

REPORT ON WEEKLY DEATHS IN SOUTH AFRICA

5 – 11 DEC 2021

(WEEK 49)

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UCT Centre
for Actuarial
Research

Glossary:

Age-standardised excess death rate: Indirectly age-standardised excess death rates have been calculated for each province to adjust the crude death rates per capita for the differences in distribution of the population by age. The adjustment factor for each province is calculated as the crude death rate for South Africa divided by what the crude rate for South Africa would have been had the age distribution of the population been that of the province. Standardisation for age is necessary when comparing populations that differ in their age structure because age has a powerful influence on the risk of dying. The rate is based on the cumulative number of excess deaths since 3 May 2020 to date divided by the population estimate for 2021 and has not been annualised.

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. **The adjustments to account for incompleteness of recording of deaths on the NPR have been re-estimated for the 2021 reports taking into account the 2017 cause-of-death data released by Stats SA in 2020.** A methodological note briefly outlining the changes can be downloaded with this report from the SAMRC website: <https://www.samrc.ac.za/reports/report-weekly-deaths-south-africa>.

Epi-week: The Weekly Death Reports in 2020 used weeks from 1 January and ran from Wednesday to Tuesday. In setting up the monitoring for 2021, we recast the data to report by an 'Epi-week' consistent with CDC and many NICD reports which run from Sunday to Saturday, ensuring continuity of weeks from one year to the next. Each week is aligned with the 'Epi-year' that has 4 or more days in that week. Week 53 of 2020 is from 27 December 2020 to 2 January 2021 and Week 1 of 2021 is 3 January – 9 January 2021.

Excess deaths: There is no universal definition of, or understanding of what is meant by, "excess mortality". It is a term used in epidemiology and public health that refers to the number of deaths that are occurring above what we would normally expect. The WHO uses the term to describe "Mortality above what would be expected based on the non-crisis mortality rate in the population of interest. Excess mortality is thus mortality that is attributable to the crisis conditions. It can be expressed as a rate (the difference between observed and non-crisis mortality rates), or as a total number of excess deaths."

Excess natural deaths associated with COVID-19: 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), provided that the counterfactual is lower. However, this approach has generally only been applied to countries where deaths have been tracking the counterfactual before the onset of significant numbers of COVID-19 related deaths. The method provides a poor estimate of the numbers of COVID-19 and collateral deaths in the early stages of the epidemic when this is not the case. Thus, we estimated the numbers of COVID-19 and collateral deaths, once a clear upward trend is evident, as the number of actual deaths less a baseline number determined as a proportion of the predicted number. By the end of the 1st wave of the pandemic, the predicted values have been used as the counterfactual.

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.

Background

This report provides estimates of the weekly number of deaths of all persons in South Africa for epidemiological **Week 49** of 2021, covering the period **5 – 11 Dec 2021**.

While preparing predicted numbers of weekly deaths for 2021, enhancements have been made to the estimation process. The estimates now take into account the release of vital registration data to include registrations up to the close of 2017. They also ensure that the national estimate of excess deaths is consistent with the sum of the estimates for the provinces. Reporting has changed to 'Epi-weeks' that run from Sunday to Saturday, which will align with other weekly reports and enable us to lessen the lag in reporting. For the report for Week 32, the estimates of the predicted number of weekly deaths for 2020 and 2021 were revised to include the number of infant deaths (<1 year of age) as well as accounting for a different trend in mortality rates in the Northern Cape.

The main methodological change introduced in the 2021 reporting is that predicted values for 2020 and 2021 are based on death data for the period 2014-2019, instead of data for 2018 and 2019 as was done for 2020 estimates. After reviewing trends in the data, separate negative binomial models have been fitted to the unnatural deaths, the natural deaths for each of KwaZulu-Natal and Western Cape, and for natural deaths for the 7 other provinces in a combined model to provide estimates by age, sex and epi-week for each year. A prediction interval has been estimated on the basis of the variability in the observed weekly data for each reported domain. The data for both 2020 and 2021 have been recast and both years will be reported with a cumulative total of excess deaths taken from the week starting 3 May 2020, considered to be the point of rapid increase in excess deaths associated with the COVID-19 pandemic in South Africa. Except for KwaZulu-Natal (and eThekweni in particular), where the additional VR data identified substantial missing late registrations from the 2015 data, the impact of the changes is relatively small. Predicted values for the metropolitan areas are still based on data from 2018 and 2019 as the trends in the sub-provincial data need further investigation to develop a comprehensive district-level model.

A brief methodological note outlining the changes that have been made for monitoring deaths during 2021 can be downloaded with this report from the SAMRC website: <https://www.samrc.ac.za/reports/report-weekly-deaths-south-africa>.

A review of provincial trends in mortality rates indicated an implausible distribution of excess deaths by age and a questioningly high rate of excess deaths per capita, indicating the necessity to model the numbers for this province separately. Previously we fitted a negative binomial regression to the 2014-2019 weekly number of natural deaths for 7 provinces excluding Western Cape (which has an earlier winter peak in deaths) and KwaZulu-Natal (which experienced a more rapid decline in mortality rates during the period 2014-2019 than the other provinces). In August 2021, we revised the predicted numbers of natural deaths for all ages based on separate negative binomial regression models for natural deaths in Northern Cape, Western Cape, KwaZulu-Natal and a single regression for the remaining 6 provinces including a provincial coefficient to allow for different levels in the provincial rates. The deaths from unnatural causes for all ages have been modelled nationally using a negative binomial regression as done previously. These changes also provided the opportunity to include, for the first time, infants under 1 year of age in all of the indicators.

Trends

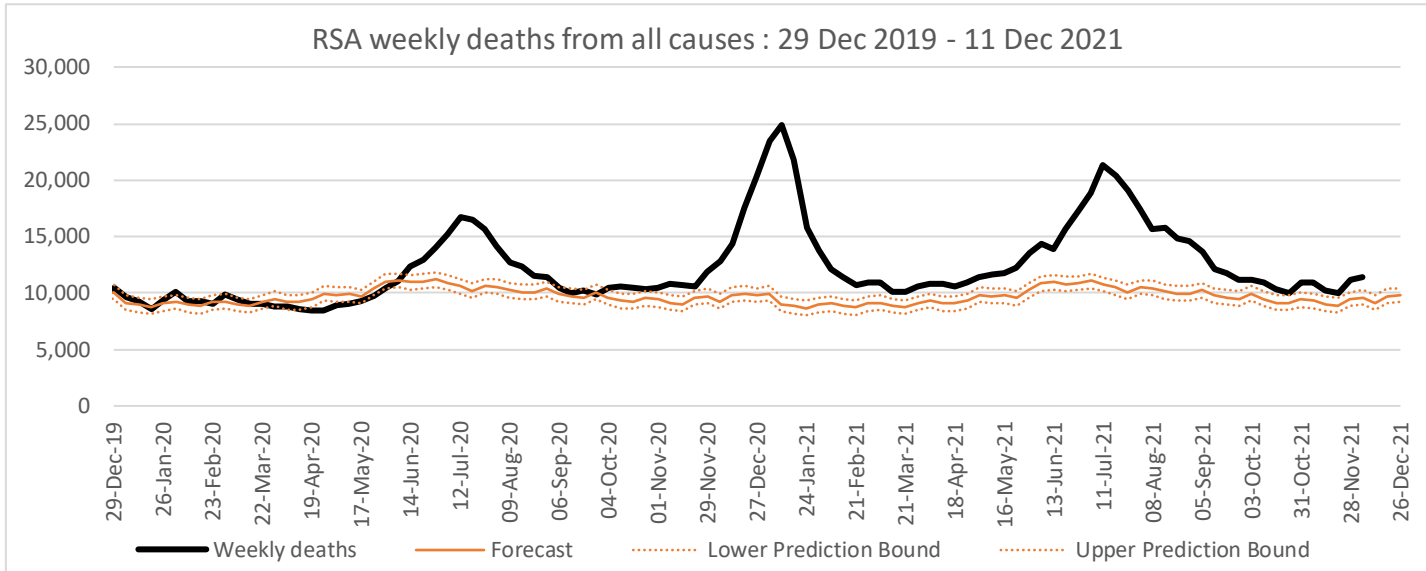
- The weekly number of deaths (all ages) from all causes increased to **11,464** in Week 49 (**5 – 11 Dec 2021**) remaining above the upper prediction bound.
- The number of excess deaths from natural causes (all ages) has increased to **1,887** in Week 49 (**5 – 11 Dec 2021**) with the total natural deaths above the upper prediction bound (p-score of 23%).
- Since 3 May 2020, there has been a cumulative total of **277,600** excess deaths from natural causes of persons all ages of which just over **192,500** occurred in 2021 (since 3 Jan 2021).

