REPORT ON WEEKLY DEATHS IN SOUTH AFRICA

1 JANUARY – 23 JUNE 2020 (WEEK 25)

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Warning: The Department of Home Affairs has faced sporadic temporary office closures, particularly in areas that are more affected by COVID-19. This may affect our allocation of a death to a metro area. For example, a death that occurred in the City of Cape Town might have been registered at an office outside of the City because of a temporary closure. Closure may also cause a delay in the processing of the death registration which would result in an underestimate of the deaths in the most recent week. This accounts for the kinks in what should otherwise be a smooth increase in numbers of deaths in Cape Town and Buffalo, for example.

New analysis

Actual number of deaths: The actual number of deaths in South Africa have been estimated from the numbers recorded on the National Population Register using weighting factors set to produce results consistent with those of the annual Rapid Mortality Surveillance Report to account for deaths of persons who are not on the National Population Register as well as those that have not been registered with the Department of Home Affairs.

Excess Natural deaths: There is no universal definition of, or understanding of what meant by, "excess mortality". Generally, the number of excess deaths per week is calculated as the number of all-cause deaths in that week less the number that might be assumed to have occurred had there not been the epidemic (i.e. the counterfactual number). However, we have estimated the numbers of excess deaths once a clear upward trend is evident as the number of actual deaths less a baseline number determined as a proportion of the lower projection bound. The proportion is calculated such that the excess deaths in that week is equal to the confirmed number of COVID-19 deaths for that week. The cumulative number of excess deaths comprises the sum of the weekly excess plus the cumulative number of confirmed deaths prior to the establishment of the clear upward trend. Where there is no clear indication of an upward trend, we have not calculated excess deaths. It is important to note that this estimate of the number of excess deaths is an estimate of the number of deaths in excess of expectation, due to the Covid-19 epidemic and not of those infected with the SARS-CoV-2 virus alone (i.e. it includes incidental deaths resulting from such things as shortage of health care and medications due to either the demands on the health systems by the virus or strategies to combat the epidemic).

Data Source

Basic demographic information for all deaths registered on the National Population Register are provided to the SAMRC on a weekly basis. Since the number of deaths has a seasonal trend, historical data from 2018 and 2019 have been used to predict the number of deaths that could be expected during 2020. Before this was done, the deaths were weighted to account for incomplete registration of deaths and those that do not have a South African ID

number. The weights were calculated by age, sex, metro/non-metro and natural/unnatural cause to be consistent with the weights applied in the annual Rapid Mortality Surveillance Reports.[1]

While we have built up a good sense of the adjustment at a national level through the annual RMS reports and the National Burden of Disease Study, estimating completeness of registration of deaths below national level is challenging, particularly given limitations of data upon which might be used to inform such an exercise, and has required numerous assumptions. Thus, the resulting estimates need to be treated with a degree of caution.

The excel forecast function[2] has been used to predict values for each week of 2020 based on a linear annual trend, allowing for a seasonal effect over the year. In addition, 95% prediction intervals have been estimated for the predicted weekly number of deaths for 2020 to give a basis to assess fluctuations. The forecasts have been applied to the estimated actual number of deaths.

Graphs of the estimated weekly number of deaths up until epidemiological **week 25** (i.e. the period from **1 January 2020** till **23 June 2020**) based on the data received on 29 June 2020 are shown below. *The figures plot the estimated numbers of deaths at the start date of each week*.

Data for the most recent week has been scaled up to account for the lag in processing registrations. Based on previous data, the numbers at the national level have been increased by 6.1%.

Sub-national statistics have been compiled for the provinces and metros by allocating the deaths according to the Home Affairs office where the death was registered. It is assumed that most of the deaths within an area are registered at an office in the same area. The numbers of deaths from **natural causes** are reported for each of the metros**.**

Estimating excess natural deaths due to Covid-19 is not straight-forward. Some suggest that the expected number of deaths based on historical data be used as the counterfactual. Alternatively, others propose that the upper confidence bound from historical data should be used. During lockdown in South Africa, it was observed that the number of natural deaths was lower than predicted and the weekly numbers were tracking the predicted trend at a level between the lower prediction bound and the predicted value. Using the predicted value as the base would therefore understate the impact of the COVID-19 epidemic. It was therefore decided to identify the relative level that the deaths were tracking during the lockdown, prior to the emergence of the COVID-19 deaths. The estimated number of deaths in the week of the 6 May (the start of the week after which the upturn in deaths became apparent) was taken as a proportion of the lower prediction bound and the base was calculated to track the lower bound. The proportion was set to produce the numbers of reported COVID-19 deaths in that week. The estimated numbers of excess natural deaths are reported in **Table 1**.

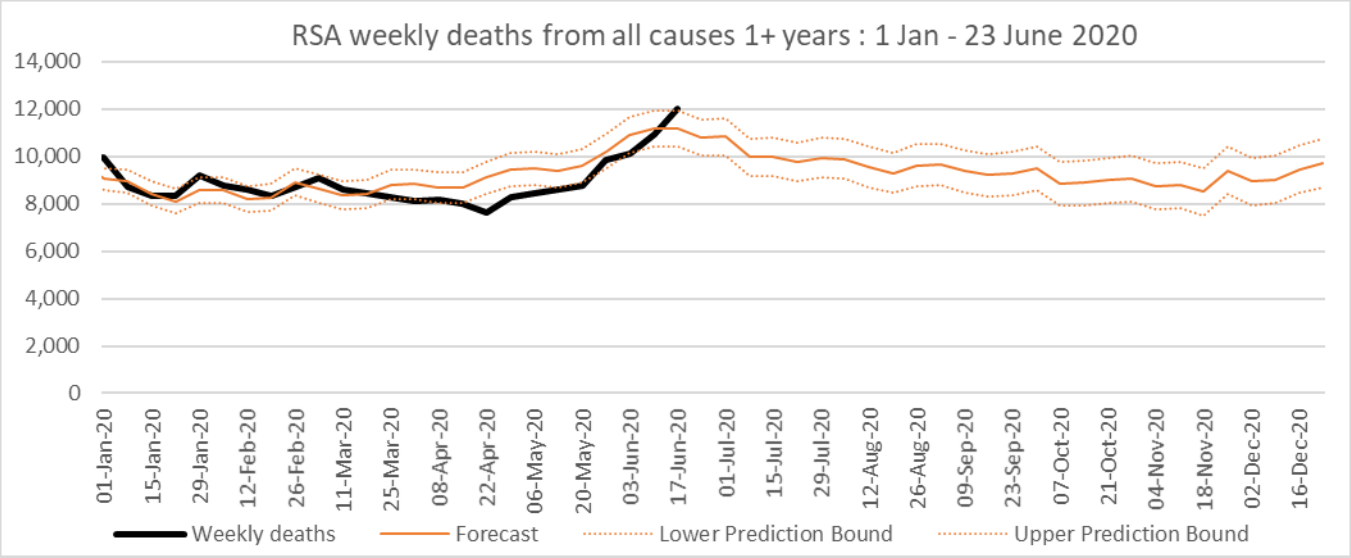
Births were not registered by the Department of Home Affairs during lockdown stage 5. This means any that die before the backlog is processed will not be placed on the National Population Register and thus that the deaths of these births will not be captured. **This report presents the estimated weekly deaths of persons 1 year and older**. Registered births are again being added to the population register, but either there remains a backlog in processing or a lower proportion of births are being registered since lockdown. Once we have confidence that registration of deaths is back to previous levels we will include deaths under age 1.

[1] Dorrington RE, Bradshaw D, Laubscher R, Nannan N (2020). Rapid mortality surveillance report 2018. Cape Town: South African Medical Research Council.

