

COVID-19 Recovery Committee

4th Meeting, 2022 (Session 6), Thursday, 3 February 2022

Modelling the epidemic in Scotland

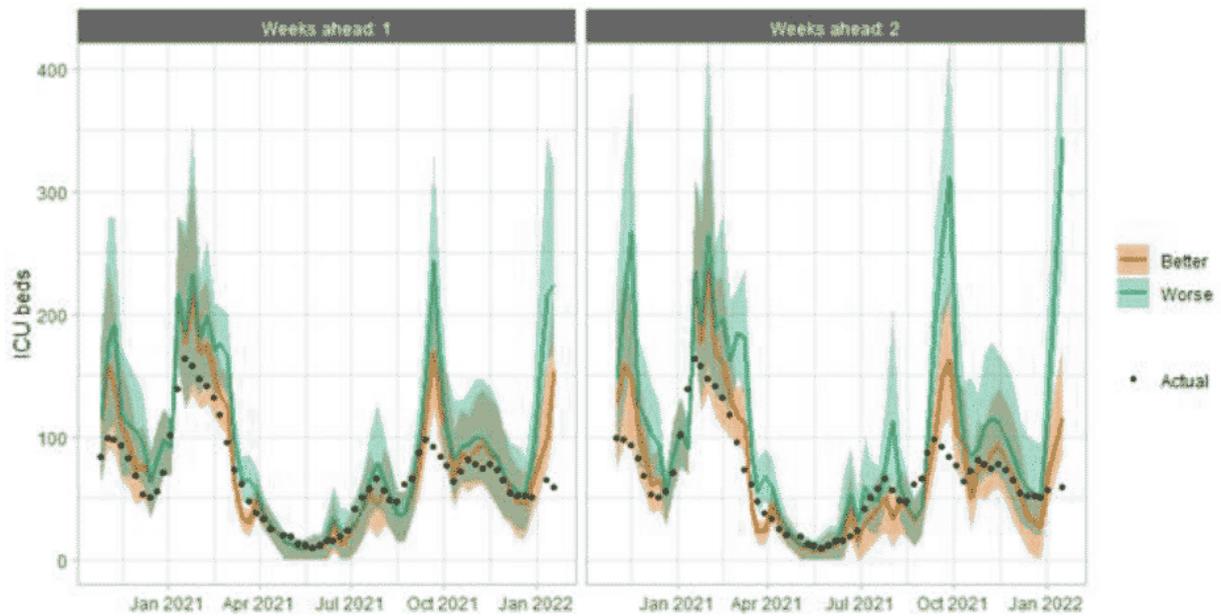
This note looks at how the Omicron variant has been modelled in Scotland

Overview of the performance of modelling

By the end of January 2022, the Scottish Government had [published 87 separate reports setting out its Covid modelling assumptions and results](#). These set out the results of modelling, as well as some of the underlying assumptions and underpinning data, for example from contact surveys, and from samples of wastewater. The [most recent modelling report](#) (27 January 2022) looked back at how well the SG modelling had performed compared to estimate of the actual data. Some of the points made by the government were that:

- Overall the actual **number of infections** were largely within the ranges modelled throughout 2021. However, there were some variations and for example, at the start of the year, the actual infections were higher than expected in the modelling due to the effects of the Alpha variant
- The actual **number of hospital beds** has been in general within model ranges.
- The actual **number of ICU beds** has in general been within model ranges. There is however a period in October 2021 where the number of ICU beds were lower than expected. This also occurred at the end of December 2021 when Omicron was dominant (see chart below.)

Figure 5. ICU bed projections versus actuals, for historical projections published between one and two weeks before the actual data came in.