Week	Date	Weekly excess deaths from natural causes (all ages)	Cumulative excess since 3 May 2020 (all ages)	Cumulative excess since 3 January 2021 (all ages)
42	17-Oct-21 – 23-Oct-21	1,136	267,977	183,033
43	24-Oct-21 – 30-Oct-21	807	268,784	183,840
44	31-Oct-21 – 6-Nov-21	1,389	270,173	185,229
45	7-Nov-21 – 13-Nov-21	1,521	271,694	186,750
46	14-Nov-21 – 20-Nov-21	1,211	272,905	187,961
47	21-Nov-21 – 27-Nov-21	1,165	274,070	189,126
48	28-Nov-21 – 4-Dec-21	1,726	275,796	190,852
49	5-Dec-21 – 11-Dec-21	1,887	277,683	192,739

- For people under-60 years, the number of natural deaths tracked within the prediction bounds since Week 36 (**5 – 11 Sep 2021**). In Week 43, the numbers increased and approached the upper prediction bound for a period of 2 weeks. The numbers have fluctuated close to the upper prediction bound over the past 2 weeks. The cumulative number of excess natural deaths for people under-60 years since **3 May 2020** was just over **72,800**.
- The number of weekly excess deaths in the 60+ years age group increased to a peak of **7,156** in Week 28 (**11 – 17 Jul 2021**) with a p-score of 152% and declined thereafter. From Week 41 (**10 Oct – 16 Oct 2021**) the decline has been erratic and reversed in Week 48. In Week 49 (**5 – 11 Dec 2021**) the number increased to **1,333** excess natural deaths in this age group with a p-score of 33%. The cumulative total number of excess natural deaths in this age group since **3 May 2020** was **204,800**.

Week	Date	Weekly excess deaths from natural causes for persons 60+ years	p-score
40	3-Oct-21 – 9-Oct-21	803	18.9%
41	10-Oct-21 – 16-Oct-21	1,072	26.2%
42	17-Oct-21 – 23-Oct-21	763	19.2%
43	24-Oct-21 – 30-Oct-21	686	17.6%
44	31-Oct-21 – 6-Nov-21	833	20.7%
45	7-Nov-21 – 13-Nov-21	935	23.5%
46	14-Nov-21 – 20-Nov-21	824	21.2%
47	21-Nov-21 – 27-Nov-21	805	21.1%
48	28-Nov-21 – 4-Dec-21	1,048	26.3%
49	5-Dec-21 – 11-Dec-21	1,333	33.0%

- In Week 49 (**5 – 11 Dec 2021**), the number of natural deaths were higher than the upper prediction bounds in **Eastern Cape** (p-score 45%), **Mpumalanga** (p-score 25%), **Northern Cape** (p-score 24%), **KwaZulu Natal** (p-score 22%), **Limpopo** (p-score 20%), **Gauteng** (p-score 19%) and **Western Cape** (p-score 17%).
- Per capita excess death rates have been calculated for the provinces to scale the cumulative deaths for the population size of each province (**Table 1**). By the end of Week 49 (**5 – 11 Dec 2021**), the national excess death rate since 3 May 2020 was **467** per **100,000** population.
- The provinces with the highest cumulative numbers of excess deaths at the end of Week 49 (**5 – 11 Dec 2021**), are, in order, **KwaZulu-Natal**, **Gauteng** and **Eastern Cape**. The ranking changes to **Eastern Cape**, **Northern Cape** and **Free State** for the crude death rates per capita (i.e., taking size of the provincial populations into account) and to **Northern Cape**, **KwaZulu-Natal** and **Eastern Cape** using the age-standardised rates (i.e., taking into account the age distribution of the provincial population).
- The weekly number of deaths from unnatural causes has continued to track close to the predicted numbers since the end of January 2021, with increases corresponding with month-ends. Following some drops below the predicted, coinciding with the change of lockdown to adjusted level 4 with re-banning of alcohol sales and extension of curfew, the number of unnatural deaths has tracked the predicted number since Week 30 (**25 – 31 Jul 2021**).



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

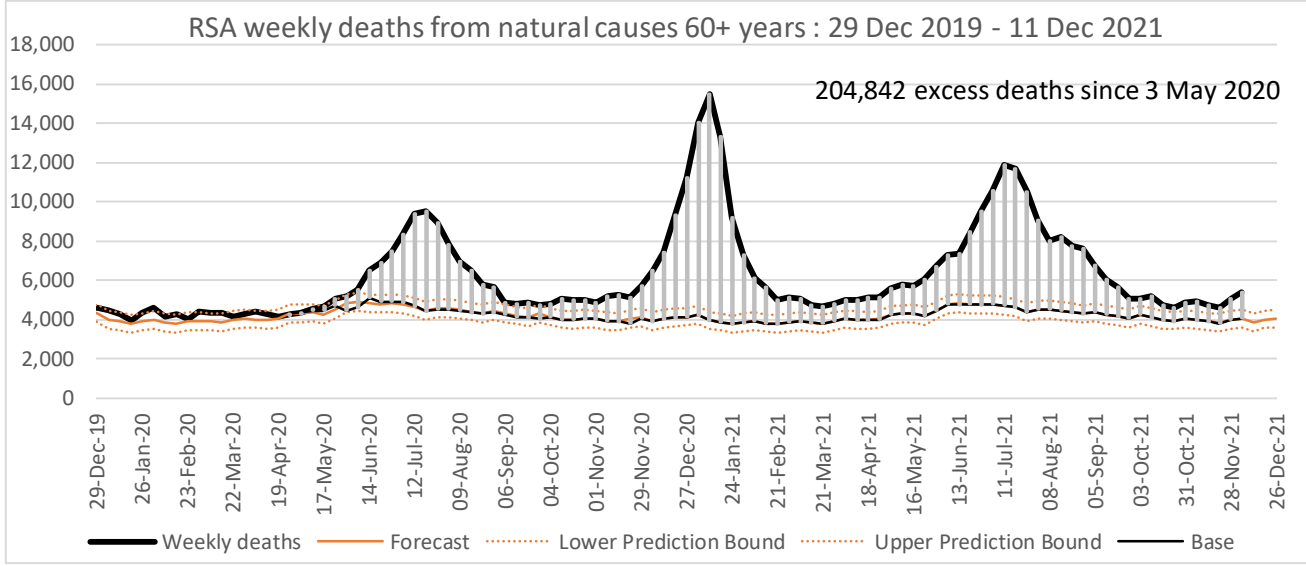
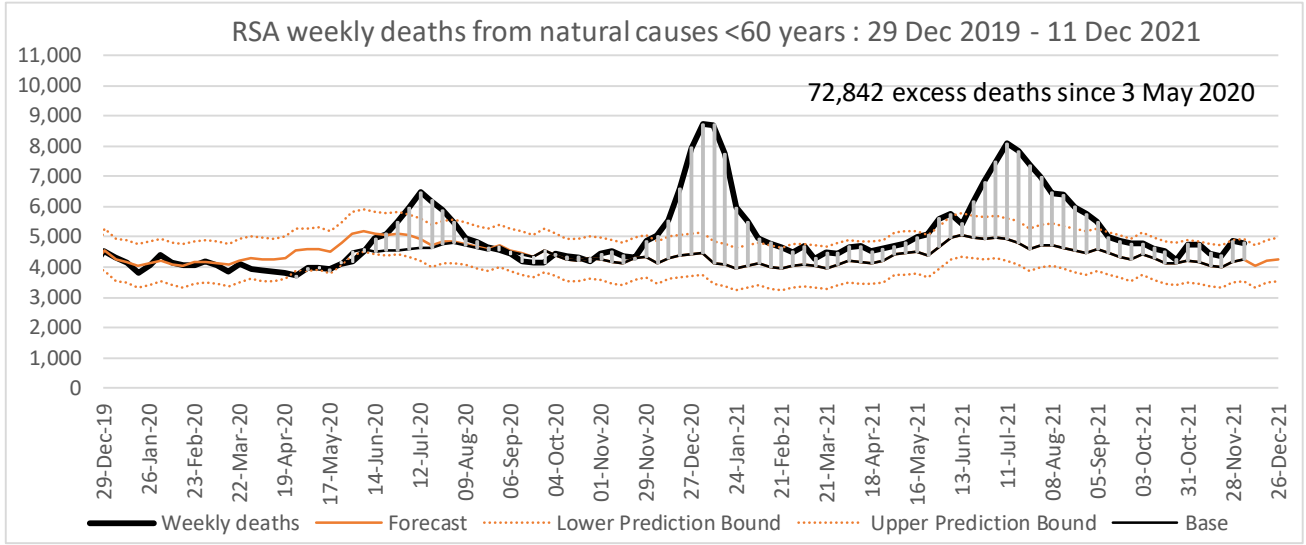
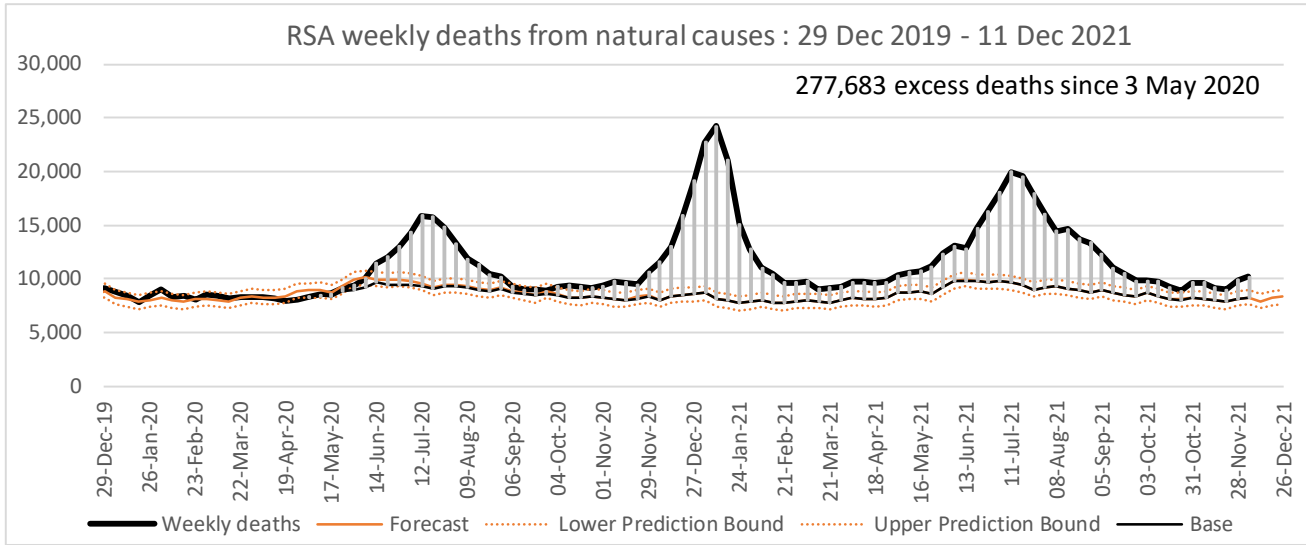
Table 1: Number of excess natural deaths of persons by province and metro relative to revised predicted number based on the observed drop during lockdown, South Africa 2020/21