[2] The Excel function implements is the Holt-Winters triple exponential smoothing (the AAA sub-method).

Trends

- After tracking the lower prediction bound for several weeks, the all-cause national number of deaths of persons 1+ years of age has increased and is significantly higher than the predicted number based on historical data.
- The number of deaths from natural causes is also significantly higher than the predicted number. While the number of deaths from natural causes of persons 1-59 years has increased in the week ending **23 June 2020**, the number of deaths of persons 60 years and older has become significantly higher than predicted.
- In the period, **6 May - 23 June 2020**, there has been an excess of **4,039** deaths from natural causes of persons 1+ year old. **Table 1** shows the estimated excess deaths in metro areas and the provinces.
- Two metros in Gauteng have shown increased numbers of deaths in the week up till **23 June 2020**.
- Deaths from natural causes in the **City of Cape Town, Buffalo** and **Nelson Mandela Bay** metros continued increasing in the week up to **23 June 2020.** Since the 6th May, an excess of **2,167** deaths from natural causes has been experienced in **Cape Town, 202** in **Buffalo** and **455** in **Nelson Mandela Bay**. A sharp increase in natural deaths was observed in **Buffalo City** and the weekly number of natural deaths is significantly higher than predicted number.
- **Western Cape**, **Eastern Cape**, **Gauteng** and **KwaZulu-Natal** have all shown increases in natural deaths and are experiencing an excess number of natural deaths.
- The number of deaths from unnatural causes (e.g. road traffic fatalities and homicides) was slightly below the predicted number in the week up till **23 June 2020**.



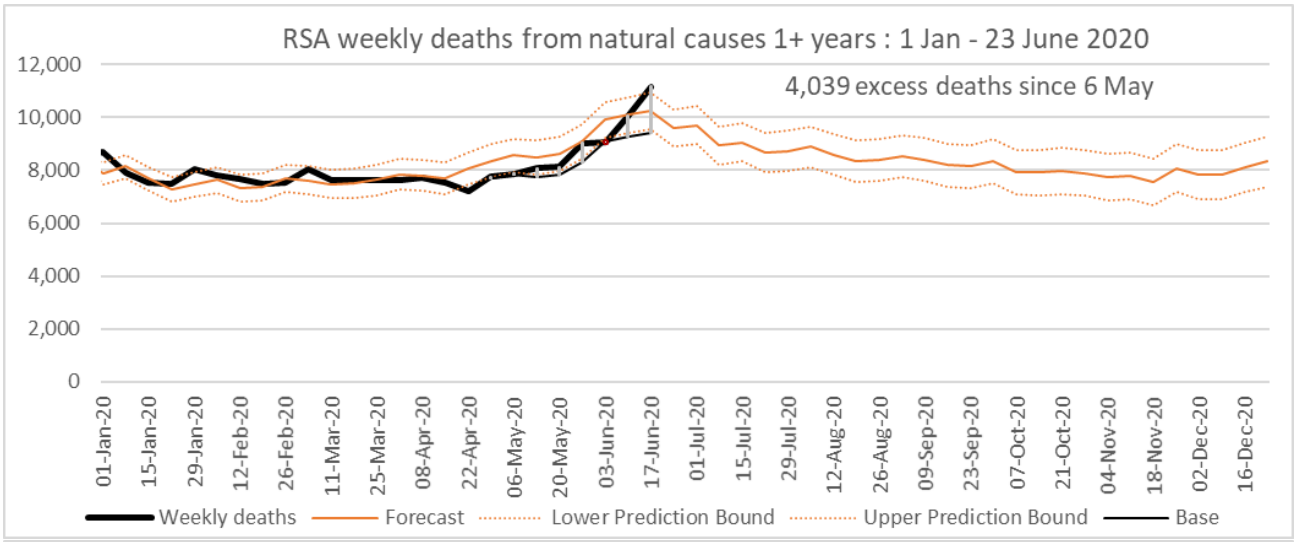
Numbers have been scaled to the estimated actual number of death and for the last week has been adjusted for delayed registrations

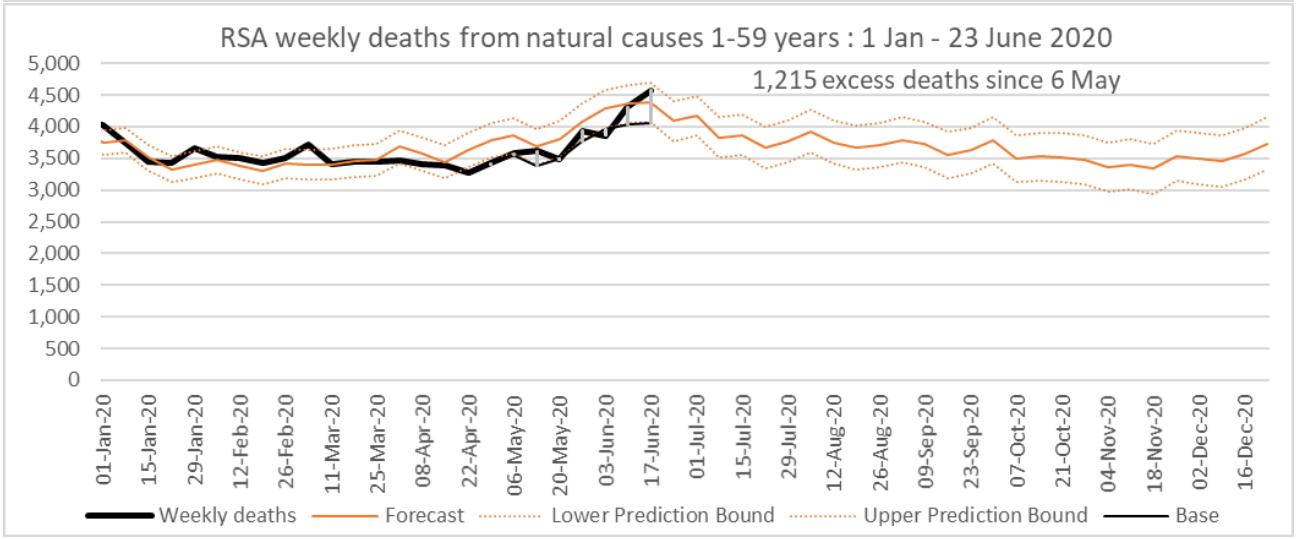
The estimated number of weekly deaths can be downloaded in excel with this report from the SAMRC website: https://www.samrc.ac.za/reports/report-weekly-deaths-south-africa

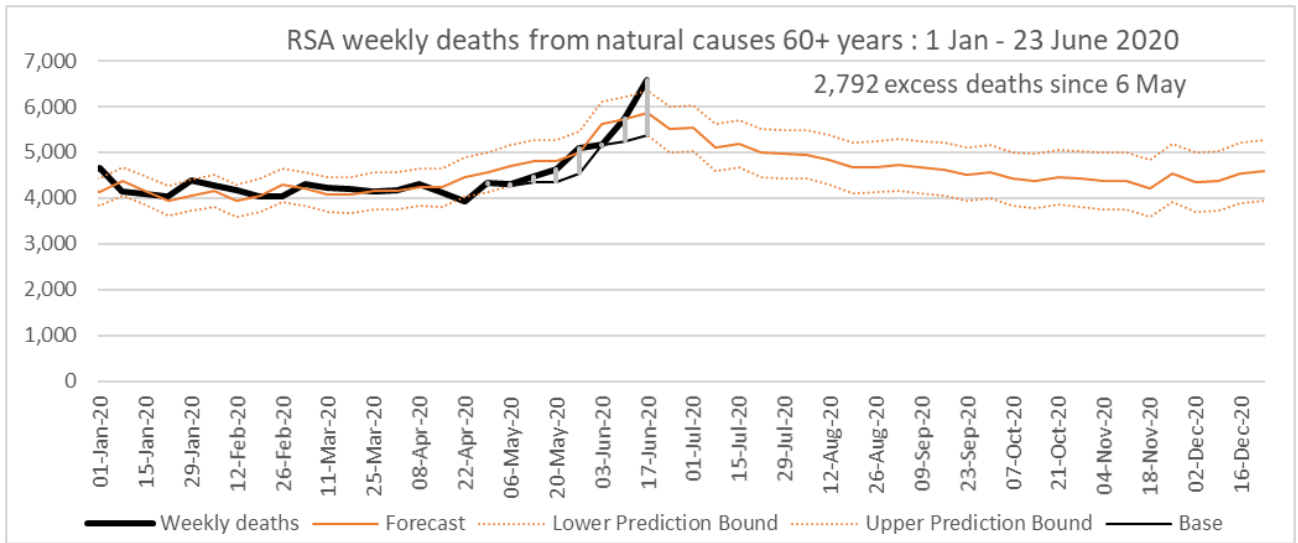
Table 1: Number of excess natural deaths of persons 1+ years by province and metro, South Africa 2020