Scottish Government Omicron in Scotland: evidence paper: 11 December 2021

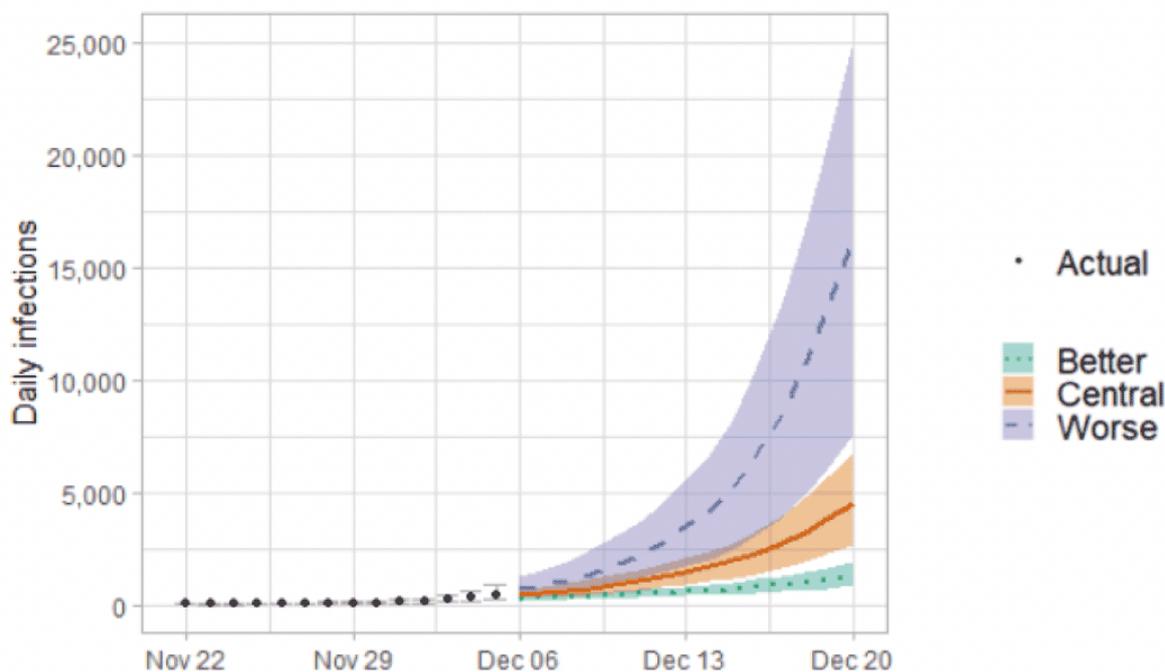
The Scottish Government produced [an evidence paper in early December](#), which set out its understanding of the new variant at that time. Amongst its conclusions were that:

“Based on data to 6th December, we can estimate a doubling time for Scotland of between 2.18 - 2.66 days” ... “Omicron is likely to make up the majority of cases in Scotland between mid-December and early January 2022”

The chart below sets out the government’s understanding of the **possible number of Omicron infections** over the next two weeks, at that time.

Figure 6: Medium term projections of modelled total new daily Omicron infections, adjusting SGTF positive tests to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 6th

December



The government said the implications of this were that:

- “Omicron is spreading at a rate that threatens a rapid and large surge of COVID-19 cases. Even if the resulting illness is relatively mild the number of cases could potentially cause great disruption to other services, in the economy and businesses, and in wider society, as more people would be absent from work due to illness and asked to isolate if they test positive, or as contacts of someone who has tested positive.
- “It also means that the rapid rise in Omicron infections could put significant additional pressure on hospitals and other health and care services, close to the point in the winter when they are already likely to be at peak pressure”.

Scottish Government *modelling the epidemic reports*

Below, are some of the key results of the modelling, **particularly in relation to the growth and impact of Omicron**. Further detail and associated caveats and explanations are set out in each report

The [December 2nd report 80](#) said that at this point

“It is too soon to take account of the potential impact of Omicron within the modelling presented in this report. Therefore, projections included are based on Delta only. In the coming weeks we hope to have further data to enable us to model the impact of Omicron with some degree of confidence.”

The [10 December report 81](#) included some of the same analysis for Omicron as set out in the evidence paper described above. This report also included projections for hospitalisations and deaths, but these were explicitly based on the available evidence **for Delta only**, (the central projections show a downward path for hospitalisations and ICU demand up to December 20th (figures 6/7) with SPI-M projections showing a continuation of that trend over a longer period (figures 8/9).

The [17 December report 82](#) said that

“Infections are rising and the number of infections are expected to continue to rise in the coming weeks as Omicron becomes more dominant. In three weeks' time we estimate that daily infections may be between 15,000 and 130,000”

And also that

“At the present time, due to the lag between infections and hospitalisations, only infections figures are provided ... We hope to be able to provide hospital occupancy and ICU in future weeks.”

