

# Covid19 Outbreak in Victoria, Australia Update August 1, 2020

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## Abstract

The Victoria Covid19 outbreak is well explained by the data represented in Figure 1. To August 1, 10,931 have tested positive for a coronavirus after more than 1,633,900 tests were performed. 116 people have died from coronavirus in Victoria. The number of infected, tests performed, their ratio, and the number of fatalities as communicated daily by<sup>1</sup> are proposed vs. the number of days since May 31st.

## Keywords

prevention, managerial epidemiology, disease management, community health, cost-effectiveness

## Introduction

The Covid19 outbreak in Victoria, Australia is everything but explained. The relevance of the positive rate is completely ignored by the Victorian government. As the absolute number of positive cases in isolation only tells a small part of a more complex story, this work is of paramount importance to emphasize the evolution of the Covid19 outbreak in Victoria. It is the addition of the positive rate, and the timeline of health policy changes, that permit in this work to come out with meaningful conclusions about this specific evolution of the outbreak, different from New Zealand or the rest of Australia, and also different from countries in Europe such as the United Kingdom or Belgium, or the United States.

The Victoria Covid19 outbreak is well explained by the data represented in Figure 1. Data are from.<sup>1</sup> To August 25th, 18,464 people have tested positive for a coronavirus after more than 2,119,199 tests were performed. 438 people have died from coronavirus in Victoria. 14,375 people have recovered from the virus. 3,651 people are currently infected. The total fatality rate, number of fatalities in closed cases, is 3.0%. The number of infected, tests performed, their ratio and the number of fatalities are proposed vs. the number of days since May 31st.

The number of the infected over the tested, the missing parameter of value for an epidemiologic assessment, was about 0.1-0.2% during the first half of June 2020, and about 0.2-0.3% during the second half of June 2020. It is from the end of June 2020 that the percentage of the infected over the tested starts to grow as an indication of an outbreak.

There is a mismatch between daily reported new cases and daily reported new tests. As it takes 1 to 3 days to have the result of a test, the positive cases of every day are the result of tests performed in the days before. The 5-days moving average provides a better assessment of the trend of the infected over the tested. It is presently at 1%, after having been at about 2% for about 10 days.

Regarding the test, the Polymerase Chain Reaction (PCR) test does not make any difference between new and old coronaviruses and does not provide any indication of the severity of the infection. The test amplifies any DNA to look for “viral sequences” growing exponentially tiny amounts of DNA until the analysis is possible. Contaminations in the sample are also amplified. The identification of a single pathogen is troublesome looking for partial viral sequences. The test only tells if the viral sequence is related to the family of coronaviruses. The PCR test does not give any indication of the viral load. Having only a few viruses, usually will not cause illness, or make spreading likely. Opposite, having many viruses, may sicken dramatically, and increase the risk of spreading exponentially.