Province	Excess deaths 6 May-23 June		Metropolitan Municipality	Excess deaths 6 May-23 June
Eastern Cape	1,303		Buffalo City	202
			Nelson Mandela Bay	455
Free State	69		Mangaung	-
Gauteng	295		Ekhuruleni	111
			Johannesburg	115
			City of Tshwane	202
KwaZulu-Natal	351		Ethikweni	-
Limpopo	82			
Mpumalanga	-			
Northern Cape	-			
North West	-			
Western Cape	2,366		City of Cape Town	2,167
South Africa	4,039			

Note: Parts do not sum to the whole because office closures due to Covid-19 may have led to registration of deaths at other offices which may not be in the same area, and random fluctuation at the point at which the baseline is determined.







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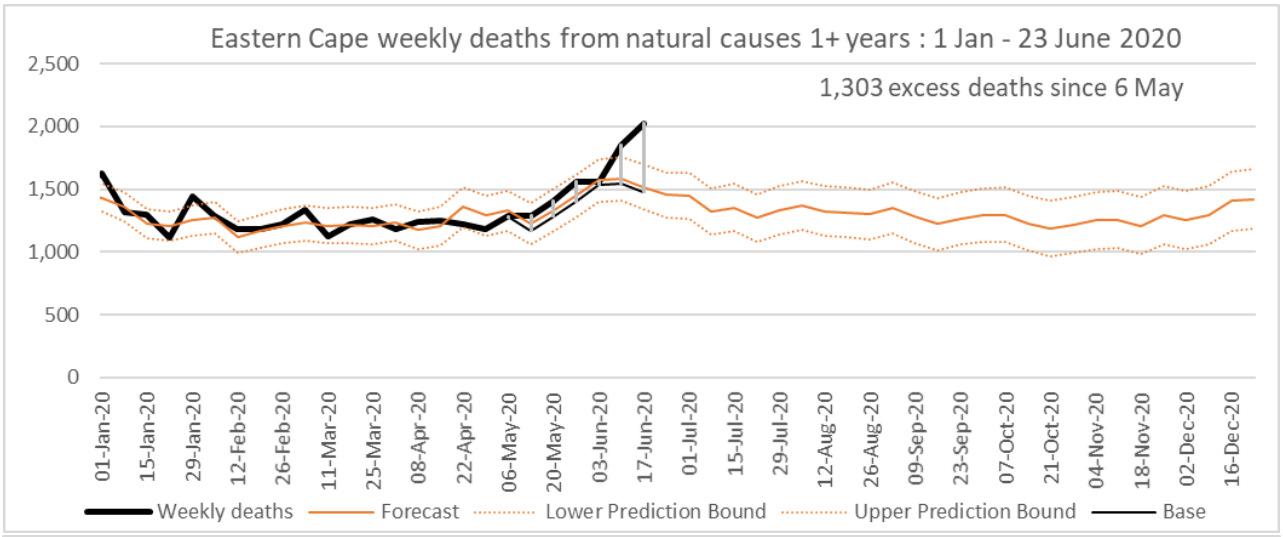