In its last report of the year, the [23 December report 83](#) still showed a wide possible range of numbers of infections (although slightly narrower than the previous week), and said:

“Infections are rising and the number of infections are expected to continue to rise in the coming weeks as Omicron becomes more dominant. In three weeks' time we estimate that daily infections may be between 18,000 and 110,000 based on the effect of the new interventions announced on 14th and 21st December, and booster take up”.

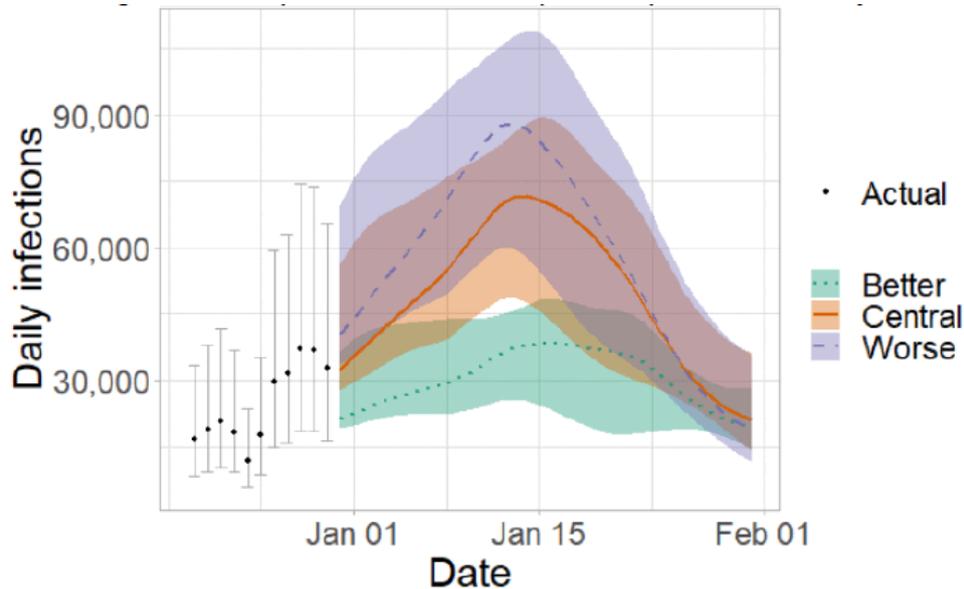
However, consensus projections for hospital admissions and deaths were not available:

“Due to uncertainty surrounding the characteristics of the Omicron variant and its increasing prevalence across the UK, SPI-M-O has been unable to produce consensus medium-term projections for hospital admissions and deaths this week”.

In the new year, the [7 January 2022 report 84](#) provided data for total combined daily infections (including Omicron and Delta), and took the projections to the end of January. The report said

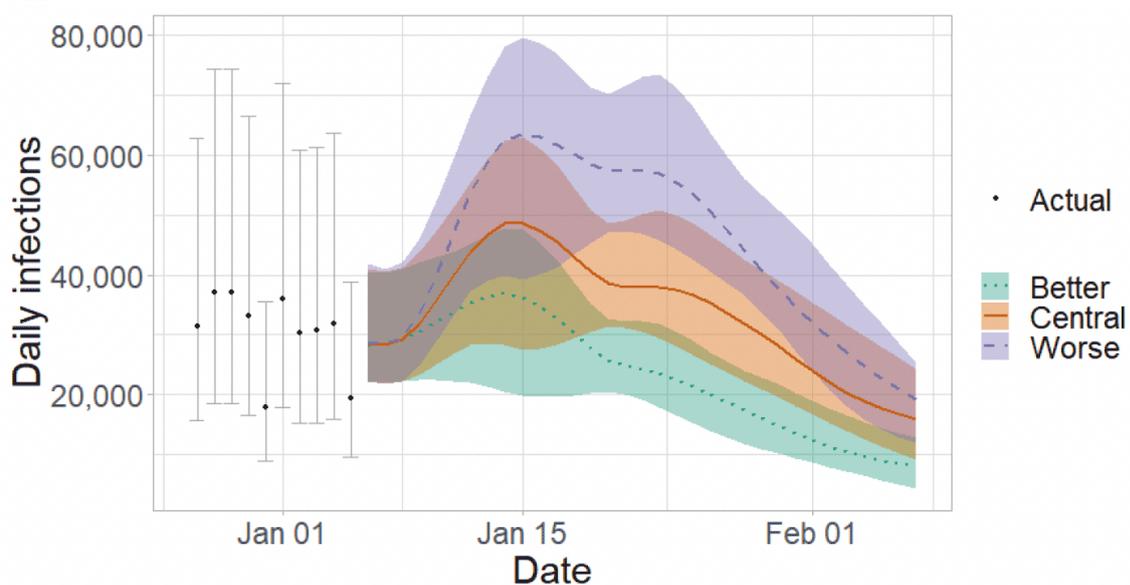
“We estimate that daily infections may be between 25,000 and 110,000 by mid-January. In two weeks, we estimate that daily hospital admissions will be between 400 and 770, and daily deaths will be between 5 and 92”