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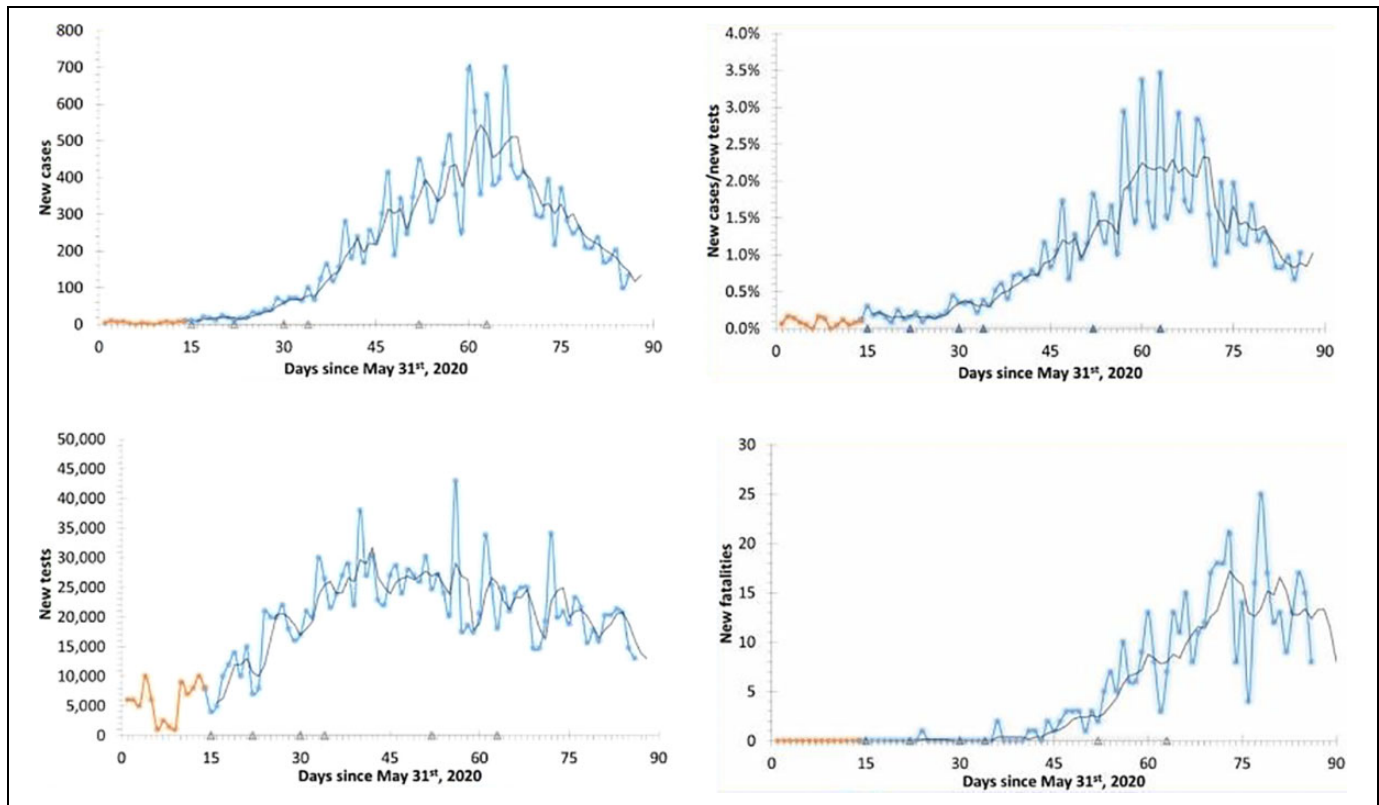
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**Figure 1.** Covid19 data for Victoria, Australia. Daily new Covid19 cases, new tests, their ratio—the positive rate—and new fatalities since May 31st, 2020. 5-days moving average trendline added. The triangles along the x-axis indicate relevant events in the timeline. Starting June 15th (day 15) the Victorian Government commenced a search for positive cases by increasing the number of tests targeting the most disadvantaged sectors of the population. It is the point of<sup>2</sup> that this unsafe and intrusive testing has been the cause of the outbreak. Starting June 22nd (day 22), the Victorian Government initiated to re-tighten restrictions on household gatherings, and local lockdowns were reinforced across 10 different Melbourne postcodes starting June 30th (day 30). On July 4th (day 34) the Victorian Government added 2 postcodes to the lockdown. Nine public housing towers housing 3,000 residents were added, with the additional condition that residents cannot leave the tower under any circumstances for 5 days. On July 22nd (day 52) “face coverings” become mandatory in metropolitan Melbourne and Mitchell Shire. Visits in aged care/ health care settings are restricted to carers only and a limit of 1 hour per day. On August 2nd (day 63) a state of disaster was declared in Victoria. Restrictions were tightened including a curfew across Melbourne from 8 pm to 5 am. Enforcement of distancing rules is done by police and army personnel. Melbourne moved to stage 4 and regional Victoria to stage 3 restrictions. “face coverings” become mandatory everywhere across Victoria. Data from [www.dhhs.vic.gov.au](http://www.dhhs.vic.gov.au).