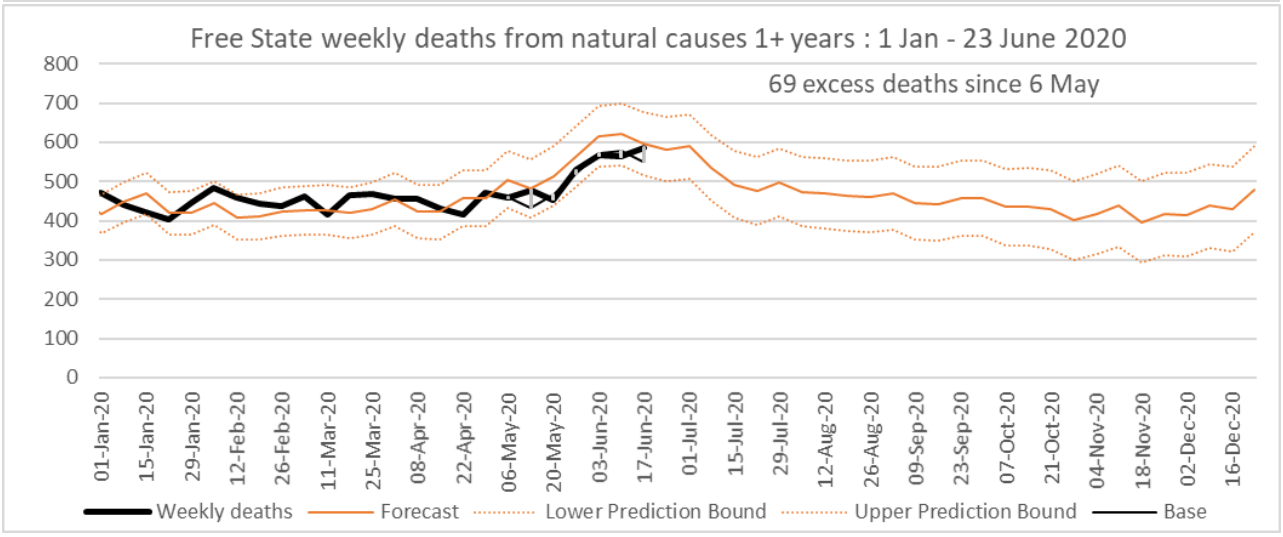

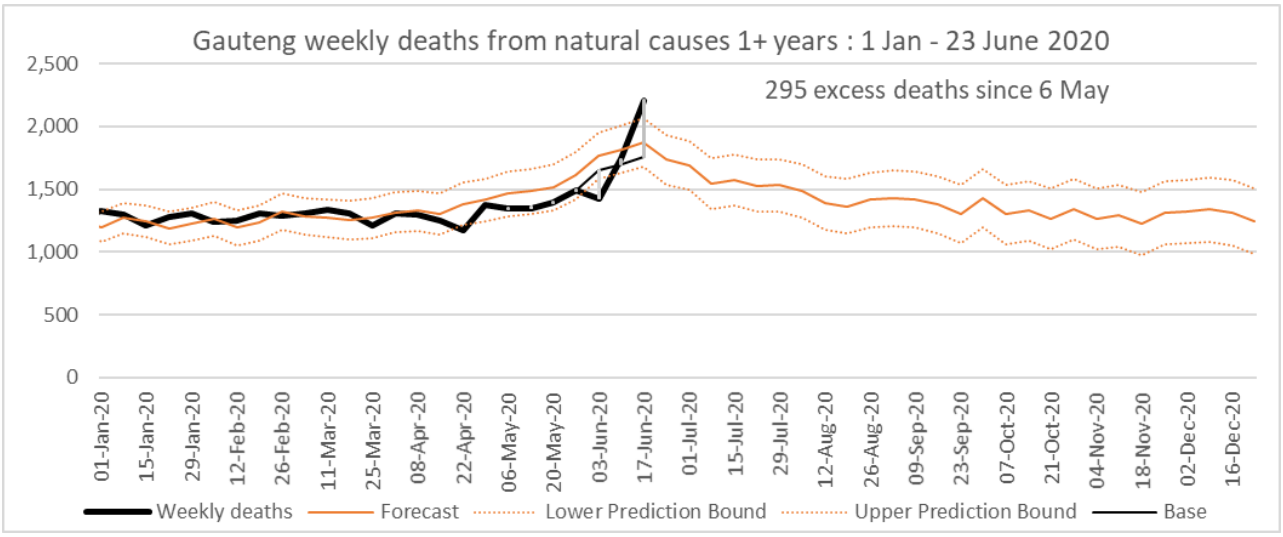

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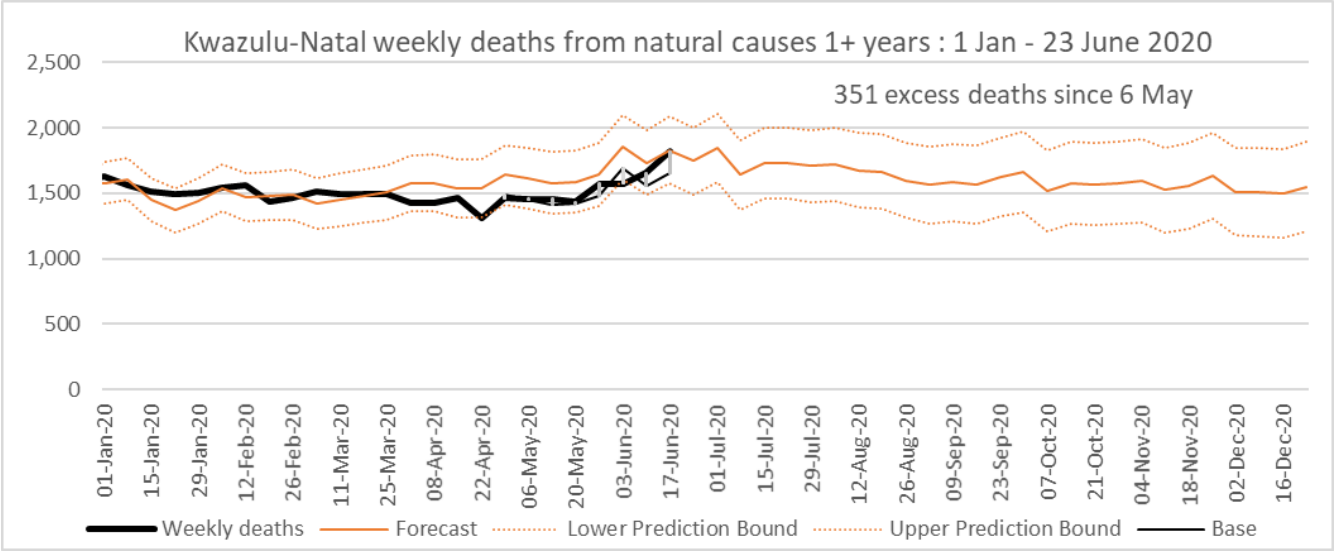

