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COVID-19

Evidence paper to accompany: Scotland's Strategic Framework Update

February 2022

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Evidence paper to accompany: Coronavirus (COVID-19) Scotland's Strategic Framework Update – February 2022

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1. Outline of the paper

The purpose of this evidence paper is to provide an overview of the key analysis and evidence underpinning the latest refresh of the Strategic Framework.

The paper is split into two main sections. The first section establishes the current position across all four harms as previously identified in the December 2020 paper "Framework for decision making – assessing the four harms of the crisis"[1]. The second section of the paper looks forward presenting the latest evidence underpinning the approaches proposed in the updated Strategic Framework for managing the epidemic as it moves into the next stage. It then sets out 4 plausible futures to illustrate how the future may unfold. Finally the paper considers how the epidemic could be monitored and reported in the future.

2. Where we are now

2.1 Introduction

This section starts off by describing the pattern of the epidemic since November 2021, the date of the last Strategic Framework update. It then considers the impact of new variants, recent changes in testing practice and the range of measures applied in Scotland to reduce the impact of Omicron.

The analysis continues to set out the current position regarding health and social care, society and the economy to complete the 4 harms analysis.

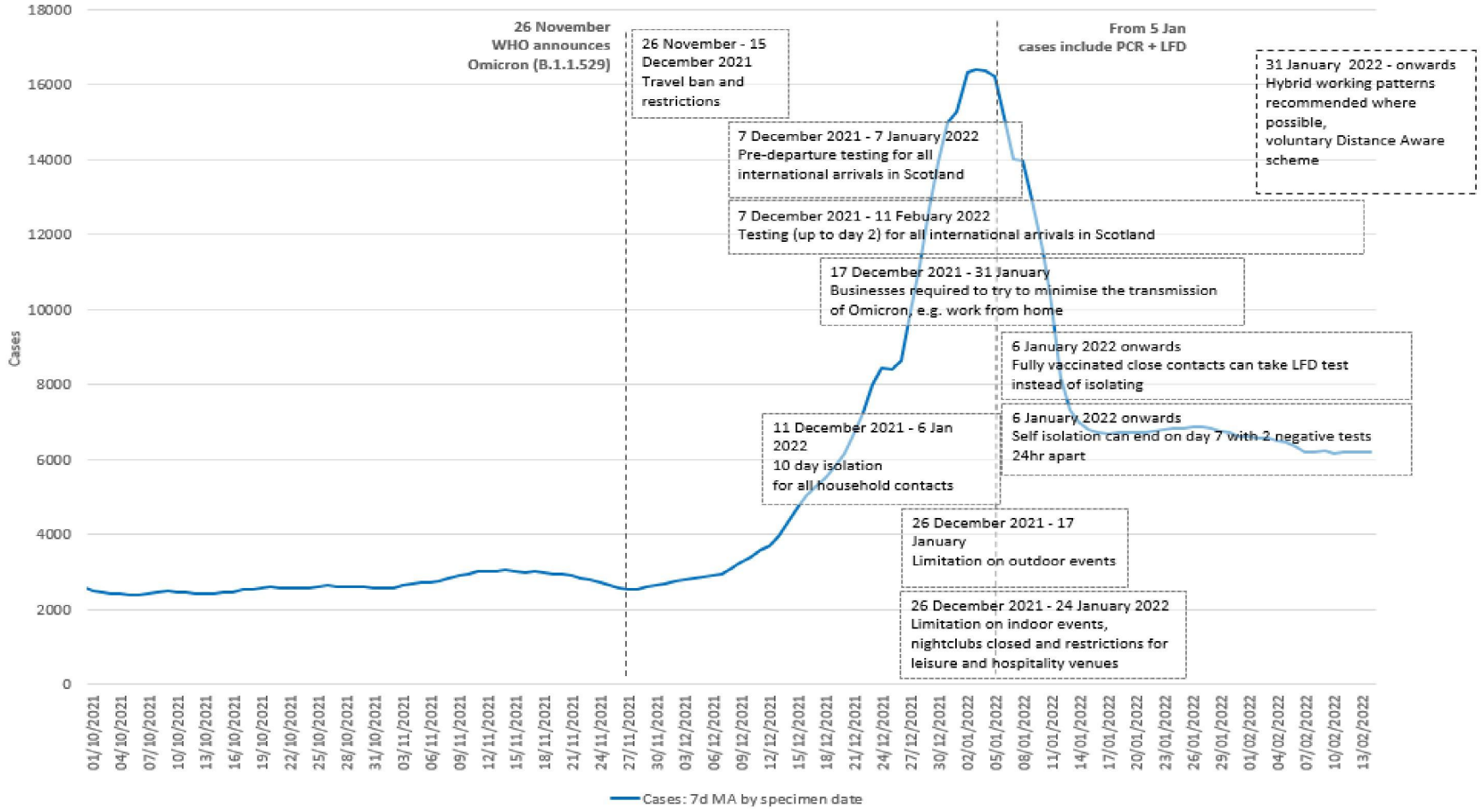
2.2 The pattern of the epidemic since November 2021

The November publication of the Strategic Framework followed a period of fairly level number of cases which fluctuated throughout the month of October 2021, see Figure 1.