As also reported by the FDA,<sup>3</sup> the PCR test is not perfect and it may propose false negative as well as false-positive cases. Additionally, despite having been considered eradicated (in New Zealand) or nearly eradicated (in Australia) at the start of the winter, the background infectivity from Covid19 infection was not zero, but only less than 0.1-0.2%.

To put the numbers of Victoria in perspective, reference is made to the data for other countries such as Belgium, the United Kingdom, or the United States, as well as New Zealand and all of Australia, see Appendix.

Victoria has a population of 6.49 million. Thus, the total fatality of Covid19 in Victoria up to August 25th is 67.48 per million. This is larger than the Australian average, at 16.51 per million,<sup>4</sup> growing but nothing yet dramatic (Belgium has 849.47 per million and the United Kingdom 680.45 per million<sup>4</sup>).

Regarding the share of Covid19 tests that are positive, also this number is everything but dramatic. As per August 24th, the

Australian average is a much smaller 0.4%<sup>4</sup> but the United Kingdom, unfortunately only updated to August 19th, has a still larger 0.7%<sup>4</sup> and there is no datum for Belgium.

The daily fatality rate per million is also not worrying. 8 over 6.49 million in Victoria is about 1.2 per million. Belgium had a peak daily fatalities of 26 per million and the United Kingdom of 15 per million.<sup>4</sup> Victoria had a peak of 2.6 per million.

As per August 25th, Australia has a daily Covid19 fatality rate of 0.58 per million, Belgium 0.26 per million, and the United Kingdom 0.06 per million.<sup>4,5</sup>

Additional to the comparison with other countries, Victoria had so far practically almost no fatality for the flu, despite being in the middle of the winter season. In 2019, Australia had a number of lab-confirmed cases 312,978, of which 69,289 in Victoria.<sup>6</sup> The total number of cases was likely much larger. The reported number of flu fatalities across Australia for 2019 is 902.<sup>6</sup> Victoria recorded 125 of these flu fatalities as per

September 13, 2019. Likely, Victoria will have a total number of Covid19 fatalities well above those caused by the flu of 2019, but a minimal number of fatalities attributed to the flu for 2020.

The major parameters needed to monitor the outbreak in Victoria and to guide policymakers are number of infected, recovered, fatalities and closed cases, plus the number of tests and the share of the tests that are positive. The positive rate indicates the spreading of the virus, if increasing or reducing, better than the simple number of positive cases in isolation, that can be misleading. The number of currently infected, i.e. total infected minus recovered or fatalities could help projecting future fatalities. Having a breakdown of the number of currently infected in the different categories for age or comorbidities representing the different risk factors for dying from Covid19 could permit a better forecast of the future fatalities.

Starting June 15th the number of tests increased, and focus was placed on the most disadvantaged areas of Melbourne. Then, more restrictions started to be enforced. Since the beginning of July, Melbourne was placed in stage 3 restrictions, and since the beginning of August, Victoria is in state of disaster, with stage 4 restrictions in Melbourne, and stage 3 restrictions across Victoria. Restrictions in Melbourne are enforced also with the help of the army.

Regarding the efficacy of the containment measures being implemented, their efficacy is ultimately represented by the trend in the daily fatalities with a lag time, and in the trend for the share of Covid19 tests that are positive with also a delay.

The over-testing and over-enforcing initiated on day 15<sup>2</sup> seem responsible for the growth of the share of the infected over the tested measured from day 28. The daily fatalities then started to grow from day 40. The measures introduced at the beginning of July in Melbourne about day 30 had minimal influence on the share of infected over tested that continued to grow. The effect of the additional measures introduced at the beginning of August in Melbourne and regional Victoria started to show their efficacy in 2 weeks. The positive rate then started to reduce.