Region	Period	Excess deaths vs revised base	Excess deaths per 100,000 population	Age standardised excess death rate per 100,000
South Africa	3 May 20 – 11 Dec 21	277,683	467	467
Province				
Eastern Cape	31 May 20 – 11 Dec 21	45,702	694	560
Free State	21 Jun 20 – 11 Dec 21	15,672	538	538
Gauteng	7 Jun 20 – 11 Dec 21	56,664	363	399
KwaZulu-Natal	7 Jun 20 – 11 Dec 21	56,812	496	571
Limpopo	21 Jun 20 – 11 Dec 21	29,247	495	433
Mpumalanga	21 Jun 20 – 11 Dec 21	21,602	449	484
Northern Cape	28 Jun 20 – 11 Dec 21	7,779	665	622
North West	28 Jun 20 – 11 Dec 21	15,771	392	402
Western Cape	3 May 20 – 11 Dec 21	28,435	403	355
Metropolitan Municipality				
Buffalo City	31 May 20 – 11 Dec 21	5,053		
City of Cape Town	3 May 20 – 11 Dec 21	20,365		
Ekurhuleni	7 Jun 20 – 11 Dec 21	13,938		
eThekweni	14 Jun 20 – 11 Dec 21	12,575		
Johannesburg	7 Jun 20 – 11 Dec 21	19,066		
Mangaung	21 Jun 20 – 11 Dec 21	4,520		
Nelson Mandela Bay	31 May 20 – 11 Dec 21	7,155		
City of Tshwane	7 Jun 20 – 11 Dec 21	10,763		