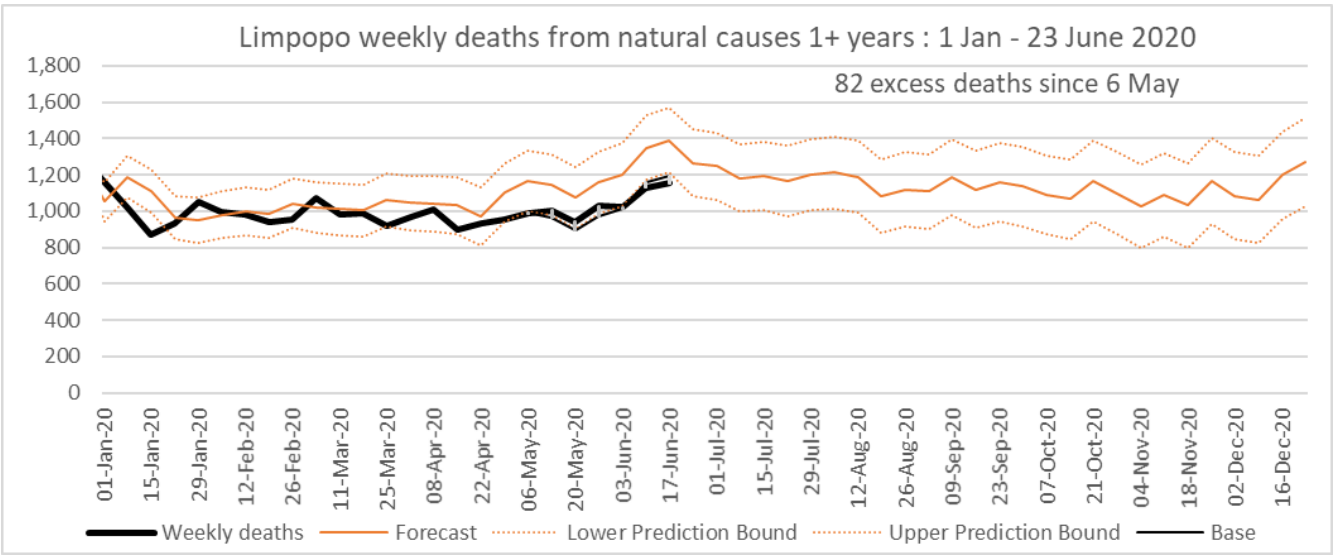

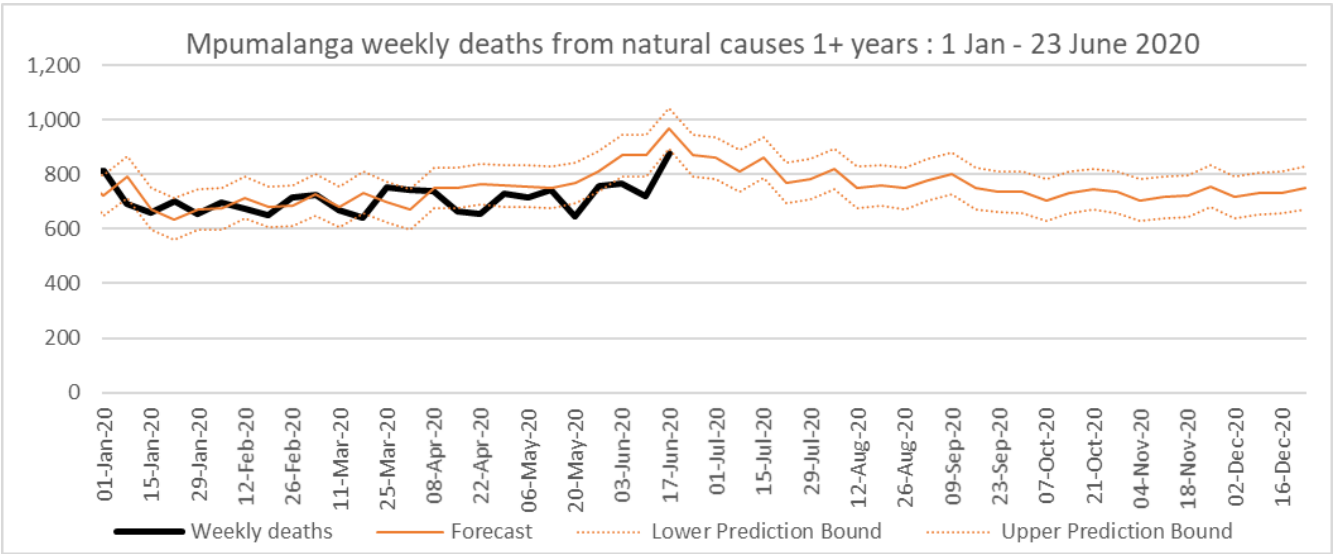

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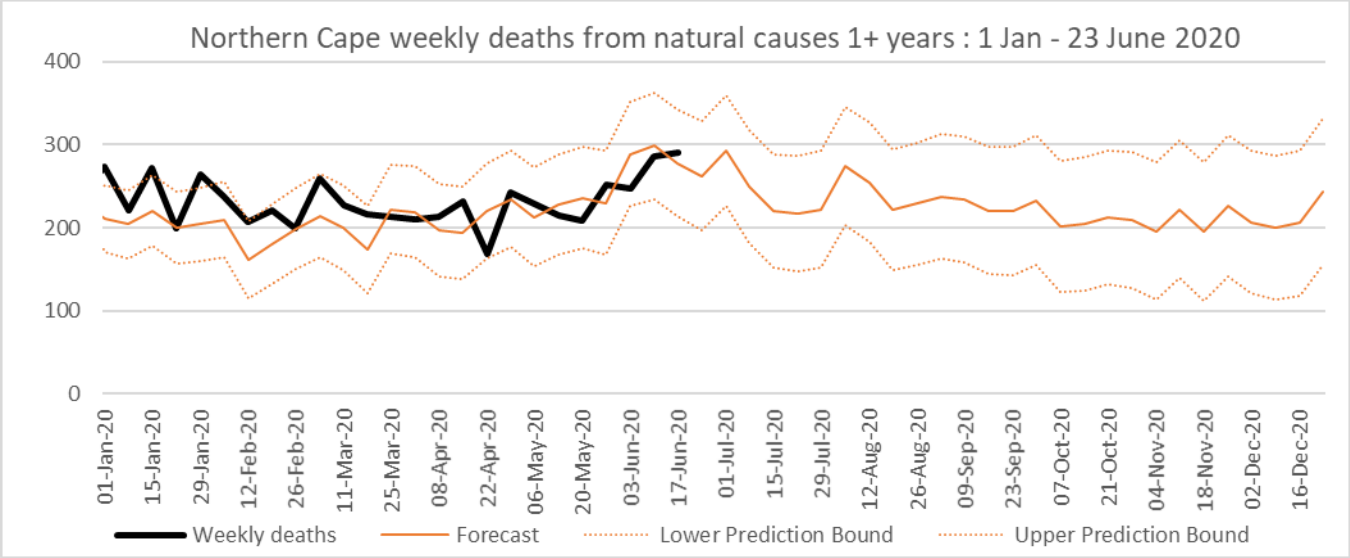