The positive rate gives an interesting insight into the epidemic in Victoria, together with the timeline of health policies. From day 1 to day 15, the positive rate is 0.1 to 0.2%, stable. People show up to get tested unsolicited. The number of tests per day is roughly 5,000. Then, on June 15—day 15—something happens. The government of Victoria is rocketed by a corruption scandal.<sup>7,8</sup> The day after the government of Victoria starts ramping up the testing, focusing on the more disadvantaged sectors of the population. Selected people are forced to get tested. Nurses move around the most disadvantaged suburbs mass testing the citizens. There are cases to mention such as the 3,000 people in the overcrowded “towers” (public homes) that are practically placed on home arrest for 3 days until fully tested. Safety requirements enforced in other countries such as South Korea or China are nowhere to be seen in Victoria,<sup>2</sup> or,<sup>9</sup> and almost 1,000 in between the nurses, that are using personal protective equipment everything but perfect, got

infected over a total 14,659 as per August the 9th.<sup>10</sup> This is 7% of the total.

From day 15 to day 27, the number of tests per day grows up to 20,000. The positive rate is however about constant at 0.2-0.3%. This is an indication the background Covid19 infection was larger in between the more disadvantaged sectors of the population, but it was still stable. To be remembered, actions reflect in the positive rate with a delay of several days. It is then from day 27, that the positive rate starts to grow, and the return to stage 3 restrictions does not help to change the slope of the curve. The percentage of positive cases grows up to above 2% on day 60. This is the peak of the outbreak. It is then likely the effect of the increased community awareness, that is becoming much stronger toward the end of July, but also of the much harsher stage 4 restrictions introduced in day 63, August the 2nd, that the positive rate stabilizes and then starts to decline around day 72.

Since day 40, when the number of tests per day peaked at about 30,000, the number of tests has been slightly declining up to the latest about 15,000 a day. The present positive rate is about 1%, but reducing.

Regarding the fatalities, this number is determined by the time the virus reached the most vulnerable, and it is not simply a fixed proportion of the number of infected with a delay time, as the fatality of Covid19 is different in between different sectors of the population, healthy and young, or old with comorbidities.

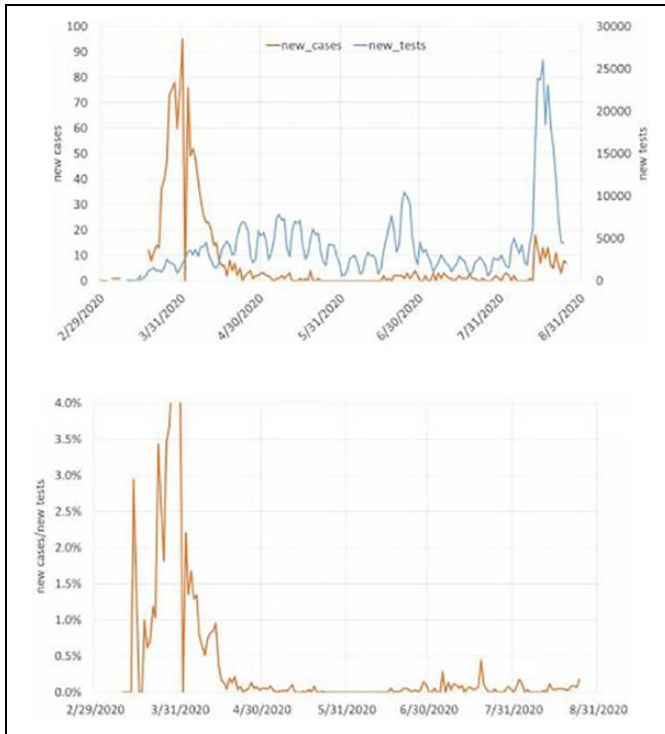
This case study of Victoria shows as the Covid19 infection is not over when the positive rate is small, even below 0.1 or 0.2%, as there may be still many cases of Covid19 undetected.

