

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

What death registration data is available?

Monthly deaths registered in Tamil Nadu's online civil registration system, from January 2018 to May 2021, are [available on github](#). The data was reported in [The Hindu](#). The data is recorded according to date of occurrence.

Cumulative data for January-June 2021 from the [state portal](#) is also available². On June 30, 2021, the portal showed a total of 465419 registered deaths during 2021. This compares to 318425 in the reported data upto the end of May. There were thus 146994 additional deaths over and above what is. We cannot, however, assume that these additional deaths all occurred in June.

What do we know about delays in registration?

According to the [2019 CRS report](#), 98% of registrations occurred within 21 days (this remained at 98% 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, Tamil Nadu saw complete death registration during 2014 to 2019. During both 2018 and 2019, total registrations in the online system were 93% of all death registrations. The 2019 total in the online system is 10% greater than the total in 2018.

There is a slight decreasing trend in registrations during 2019.

Are there risks of bias in using this data?

There was a significant increase in registered deaths (in the CRS bulletin and in the online system) between 2018 and 2019. It is unclear to what extent this marks a trend, but not taking it into account, leads to a possible risk of bias.

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

There was a 5% drop in registrations during March to May 2020 relative to 2019, and a 1% drop in registrations during January to June in 2020 relative to 2019. There is thus some indication of disruption, but not on a major scale. The fact that data is recorded by date of death rather than date of registration suggests that these drops could reflect missed registrations rather than delayed registrations. There was also a minor drop (of around 1%) in birth registrations in the state during 2020 relative to 2019.

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

2019 values or the 2018-19 average, perhaps corrected for drops in registration coverage, 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 incomplete coverage in the online system.

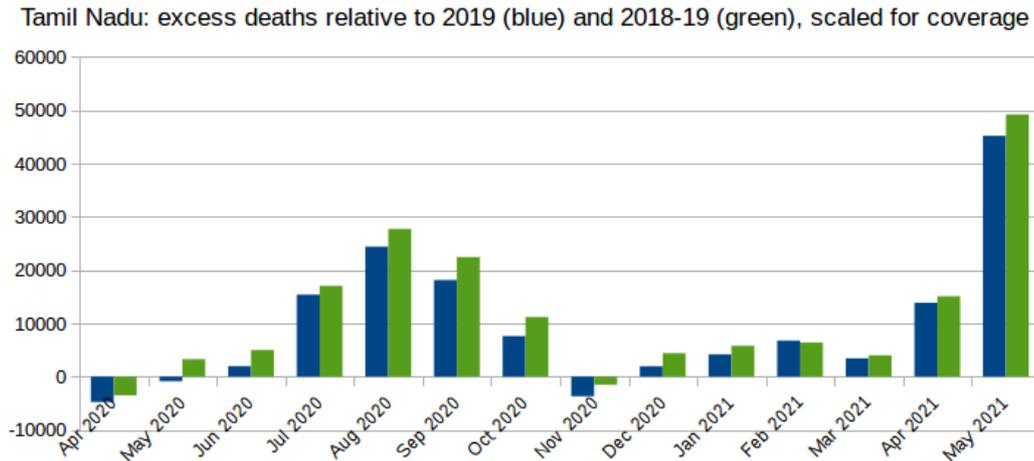
What do monthly excess deaths look like relative to various baselines?

Below is a plot of excess deaths, relative to 2019 and 2018-19 baselines, scaled for coverage in the online system.

We do not include in these plots the additional 146994 registered deaths for 2021 on the [state portal](#) by the end of June, since we cannot be sure when these occurred. It seems likely, however, that the majority of these registrations correspond to deaths which occurred during March-June 2021.

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

2 Many thanks to Dr Christopher T. Leffler for sharing this data



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	71	98	0.9	1.3	12%	18%	5.7	5.9
March-May 2021	62	68	0.8	0.9	40%	45%	5.3	5.8
*March-Jun 2021	168	177	2.2	2.3	80%	89%	8.4	8.8
Apr 2020-May 2021	134	166	1.8	2.2	18%	24%	5.5	6.9
*Apr 2020-Jun 2021	239	275	3.1	3.6	30%	37%	7.3	8.4

(* = based on additional data for June 2021 from the [state portal](#). March-June 2021 figures are calculated on the assumption that all additional deaths registered on the portal by June 30, 2021 occurred between March and June 2021.)