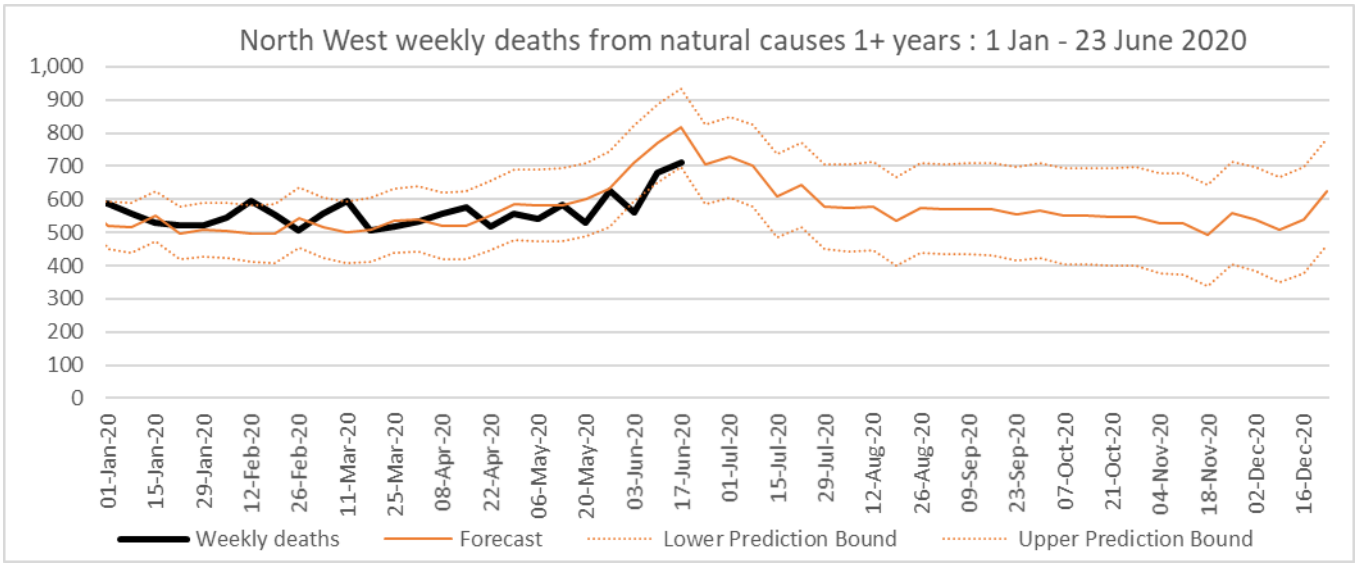

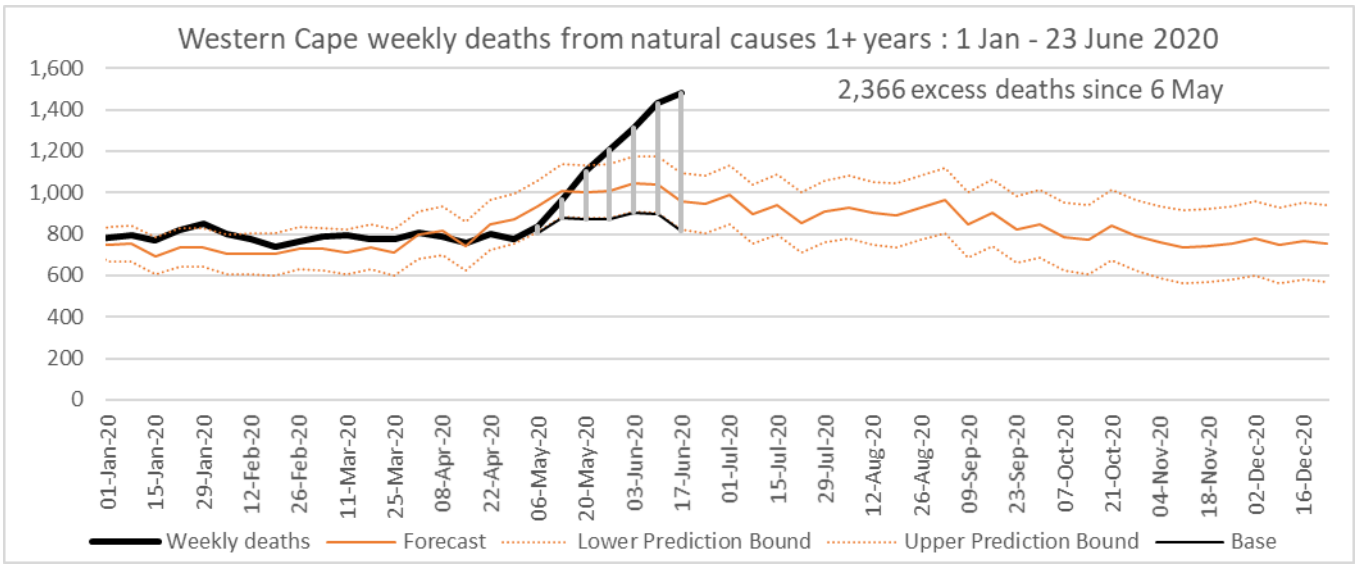

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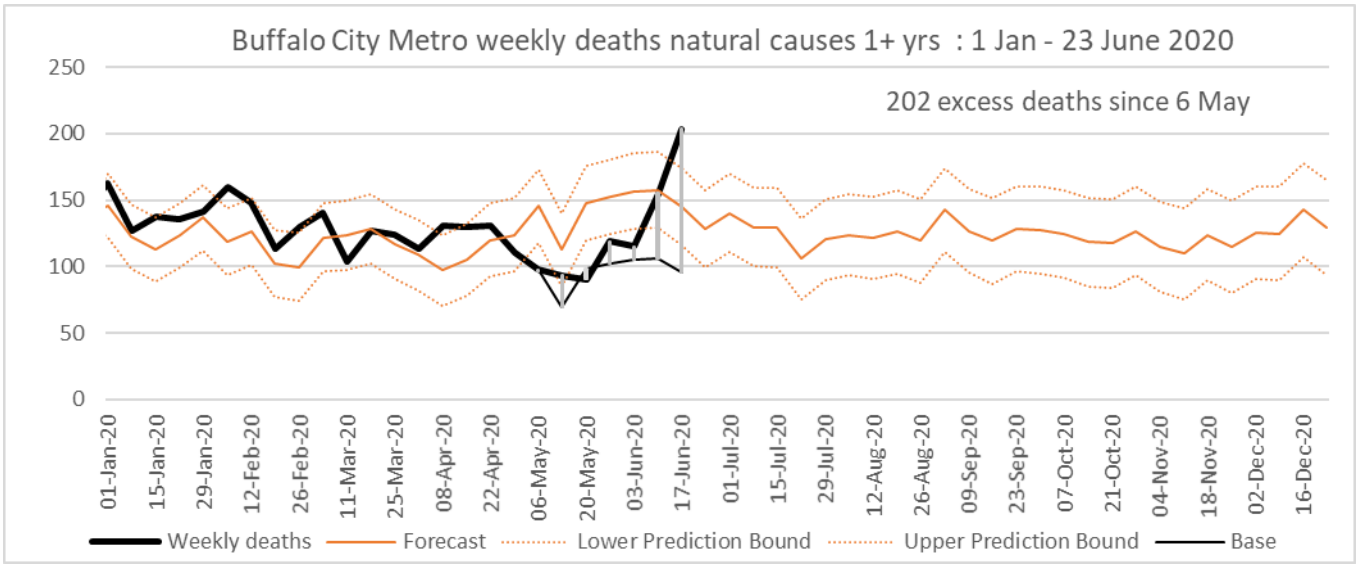