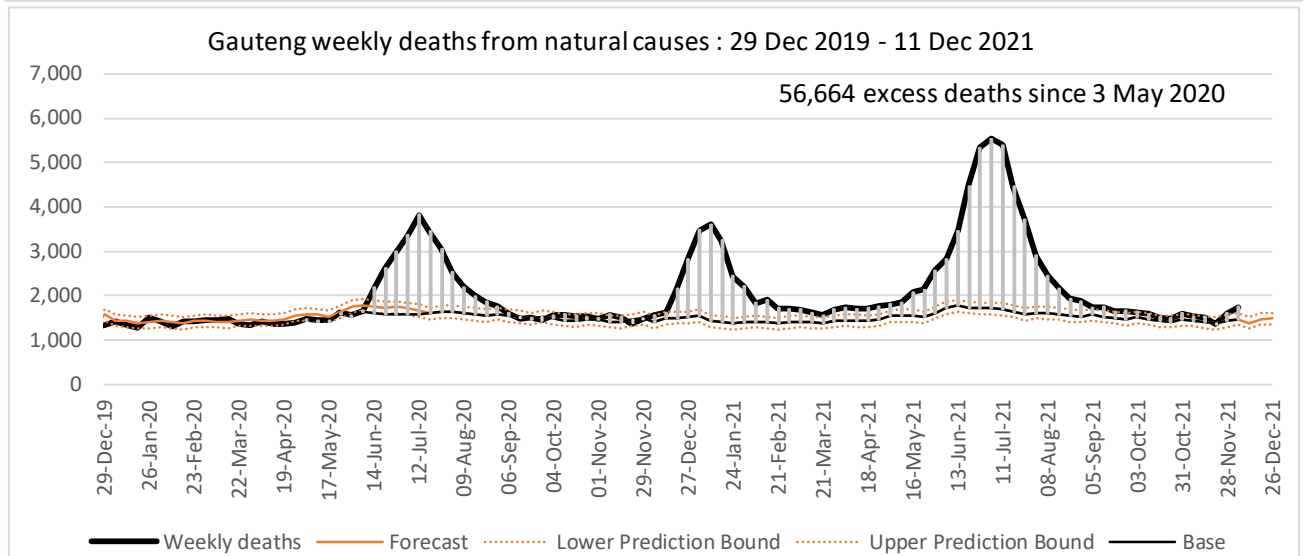
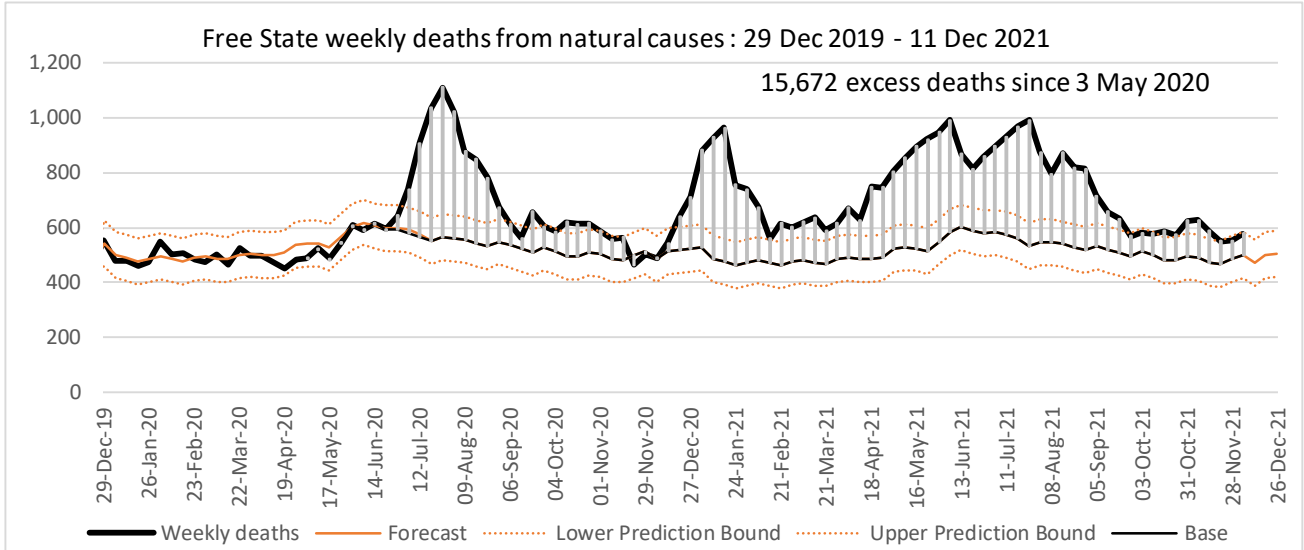
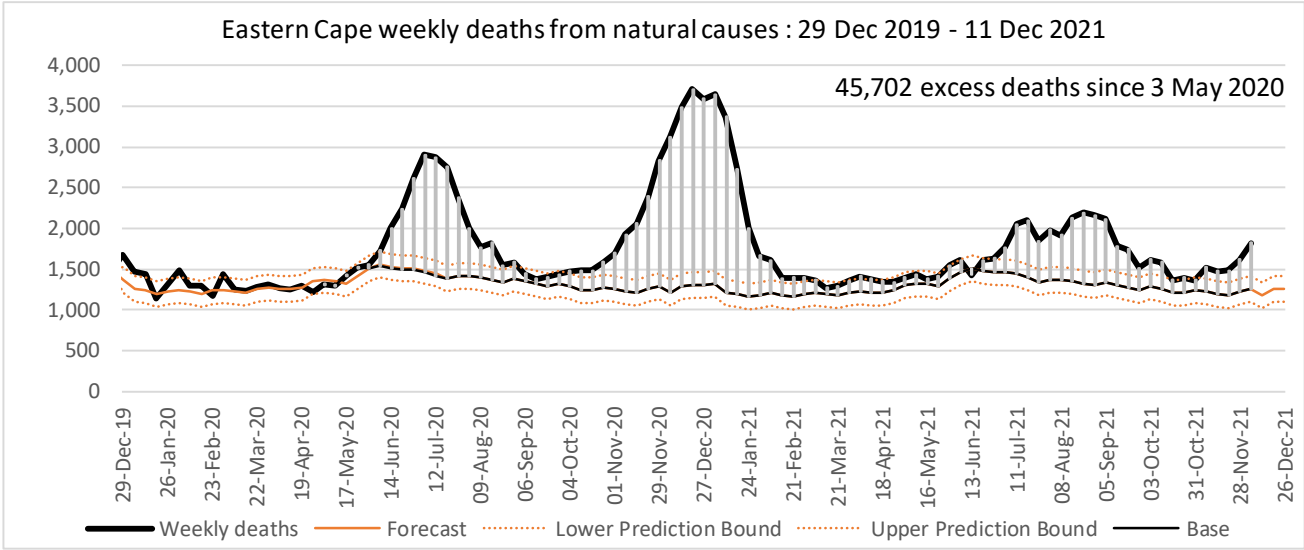
Note: Period has been determined based on when an upturn in the number of natural deaths became apparent. Parts do not sum to the whole because office closures due to Covid-19 may have led to registration of deaths at other offices which may not be in the same area, and random fluctuation at the point at which the baseline is determined.

Table 2: Number of excess deaths from all causes of persons by province and metro relative to predicted number based on historical trend, South Africa 2020/21

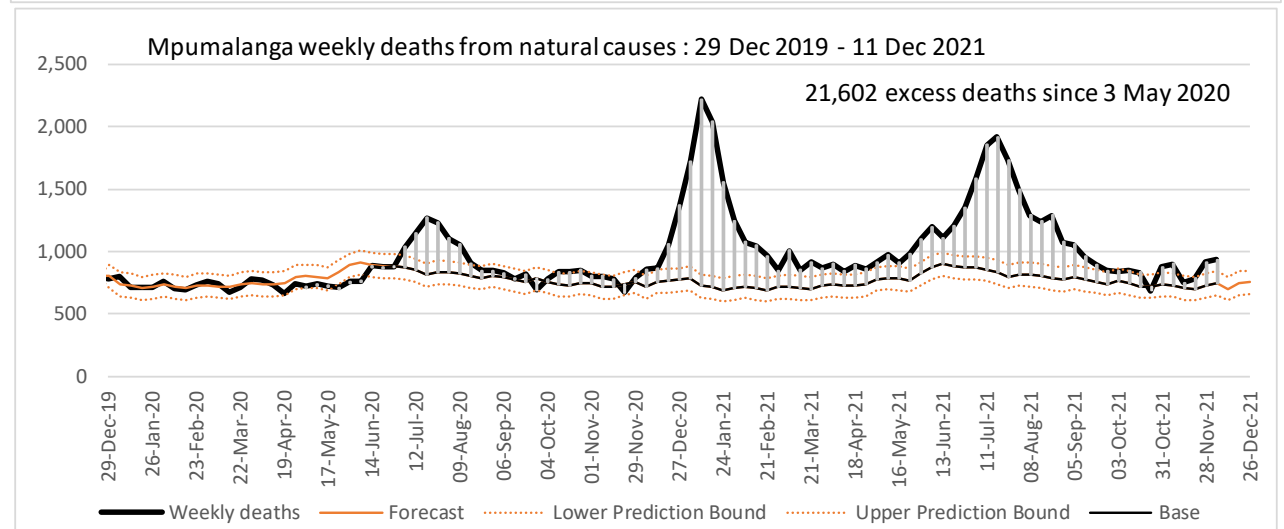
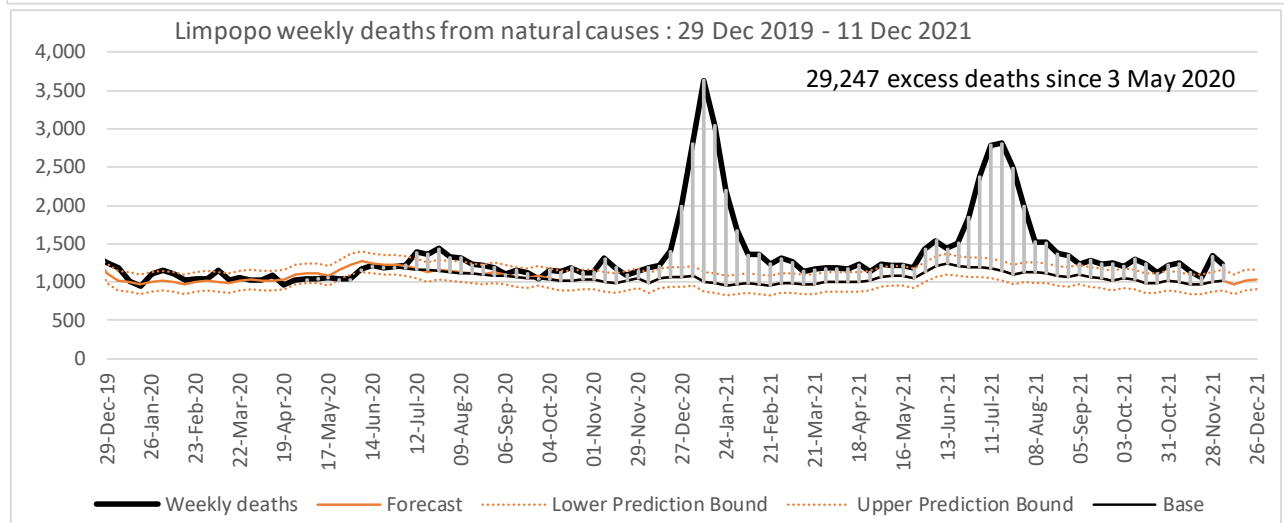
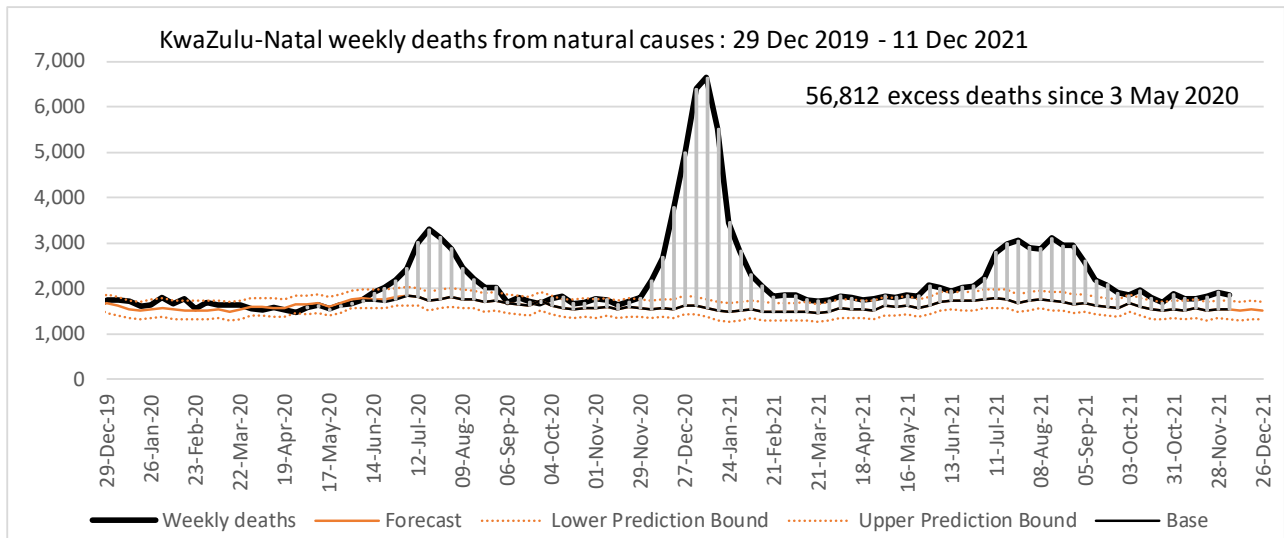
Region	Excess deaths vs forecast	Excess deaths per 100,000 population
South Africa	274,164	461
Province		
Eastern Cape	46,636	709
Free State	15,415	529
Gauteng	53,707	344
KwaZulu-Natal	58,012	507
Limpopo	29,289	496
Mpumalanga	21,293	443
Northern Cape	7,693	657
North West	15,287	380
Western Cape	26,834	380
Metropolitan Municipality		
Buffalo City	5,144	
City of Cape Town	18,718	
Ekurhuleni	12,752	
eThekweni	11,579	
Johannesburg	18,770	
Mangaung	4,952	
Nelson Mandela Bay	7,216	
City of Tshwane	10,993	