Figure 12. Medium term projections of modelled total new combined daily infections in Scotland, adjusting positive tests to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 2nd January 2022



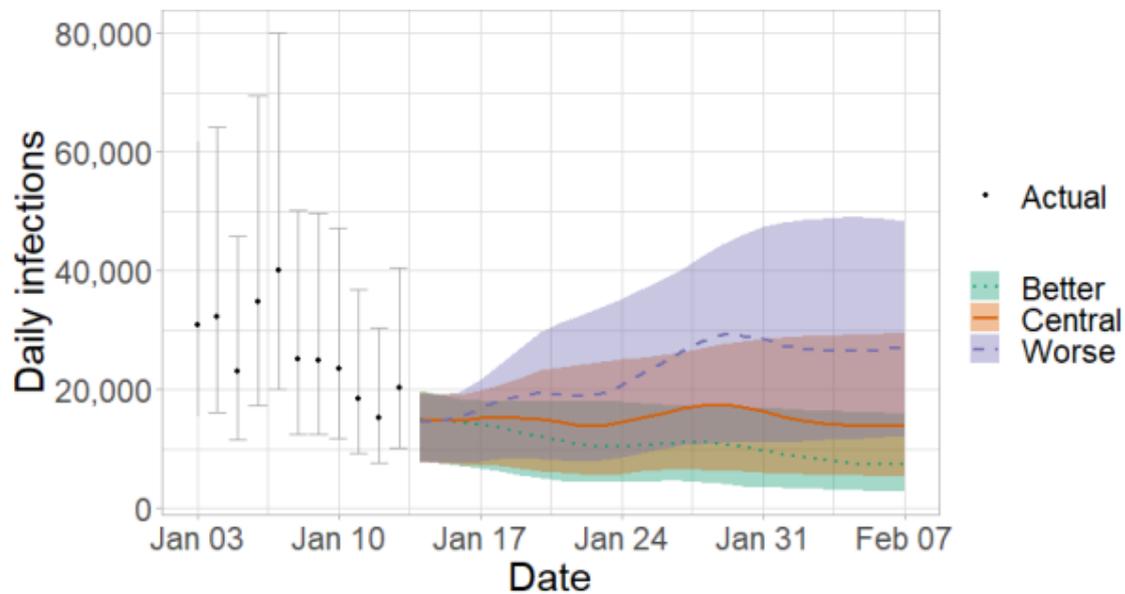
The [13 January report 85](#) had the same analysis as the previous week, though updated, and the projected number of infections ran into February. The estimate for daily infections was “between 20,000 and 80,000 by mid-January. By 7th February daily infections are estimated to be between 5,000 and 26,000” and that generally, “hospitalisations, hospital occupancy and deaths are rising and are expected to continue to rise”

Figure 9: Medium term projections of modelled total new combined daily infections in Scotland, adjusting positive tests to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 5th January 2022



The [report of 21 January 2022](#) includes an estimate of daily infections may be between 5,000 and 50,000 in early February