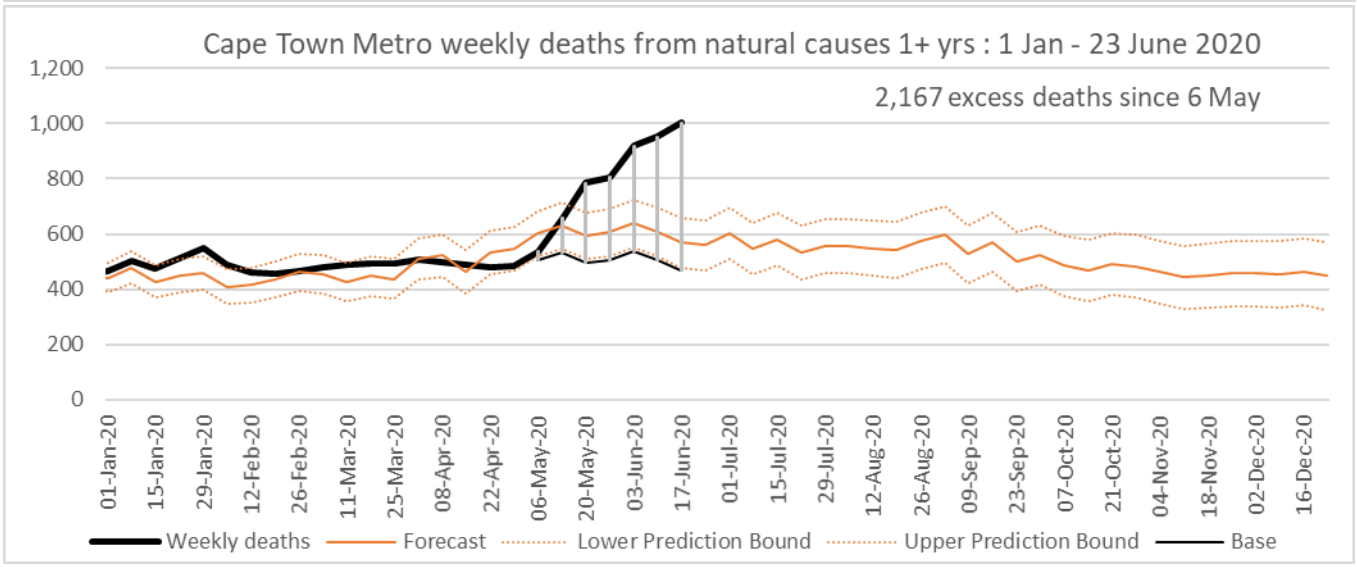

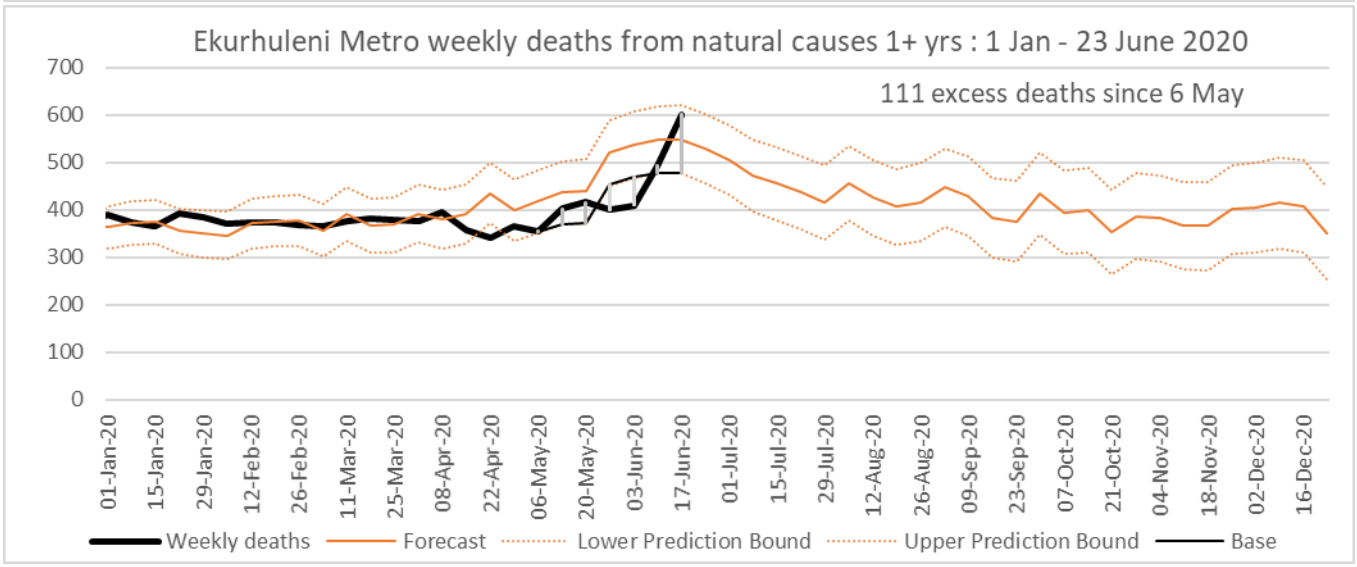

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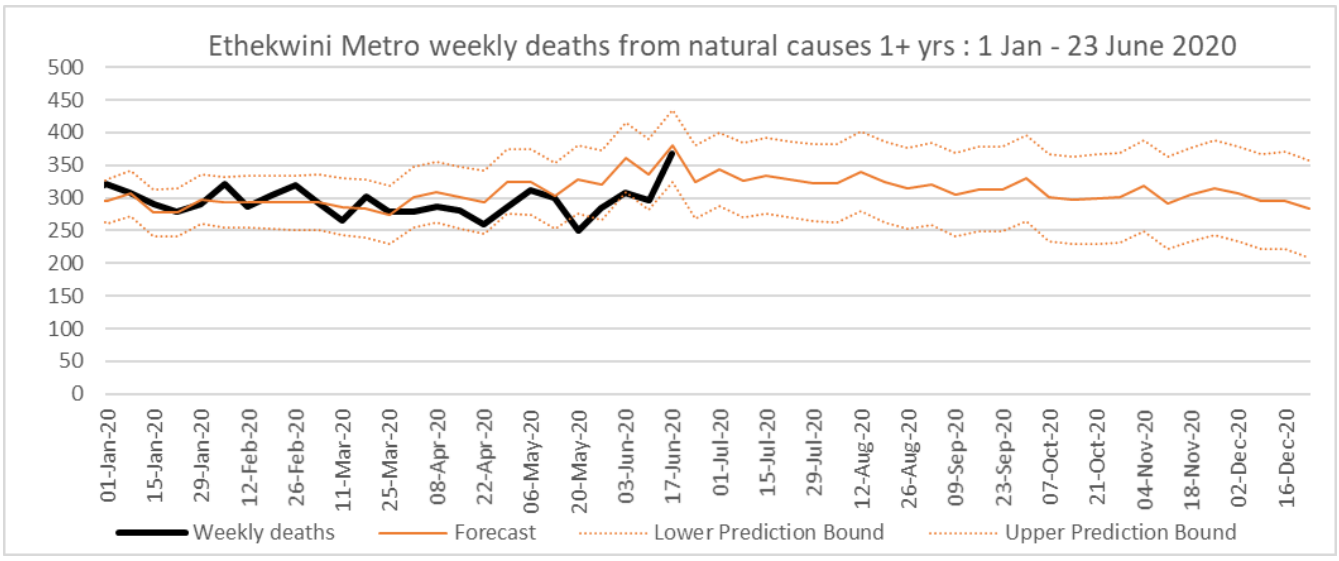