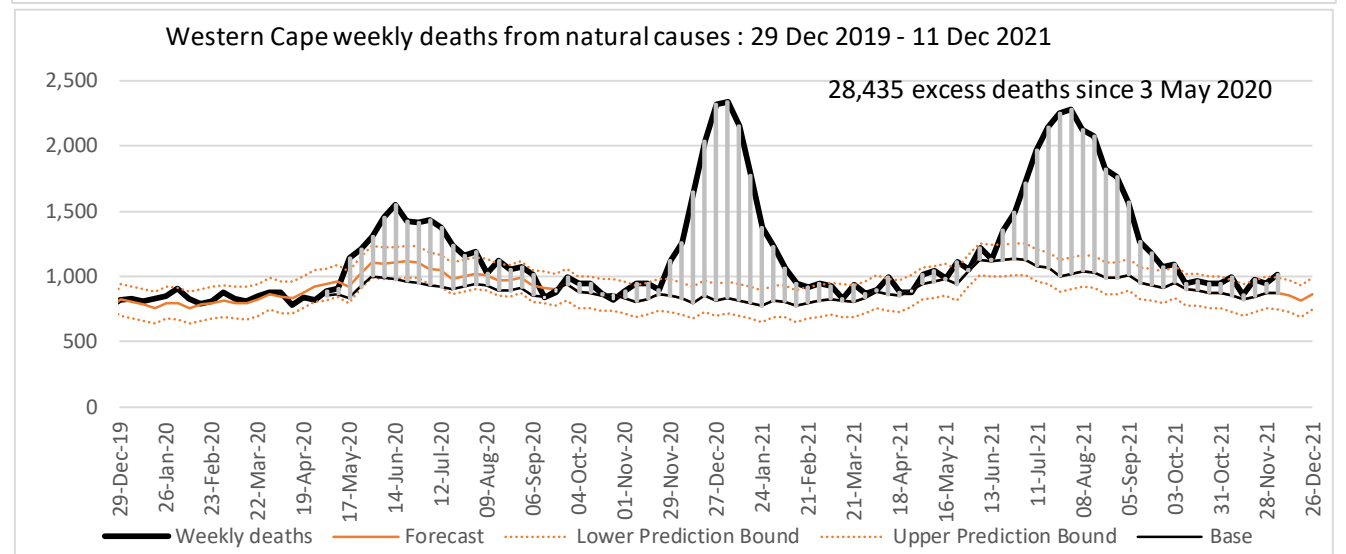
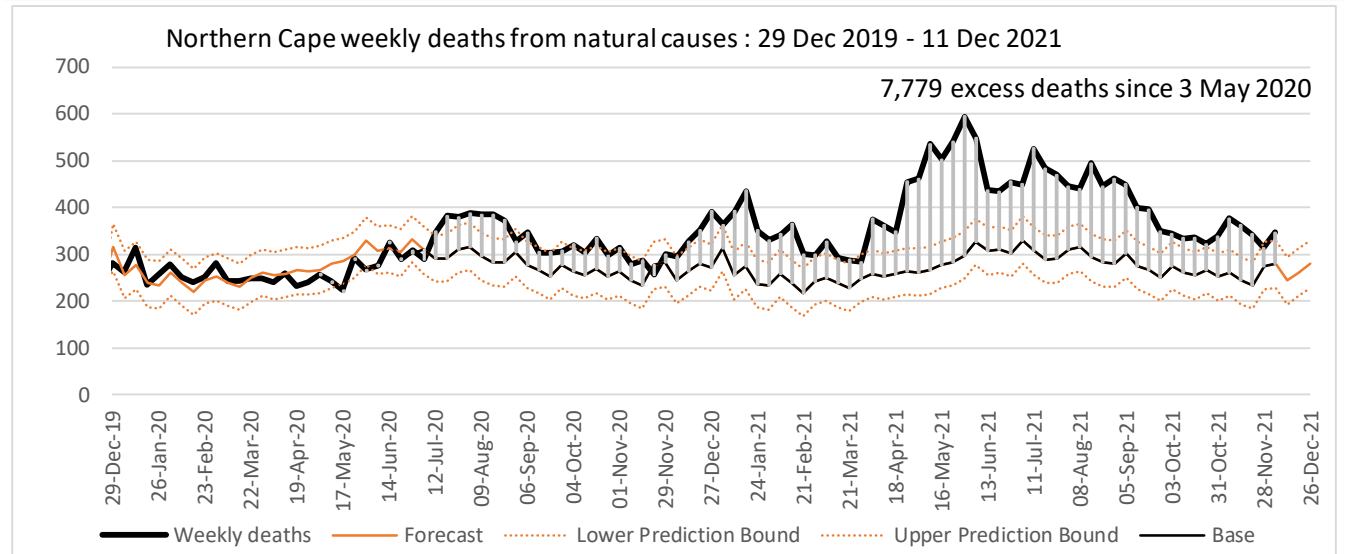
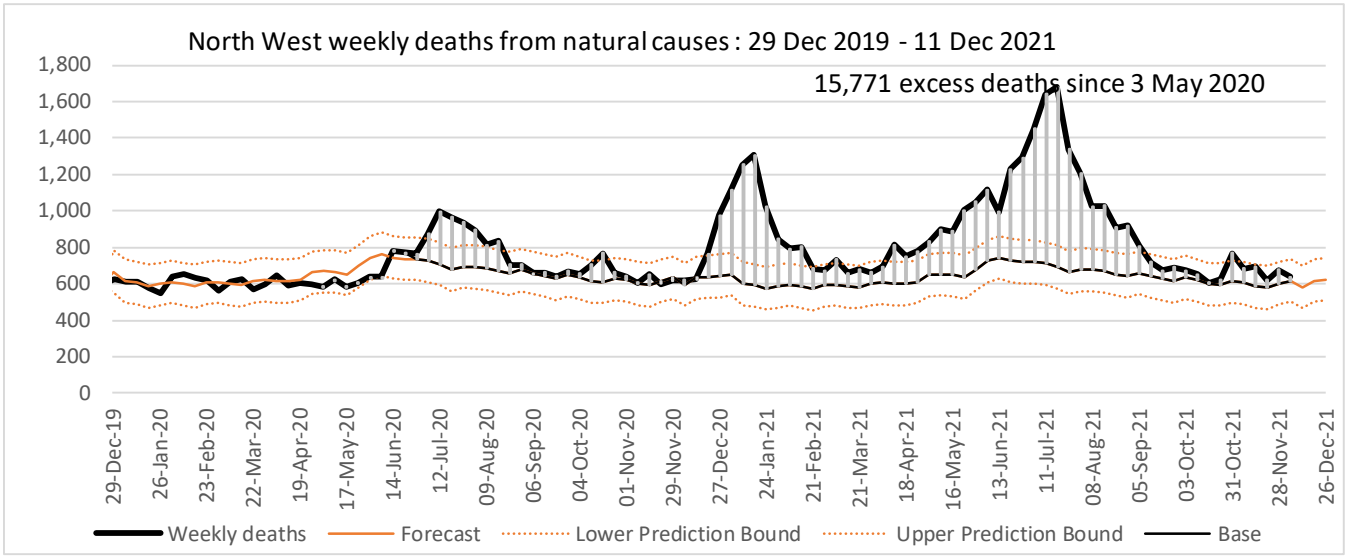
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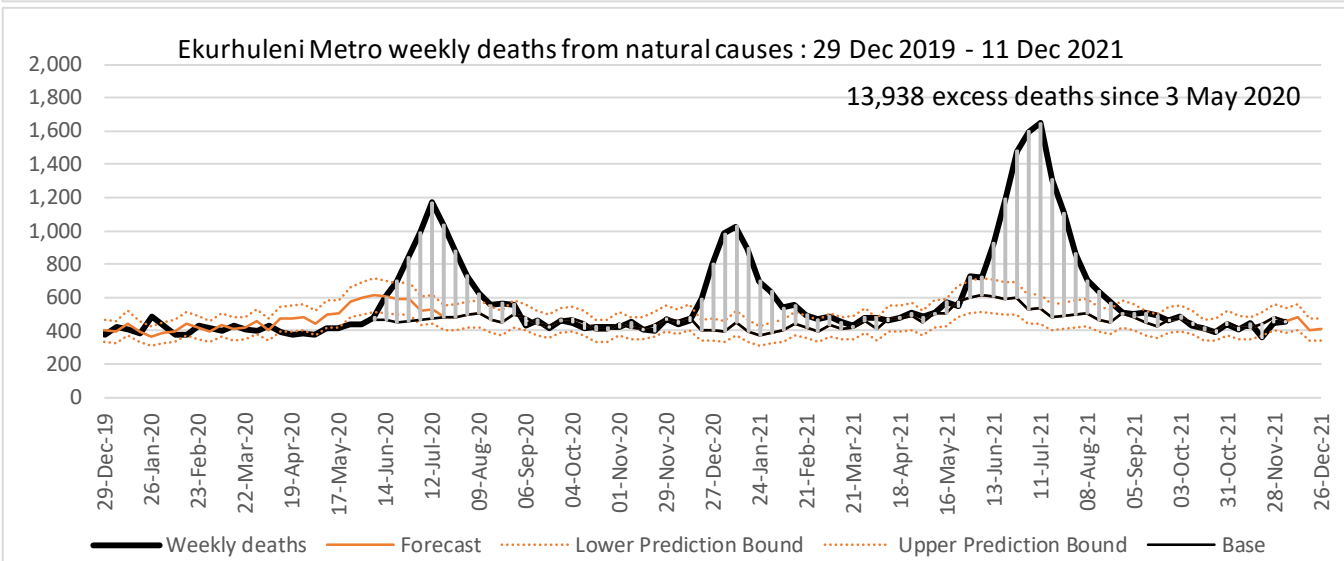
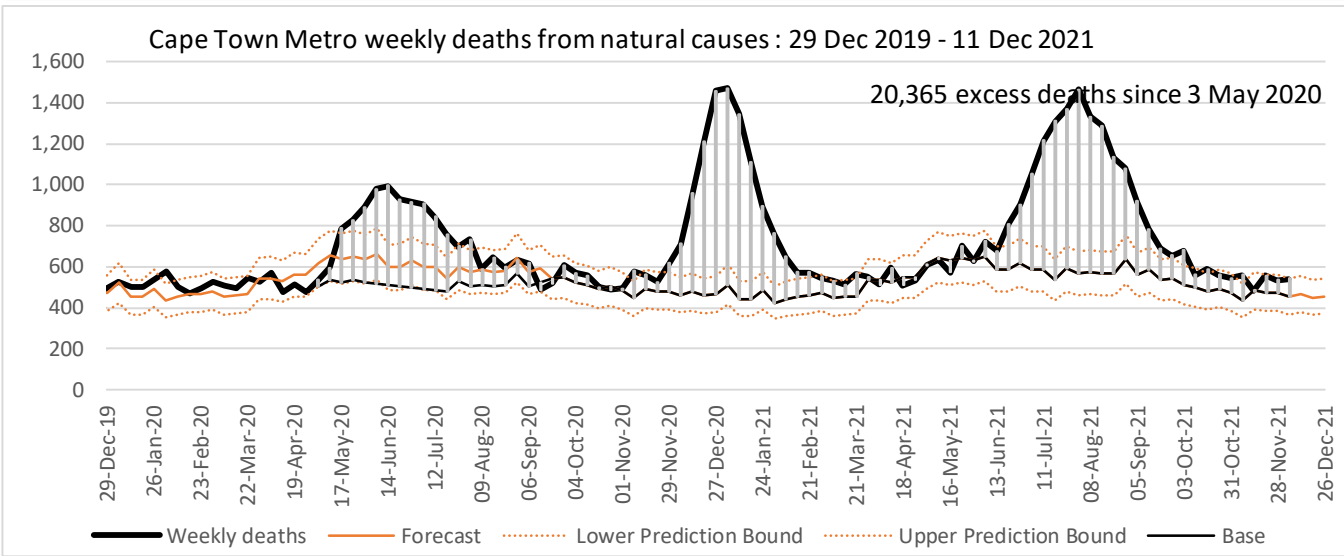
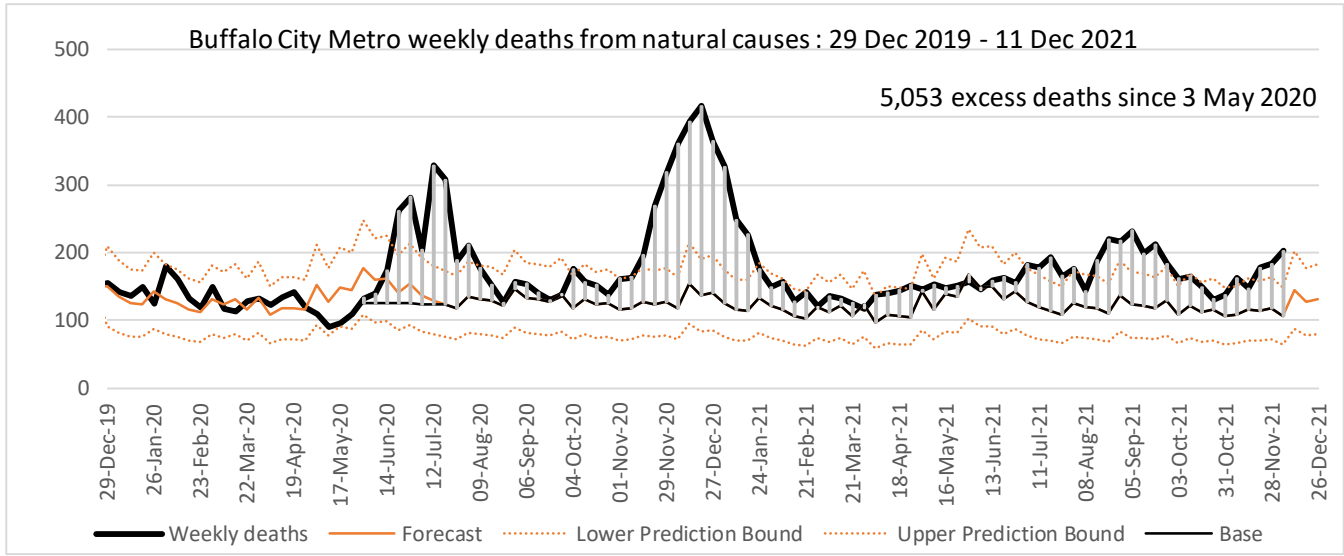
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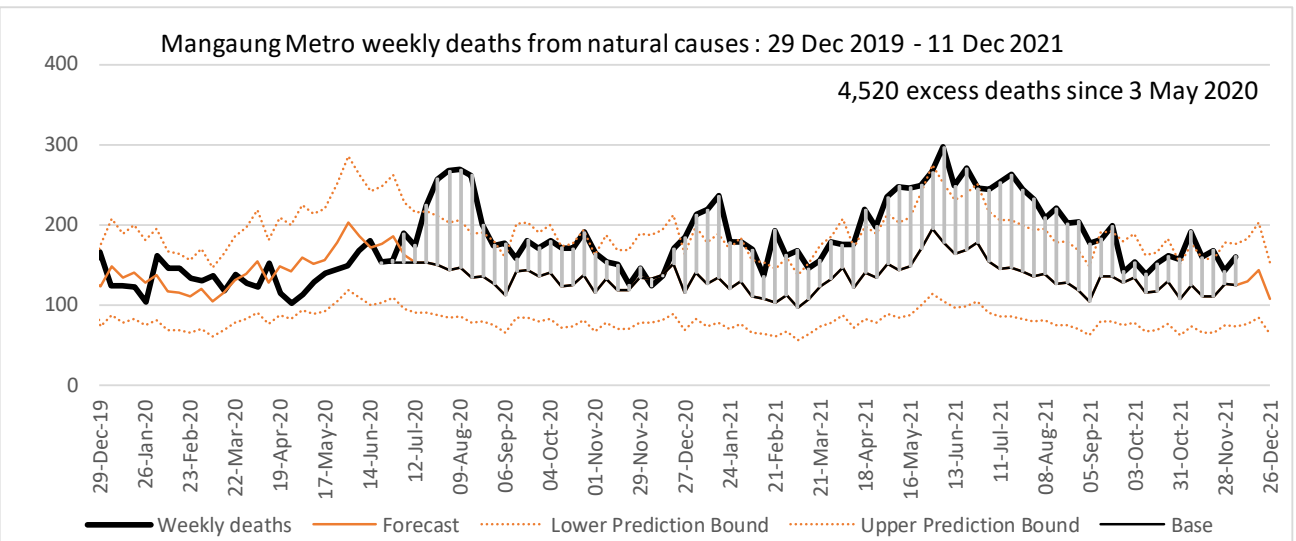
