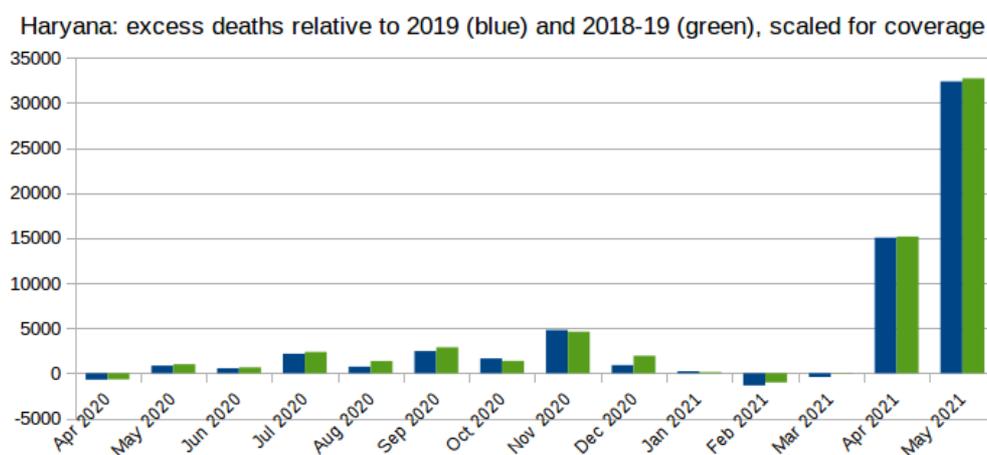
Registrations during March-April 2020 were 3-4% below the values in 2018 and 2019. There were thus only minor fluctuations in registered deaths around the time of national lockdown.

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 online system.

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

The choice of 2019 or 2018-19 average makes little difference to total excess mortality estimates in the state. The latter gives around 5% higher excess mortality, and slightly higher correlation between excess deaths and recorded COVID-19 deaths (see later). Below is a plot of excess deaths during April 2020 to May 2021, relative to a 2019 baseline and a 2018-19 baseline. In each case, the values are scaled for coverage in the online system.



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

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	15	0.4	0.5	7%	9%	4.0	4.8
March-May 2021	47	48	1.6	1.6	105%	107%	8.9	9.1
Apr 2020-May 2021	59	62	2.0	2.1	27%	29%	7.1	7.5

According to these calculations, 77-79% of the total excess deaths upto May, 2021 occurred during March-May 2021. Thus, Haryana is a state where, according to mortality data, the second wave hit much harder than the first. If there are, as is likely, further excess deaths in June, the asymmetry will become even greater.

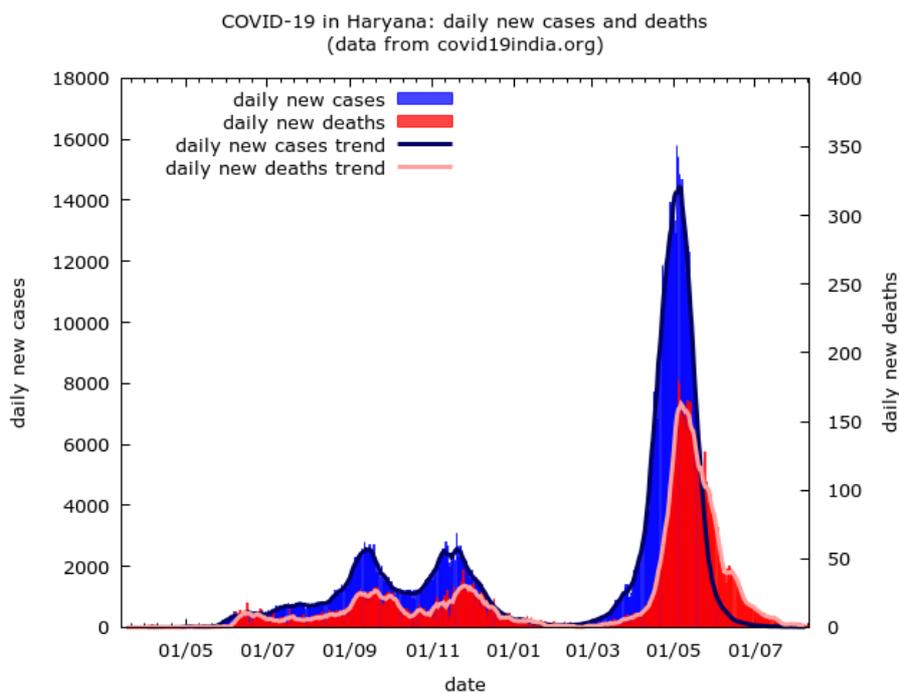
The data suggests that recording of COVID-19 deaths got somewhat worse during the second wave.