Without having a significant percentage of the population that is immune, there is always the opportunity of novel waves of infection. Almost nobody in the world has reached so far this situation, and certainly not in Australia. This is an indication that the containment measures should be enforced over a long time, but also an indication that these measures must be sustainable, and based on awareness more than constriction.

In terms of fatalities, the protection of the vulnerable is of paramount importance.

Regarding actions, pros and cons of every novel health policy should be better pondered. Their efficacy, will be ultimately shown by the analysis of the Covid19 infection data, number of positive cases, number of fatalities, number of tests, and the ratio of the number of cases vs. the number of tests.

Regarding the use in the graphs of 5-days moving averages, we must add as 7-days rolling averages are used by ourworldin data.org to provide smooth trends free of spikes resulting from the updating rates everything but uniform over time in the different parameters. In our case, we preferred to use a smaller number of days to compute the moving average, to better capture the details of the outbreak. As previously mentioned, the 5 days moving average is used because the number of positive cases in a given day is the result of tests performed in the previous days, as it takes 1 to 3 days to have a response. Additionally, reporting is different on weekdays and weekends. Thus, the 5 days moving average of the positive rate provides a



**Figure 2.** Covid19 data for New Zealand. Data from ourworldindata.org. Daily new Covid19 cases, new tests, their ratio. Covid19 was wrongly considered eradicated in July with a much higher positive rate than what was measured on August 12, when a new outbreak was declared.

more realistic trend without spikes while capturing short term movements otherwise filtered out by the smoothing. For similarity, the 5-days moving average is used also for the other parameters.

The Victorian government still excludes the positive rate as a parameter of value from the daily updates. Opposite, consideration also of this parameter explains a pattern that is otherwise difficult to interpret. In this part of the world, not only in Victoria, Australia, but even more in New Zealand, there is an attitude to neglect the positive rate and make singular claims based on the number of infected no matter the number of tests. In New Zealand, the fresh claim of “outbreak” of Covid19 infection<sup>11</sup> has been made with a percentage of the positive over the tested smaller than the one measured during the times Covid19 was claimed “eradicated,” Figure 2. This latter spike albeit negligible in the number of infected is only an artifact of the number of tests increased from 2,500 to 25,000 per day.

It may be argued that the health policy changes introduced in Victoria as well as New Zealand have political more than epidemiological origins. The search for the virus that started in Victoria on June 15 was phased with a corruption scandal quickly forgotten, as the headline news become monopolized by the fresh outbreak, no matter the positive rate only grow to a still small and stable value explained by the testing of the more disadvantaged. Unfortunately, the way the search was

conducted, with unsafe, intrusive testing, contributed to the growing percentage of positive cases then experienced, as discussed in.<sup>2</sup> With the objective state of the outbreak well depicted by Figure 1, The Victorian government has extended on August 23 rd the state of disaster and the lockdown until the end of September, and the state of emergency for another 12 months to a total of 18 months.<sup>12</sup> Similarly, in New Zealand a very small number of positive cases obtained through over-testing (a factor of 10 increment in the number of tests per day) with a reducing rather than increasing positive rate has been used to postpone general elections.<sup>13</sup> Covid19 has certainly been used down under also for political reasons, and the changes of testing practices enforced in New Zealand mid-August and Victoria mid-June, have very clear political explanations.