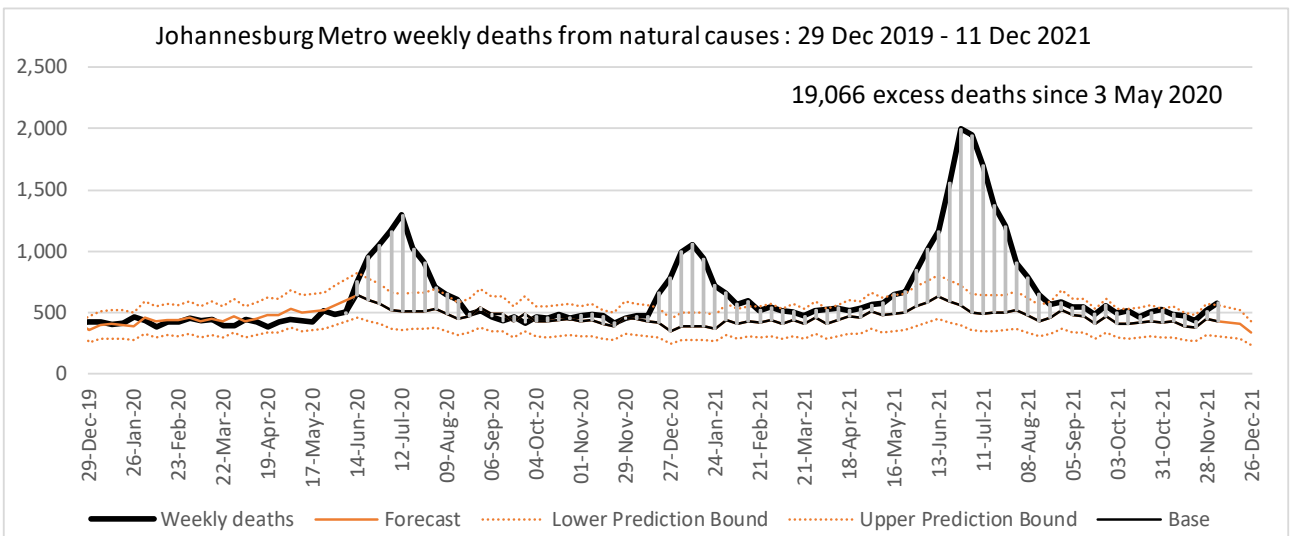
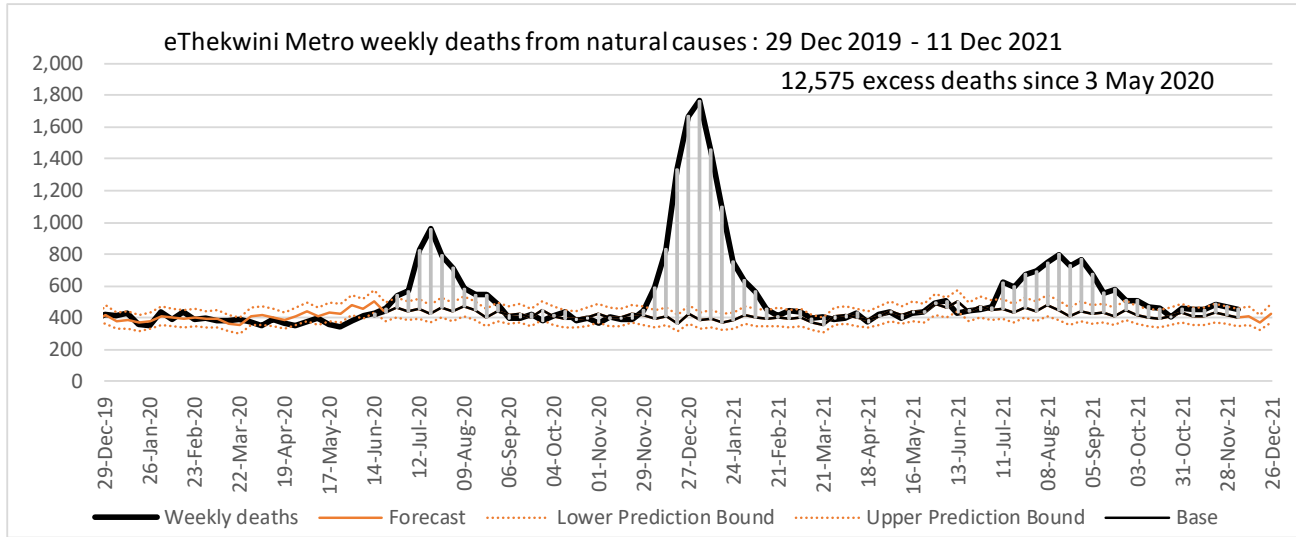
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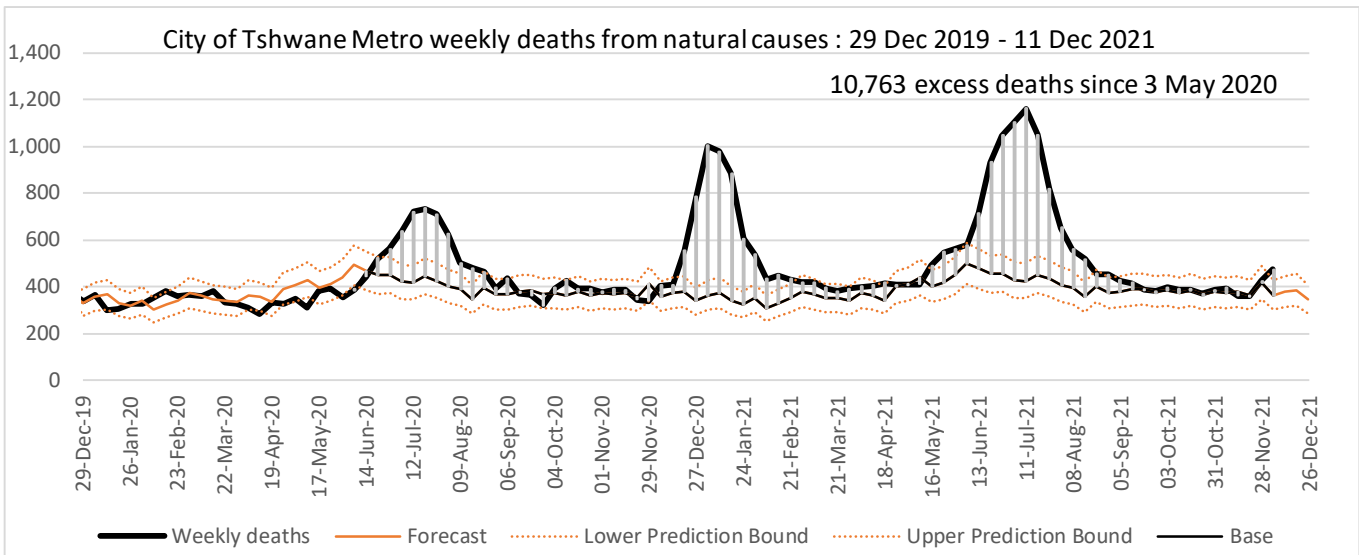
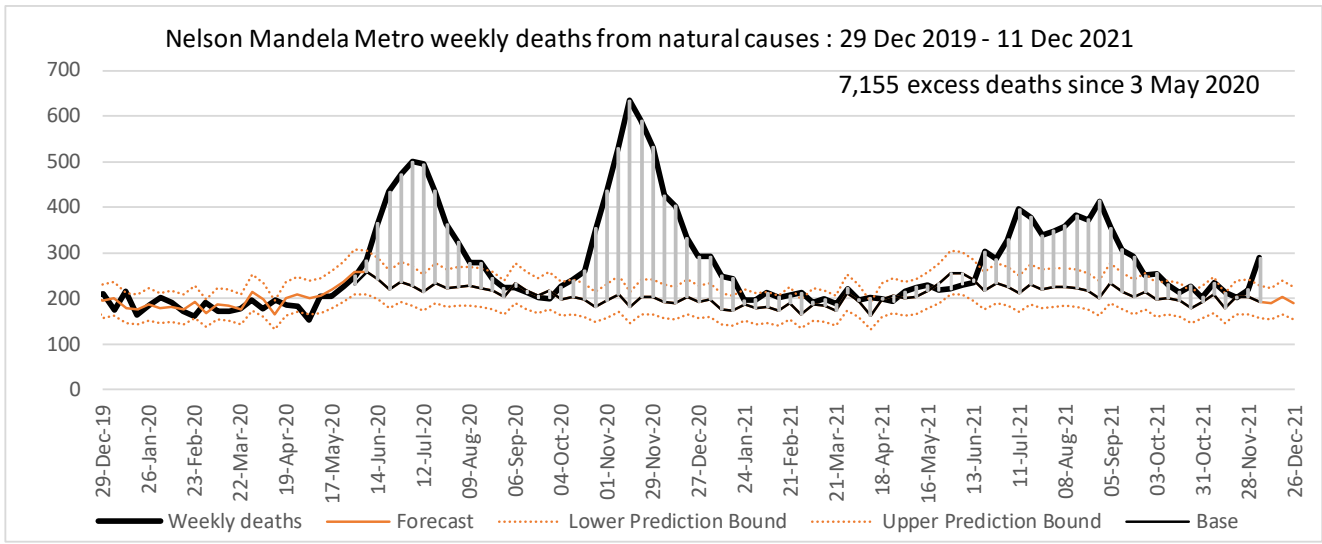
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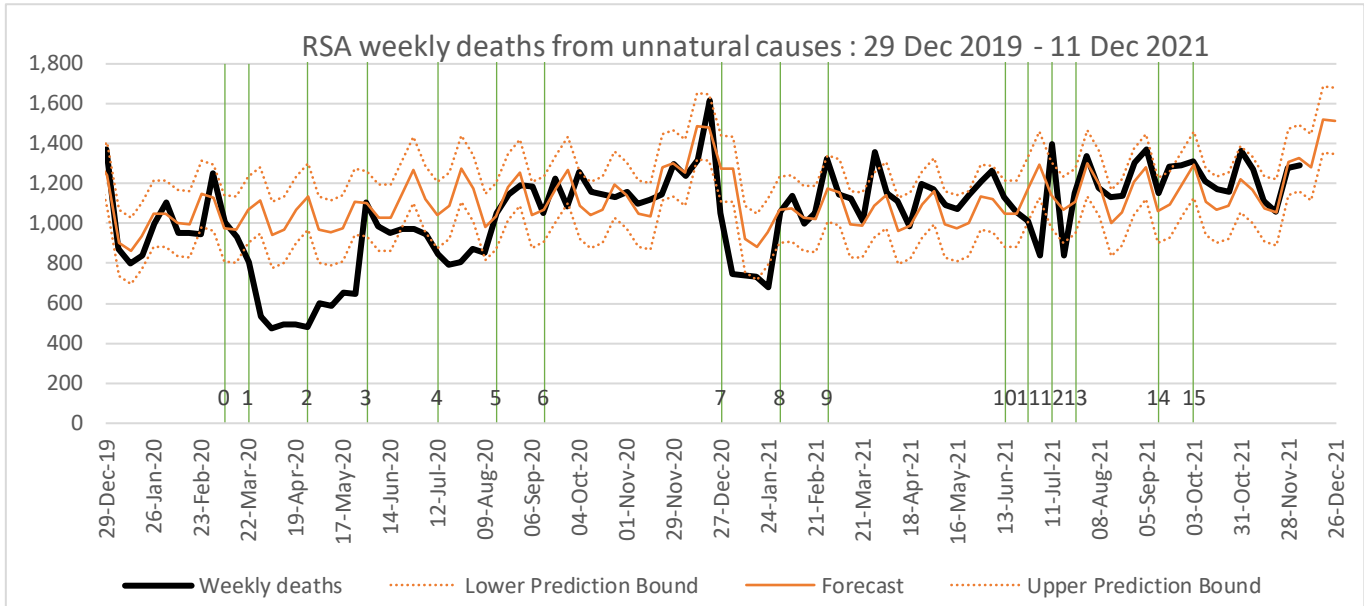
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Numbers have been scaled to the estimated actual number of death and for the last week has been adjusted for delayed registrations. As only a quarter to a third of unnatural deaths in the most recent week are processed at the time of the survey, the estimate for the most recent week is quite uncertain.