Are there other notable features in the death registration data?

The greatest 2020 excess mortality was in November, 2020. This coincides with a second surge in the state which followed a surge in COVID-19 cases in Delhi late in 2020. During January-March 2021 deaths return to a little below 2019 (or 2018-19) baseline.

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

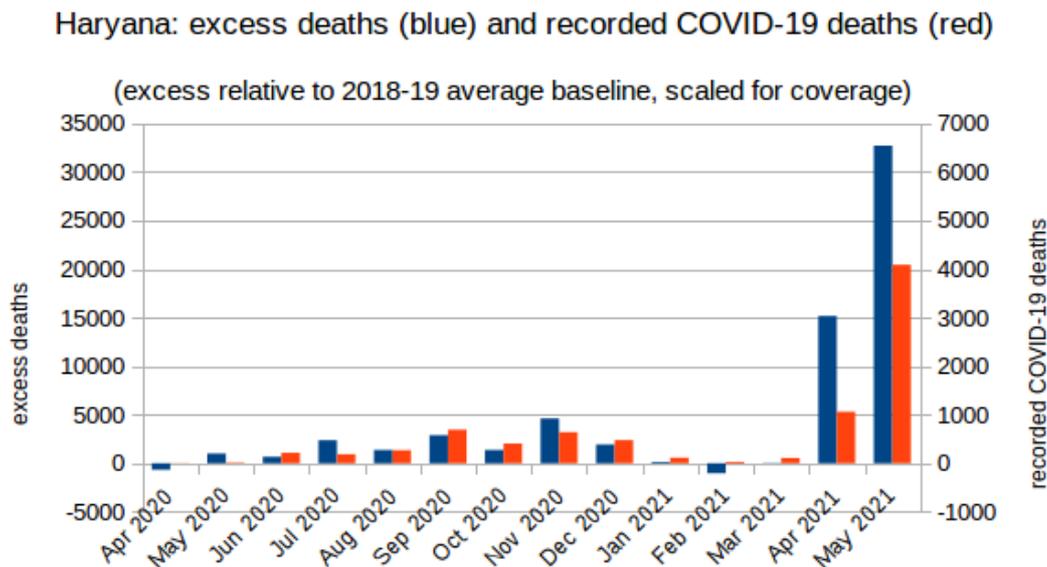
The trajectory of recorded COVID-19 cases and deaths, using data from covid19india.org, is shown below.



The state saw two first wave peaks, each at around 2500 daily cases: the first around September 13, 2020, and the second around November, 20, 2020. These peaks were also visible in official COVID-19 deaths. Note, however, that excess deaths in November 2020 were higher than in September 2020. The second wave peak saw around 14400 daily cases and occurred around May 6, 2021.

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.



The second wave peak in recorded daily COVID-19 deaths (around 160 daily deaths) is much higher than the first wave peaks (around 30 daily deaths). This is also true of excess deaths - in fact the disparity between the heights of first and second wave peaks in excess deaths is even greater.

There is a fairly high correlation between monthly recorded COVID-19 deaths and monthly excess deaths. Using a 2019 baseline, during April 2020 to February 2021, the correlation coefficient is 0.78, rising to 0.97 over the whole period from April 2020 to May 2021. Using a 2018-19 baseline, during April 2020 to February 2021, the correlation coefficient is 0.83, rising to 0.97 over the whole period from April 2020 to May 2021.

June 2021 saw slightly more official COVID-19 deaths than April 2021, and we should expect significant further excess mortality during June.