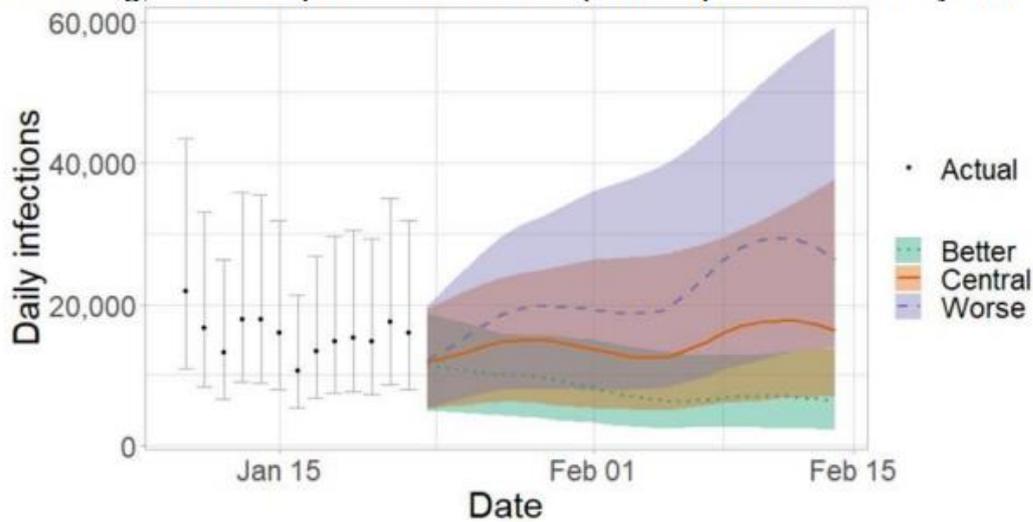
Figure 10. Medium term projections of modelled total new combined daily infections in Scotland, adjusting positive tests⁵ to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 17th January 2022



Finally, [the most recent report \(of 28 January 2022\)](#) indicated that

- The future trajectory of infections, hospitalisations, hospital occupancy and deaths is highly uncertain; some Delta infections may also continue. We estimate that daily infections may be between 5,000 and 60,000 in mid-February. This includes the impact of the interventions announced on 14th and 21st December; those announced as being lifted from 17th, 24th and 31st January; and booster take up.

Figure 19. Medium term projections of modelled total new combined daily infections in Scotland, adjusting positive tests²⁶ to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 24th January 2022.



Modelling Omicron – early data from England

In early December there was considerable uncertainty about Omicron. [This paper](#) (11 December 2021) which described itself as “a work in progress”, modelled the potential consequences of Omicron in England (London School of Hygiene & Tropical Medicine and Stellenbosch University). The paper described a number of scenarios, and also said “Due to a lack of data, we assume Omicron has the same severity as Delta. If Omicron exhibits lower severity than Delta, this would decrease the projected number of severe outcomes in our model.”

The paper’s summary includes the following results:

“In all four main scenarios, we model a policy of compulsory mask wearing in shops and on public transport from 30th November 2021, as well as introducing “Plan B” measures from 12th December 2021. Under these control measures, our most optimistic scenario projects peak daily hospital admissions of 2,400 (95% projection interval: 1,700–3,600) in England occurring in January 2022. Our most pessimistic scenario projects peak hospital admissions of approximately twice the size of the January 2021 peak....

...These results suggest that Omicron has the potential to cause substantial surges in cases, hospital admissions and deaths in populations with high levels of immunity, including England. The reintroduction of additional non-pharmaceutical interventions may be required to prevent hospital admissions exceeding the levels seen in England during the previous peak in winter 2020–2021.”

Figure 2 in the paper set out a number of scenarios and included projections of deaths in England due to Omicron from 1 December 2021 to 1 April 2022 of between 24,700 and 74,800.

In an [update \(23 December 2021\)](#) the authors identified new evidence and said

“A new paper released on 22nd December 2021 by Imperial College ([Report 50](#)) shows that A&E visits among Omicron cases are reduced by 30–40% relative to Delta. This could translate into a baseline severity for Omicron of 60–70% relative to Delta which would scale our projections for severe outcomes down by 30–40%.”

Simon Wakefield SPICe Research,

2 February 2022

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