Vertical lines in order

- 0 Week Disaster Management Act implemented
- 1 Week lockdown level 5 introduced
- 2 Week lockdown changed to level 4, with curfew
- 3 Week lockdown changed to level 3 including unbanning of alcohol
- 4 Week alcohol re-banned and a curfew re-introduced
- 5 Week lockdown changed to level 2, including unbanning of alcohol
- 6 Week lockdown changed to level 1
- 7 Week lockdown changed to level 3 advanced (re-banning alcohol and a extension of curfew)
- 8 Week lockdown relaxed to allow sale of alcohol 4 days/week and reduce curfew
- 9 Week lockdown relaxed to allow sale of alcohol except during curfew and reduce curfew to midnight to 4am
- 10 Week lockdown changed to level 3 advanced (limiting alcohol and a extending of curfew)
- 11 Week lockdown changed to level 4, with re-banning of alcohol, curfew 9pm-4am
- 12 Week of unrest in KZN and GT
- 13 Week lockdown changed to level 3 advanced (alcohol 4 days/w, curfew 10pm-4am)
- 14 Week lockdown changed to level 2 advanced (alcohol 5 days/w, curfew 11pm-4am)
- 15 Week lockdown changed to level 1 advanced (no alcohol post 11pm, curfew 12pm-4am, large gatherings)