The average number of PCR (polymerase chain reaction) confirmed cases each day remained fairly level throughout November, see Figure 1. By 30 November 2021 there was an average of 2,656 PCR confirmed daily cases by specimen date. Omicron was first reported in Scotland on 29 November 2021 (based on a sample from 23 November)[2] and became the dominant strain on 17 December. Throughout December cases rapidly increased to a peak on 3 January 2022 of 16,407 (7-day average) PCR confirmed cases per day by specimen date. This peak was considerably higher than previous peaks in September 2021 (6,439 average daily PCR cases) and July 2021 (3,318 average daily PCR cases).

[1] Coronavirus (COVID-19): framework for decision making - assessing the four harms - gov.scot (www.gov.scot)
[2] Omicron variant - gov.scot (www.gov.scot)

Figure 1: Number of new cases of COVID-19 in Scotland per day: October 2021 to February 2022[3]



[3] COVID-19 Daily Dashboard | Tableau Public

On 5 January 2022, the Scottish Government announced[4] that people who do not have symptoms of COVID-19 would no longer be asked to take a PCR test to confirm a positive Lateral Flow Device (LFD) result. Instead, anyone with a positive LFD, who does not have symptoms, is required to report the result online as soon as the test is done. This means that those without symptoms who previously would have taken a confirmatory PCR test, no longer do so. Data has been updated to reflect the new case definition for those who have recorded a first positive PCR or LFD from 5 January 2022, see Figures 1 and 4.

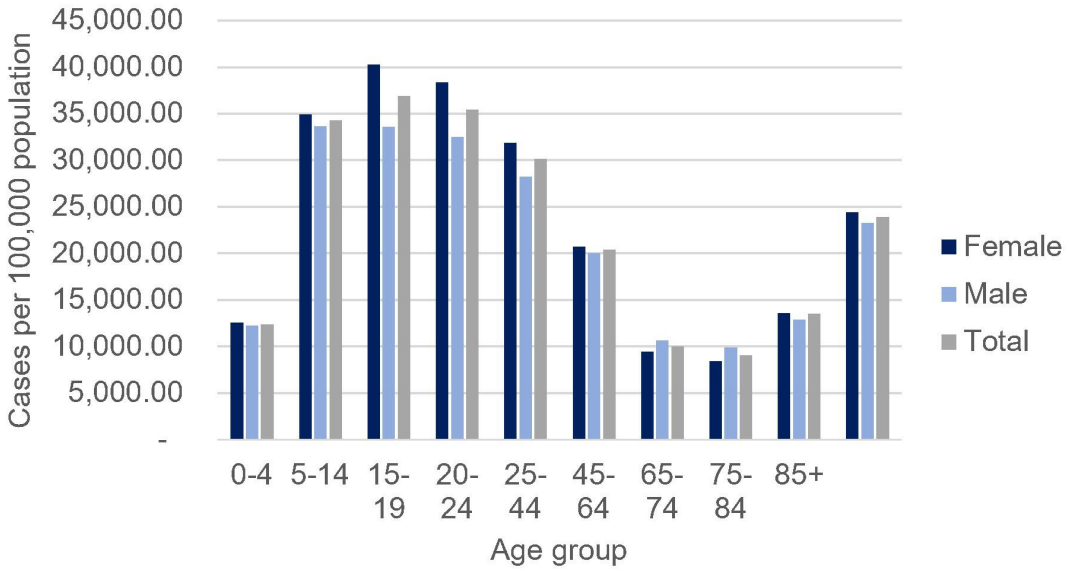
Since the peak in early January 2022 there has been a decreasing trend in both PCR confirmed cases and in PCR and LFD cases reported to mid-January. The seven-day average number of combined PCR or LFD daily cases has levelled off since around 18 January, with a slight overall decrease in the most recent two weeks, see Figure 4. The Covid-19 Infection Survey also shows that the number of people in the private residential population testing positive for COVID-19 decreased from a peak on 3 and 4 January 2022 and then fluctuated from mid to late January[5].

Since November 2021, those aged 60 and over have consistently had lower case rates, than those aged under 60. The peak in case rates in early January 2022 was largely driven by those in the 20-39 age group, followed by those aged 40-59 and those aged under 20[6]. PCR and LFD case rates have levelled off for those aged 25 and over since mid-January, and have remained at similar levels with minor fluctuations throughout the weeks. Among those aged 19 or younger, weekly case rates increased from mid-January, peaking on 26 January. The weekly case rate for this age group has since decreased, but in the week to 12 February the weekly case rate for those aged 16 to 17 remained similar to the previous week[7].

Overall, males and females have typically had a similar case rate, with females having a slightly higher number of cases per 100,000, see Figure 2. Females aged 64 and under tend to have higher levels of Covid case rates than males in the same age groups, and the trend is reversed for those aged 65 to 84. The Equalities Impact Assessment, will be published at a later date and provides more detail on COVID-19 inequalities.