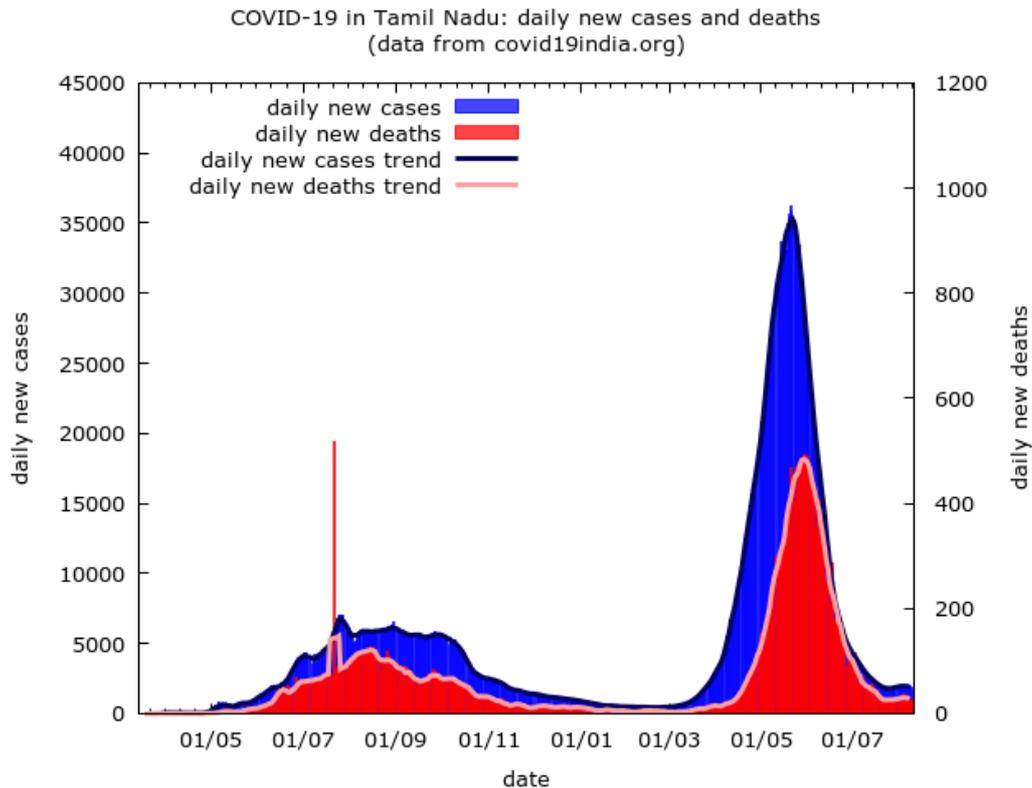
Compared to several other states Tamil Nadu's epidemic appears to have been spread fairly evenly over the pandemic period. Once we include data upto June 2021, assuming that the additional registrations correspond to deaths which occurred during or after March 2021, around 30-36% of the excess deaths recorded upto June, 2021 occurred during April 2020-February 2021.

Are there other notable features in the death registration data?

In the data we see some drops in registered deaths during March to May 2020, and some excess mortality during January to March 2021, when recorded COVID-19 cases and deaths were few.

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

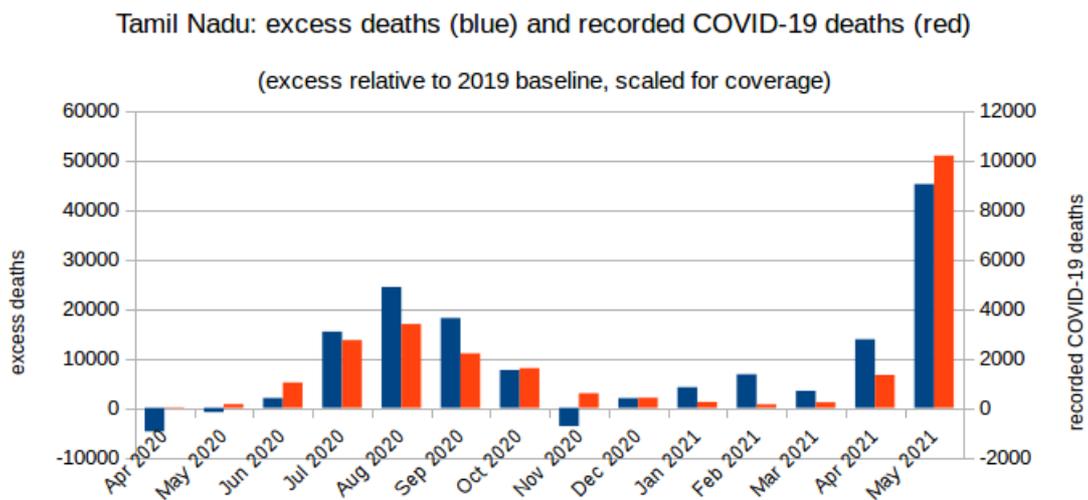
The trajectory of recorded COVID-19 cases and deaths, using data from covid19india.org, is shown below.



The first wave saw a long high plateau in cases, with daily cases at over 5K from around July 20 to around October 10, 2020. The second wave saw a peak in daily cases at around 35K close to May 22, 2021.

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

Excess deaths relative to 2019 values (scaled for coverage in the online system), alongside recorded COVID-19 deaths from covid19india.org, are plotted below.



There is a 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 0.90, rising to 0.93 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 0.91, rising to 0.94 over the whole period from April 2020 to May 2021.

Other notes

Although in theory the state achieved complete registration coverage prior to the pandemic, the continued slight excesses during January-March 2021, when recorded COVID-19 cases and deaths were few, suggests that there may have been some increase in registration coverage during the pandemic period, after early disruption. This could mean some overestimation of excess mortality during 2021; it could also imply incomplete registration prior to the pandemic, and consequent underestimation of mortality in the early days of the pandemic. How these effects might sum up is unclear.