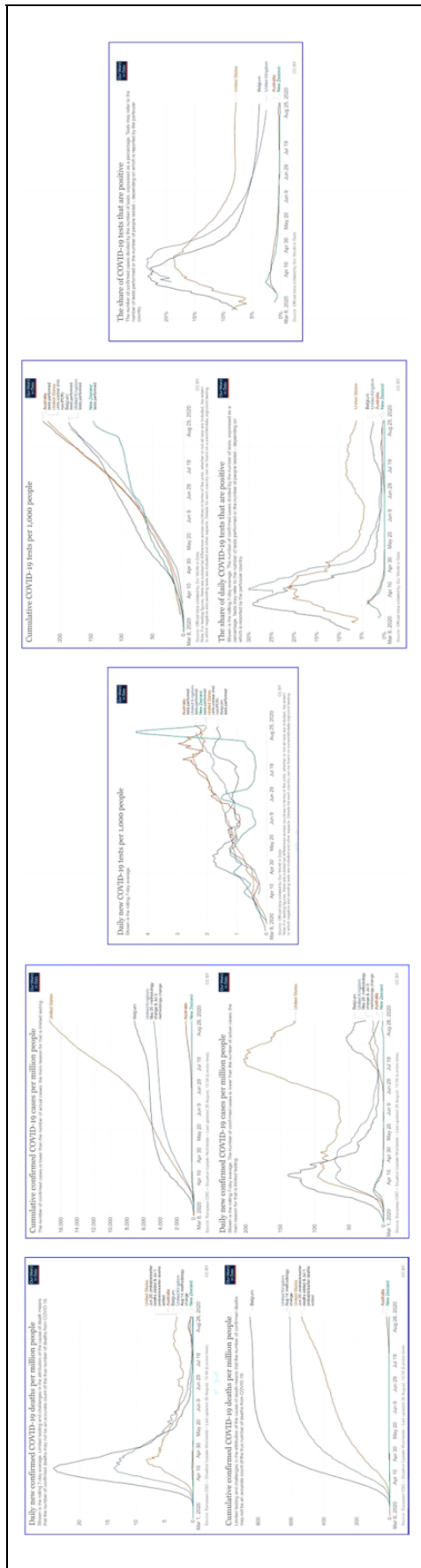
While the proposed number of tests, positive cases, their ratio, and the number of fatalities provide the key epidemiologic metrics, they should be based on similar testing practices to permit comparison, and also complemented with additional demographic and societal information to be even more meaningful. Extremely important would be the breakout for age and comorbidities, which are associated with very different mortality risk factors.

Of the many considerations circulating about Covid19 infection, it seems appropriate to mention those restrictions enforced to slow down the spread of the virus have not always been productive,<sup>14,15</sup> rather often the opposite. Lockdowns do not always slow the spread, and they cannot go on forever. It is of paramount importance to figure the way out from the Covid19 pandemic, adopting sustainable measures, protecting the vulnerable while permitting life the-closest-possible-to-normal to those at limited risk of serious consequences from the Covid19 infection.

## Appendix

Covid19 data for Australia and New Zealand compared to the United States, Belgium, and the United Kingdom.

This appendix provides a comparison for the United States, United Kingdom, Belgium, Australia, and New Zealand. Europe has experienced large excess mortality since June. Australia’s death rate would seem to have been far less severe. Belgium is the country with the world’s largest fatality per million, at 850. New York is the mega-city with the largest fatality per million at 2,500. Figure A.1 presents the daily new cases, new tests, new fatalities, the positive rate, plus the cumulative number of cases and fatalities. These results are difficult to be compared, as the testing is everything but uniform. The number of fatalities is ultimately the best measure of the intensity of the epidemic, but the fatality rate is delayed vs. the infection rate. A second wave is occurring in the United States. Images are from ourworldindata.org. In New Zealand and Australia, the outbreak has been very limited, simply because they are very far from everybody else. Melbourne, in Victoria, Australia is the only exception, with numbers of fatalities still



**Figure A1.** Covid 19 data for Australia, New Zealand, Belgium, the United Kingdom, and the United States. Data from ourworldindata.org. 7-days rolling averages and cumulative Covid 19 cases, tests, positive rate. The positive rate is defined differently from Figures 1 and 2.

small but not negligible anymore. The outbreak is presently more intense in the United States than in the other countries considered in the images. However, the number of new cases is misleading, as it often reflects the number of tests, that have been strongly variable in between countries and in every country over time. The recently increasing number of cases in the United Kingdom or Belgium after early peaks and decline, and more than there in the United States, is the result of second waves as well as more testing. Without any test, then there is no Covid19 case.


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