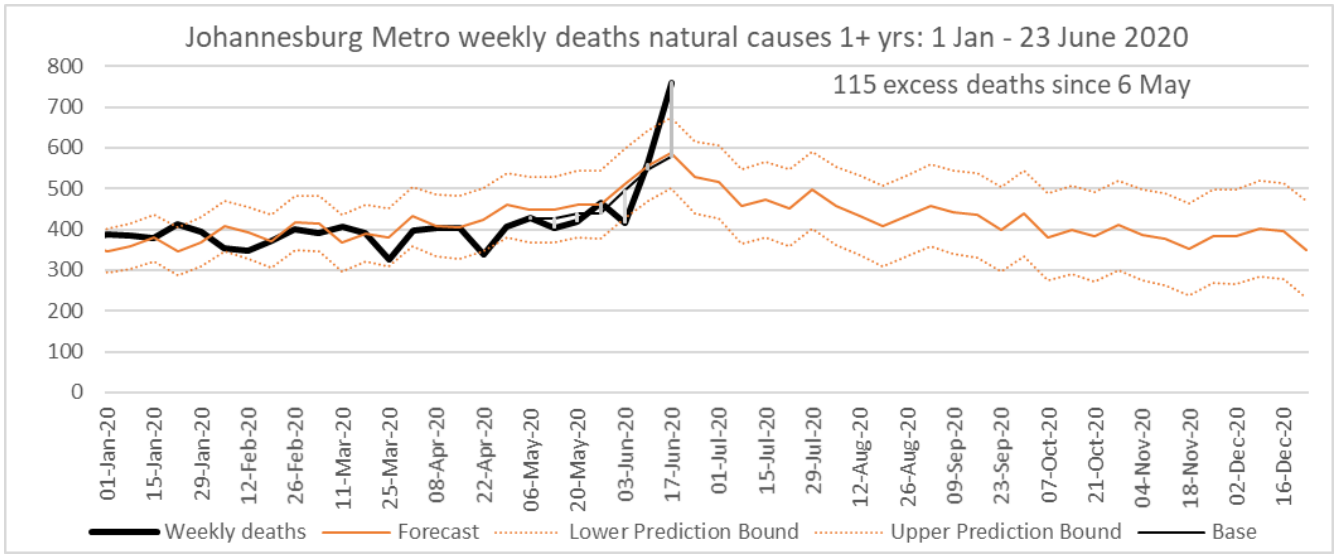

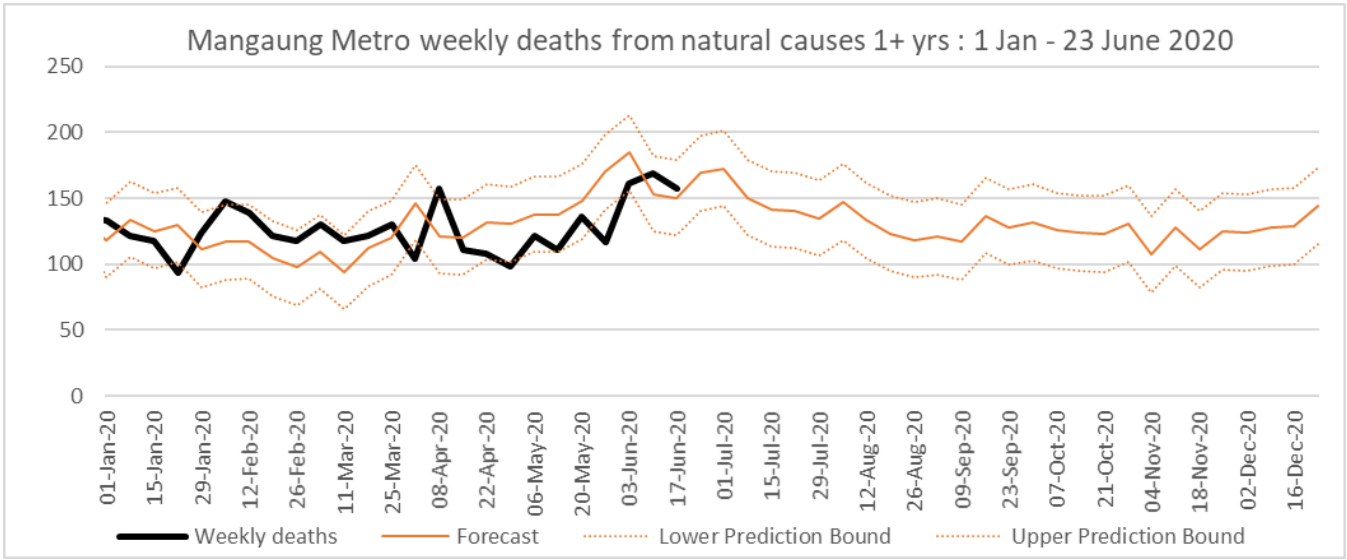

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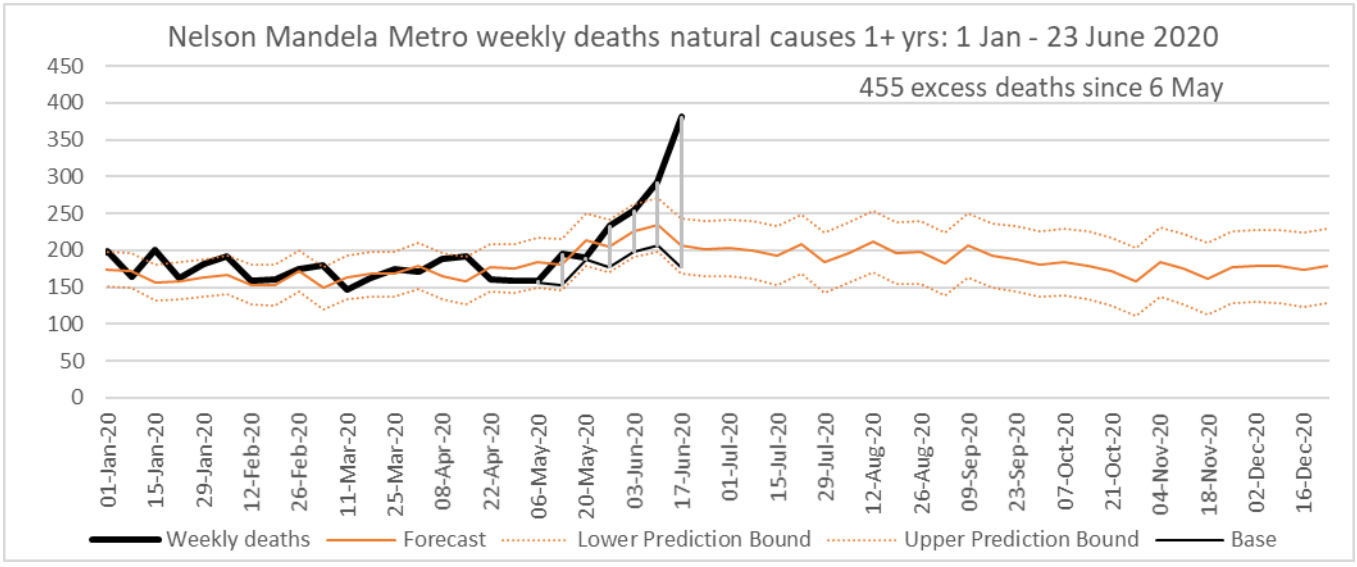

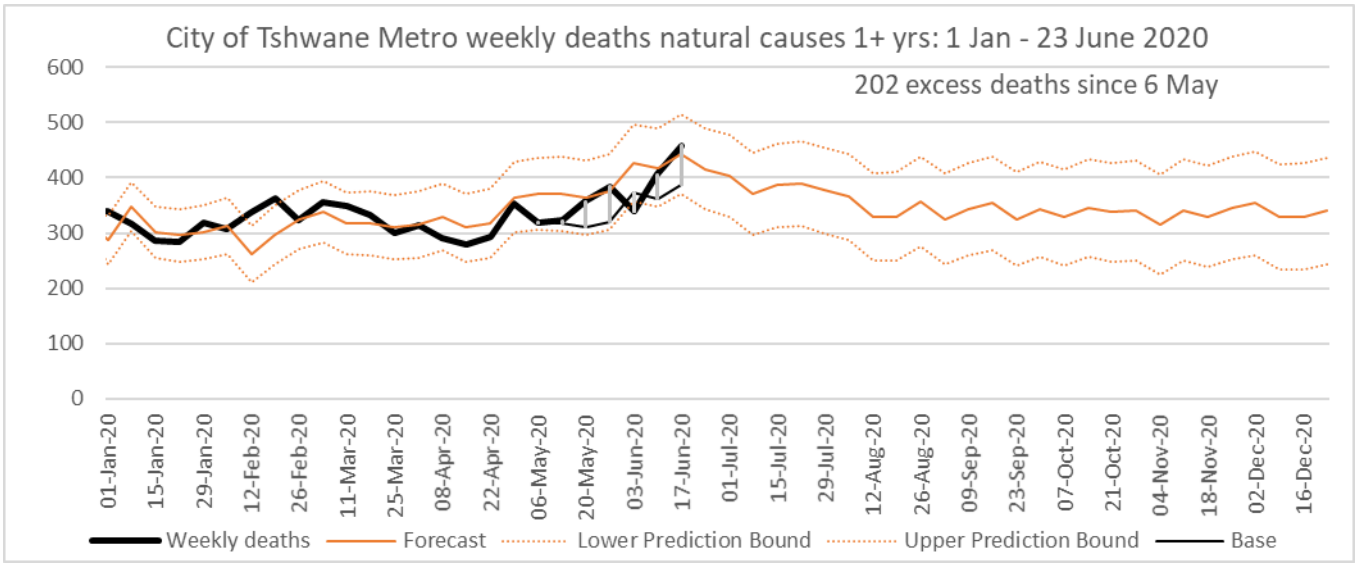

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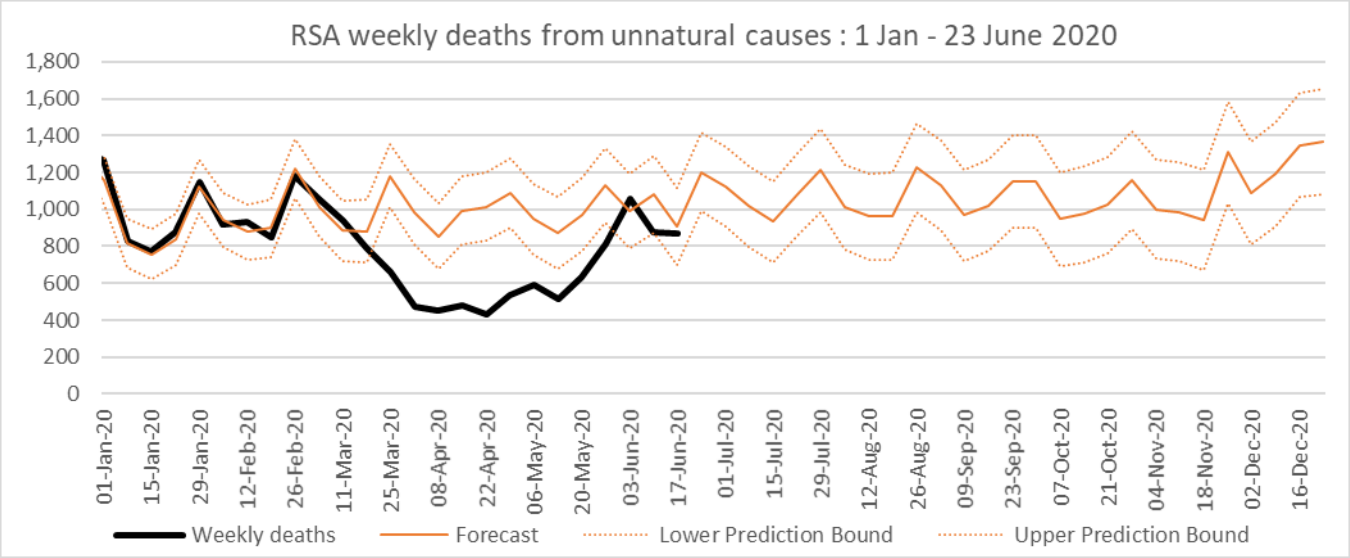

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