[4] Self-Isolation and testing changes - gov.scot (www.gov.scot)
[5] Coronavirus (COVID-19): infection survey - gov.scot (www.gov.scot)
[6] Coronavirus (COVID-19): state of the epidemic - gov.scot (www.gov.scot)
[7] Coronavirus (COVID-19) state of the epidemic 18 February 2022 - gov.scot (www.gov.scot)

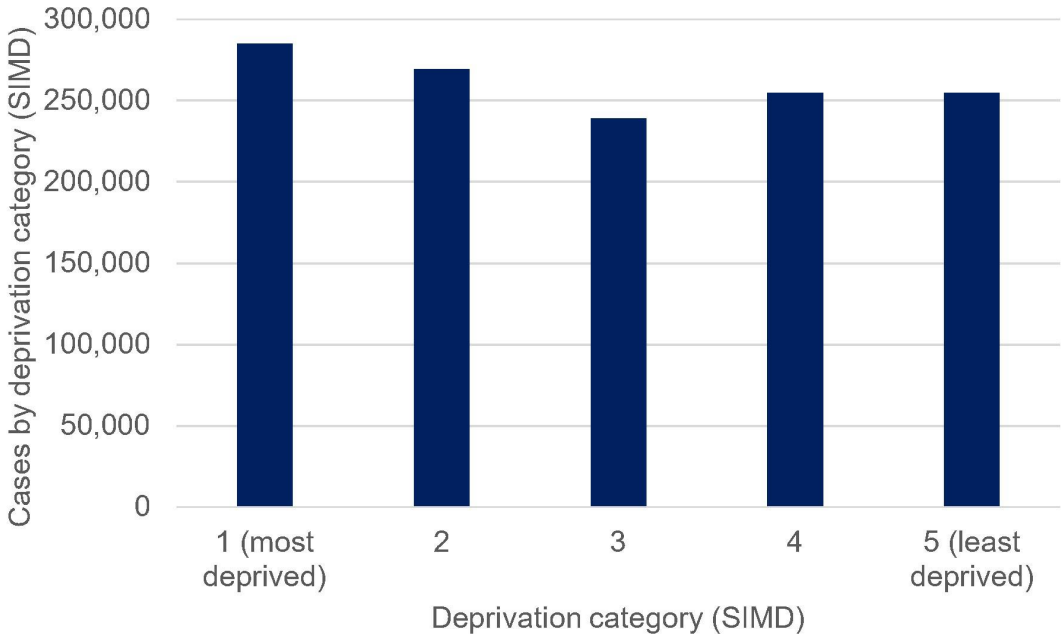
Figure 2: Positive COVID-19 cases per 100,000 population by age (28 February 2020 to 13 February 2022) [8]



Over the course of the pandemic, the total rate of positive cases per 100,000 in Scotland is highest in the most deprived quintile, followed by the second most deprived, see Figure 3.

[8] Dashboard - COVID-19 statistical report - 16 February 2022 - COVID-19 statistical report - Publications - Public Health Scotland

Figure 3: Positive COVID-19 cases by deprivation category (SIMD) (28 February 2020 to 13 February 2022) [9] [10]



The relationship between infections and serious health harms has weakened significantly compared to earlier stages of the pandemic. Serious health harm continues but at much lower levels for a given number of cases than in the past. However, the rapid increase in PCR confirmed cases as a result of the spread of the Omicron variant translated into a high level of COVID-19 hospital admissions, peaking at a seven day average of over 160 per day at the beginning of January 2022. This was at a similar level to the previous peaks in September 2021 (peaking at an average of over 160 per day) and lower than the peak in January 2021 (peaking at an average of over 200 per day), see Figure 4. COVID-19 hospital admissions have continued to decrease since the peak in early January 2022.

In general, throughout the pandemic, older age groups have had the highest COVID-19 admissions to hospital[11]. Those aged 65 and over have had more admissions to hospital per 100,000 compared to the average for all ages (899 admissions per 100,000), while those aged 85 and over have had over 5,400 admissions to hospital per 100,000.

Overall, through the course of the pandemic, males and females have typically had a similar hospital admissions rate, with males having a slightly higher number of COVID-19 related hospital admissions per 100,000. Females aged between 5 and

[9] Dashboard - COVID-19 statistical report - 16 February 2022 - COVID-19 statistical report - Publications - Public Health Scotland
[10] Based on the Scottish Index of Multiple Deprivation (SIMD): Scottish Index of Multiple Deprivation 2020 - gov.scot (www.gov.scot)
[11] Dashboard - COVID-19 statistical report - 16 February 2022 - COVID-19 statistical report - Publications - Public Health Scotland

44 have tended to have higher levels of admissions than males in the same age groups, and the trend is reversed for those aged 45 and over[12].

COVID-19 admissions to hospital have also been highest for those in the most deprived quintile, and lowest for those in the least deprived quintile[13] [14]. The latest data available shows that as at 30 September 2021, compared to White Scottish, rates of hospitalisation or death were estimated to be around 4-fold higher in Pakistani and Mixed groups, and around 2-fold higher in Indian, Other Asian, Caribbean or Black, and African groups. Higher rates were also observed in White Other. Lower rates were observed in patients recorded as White Irish[15] [16].

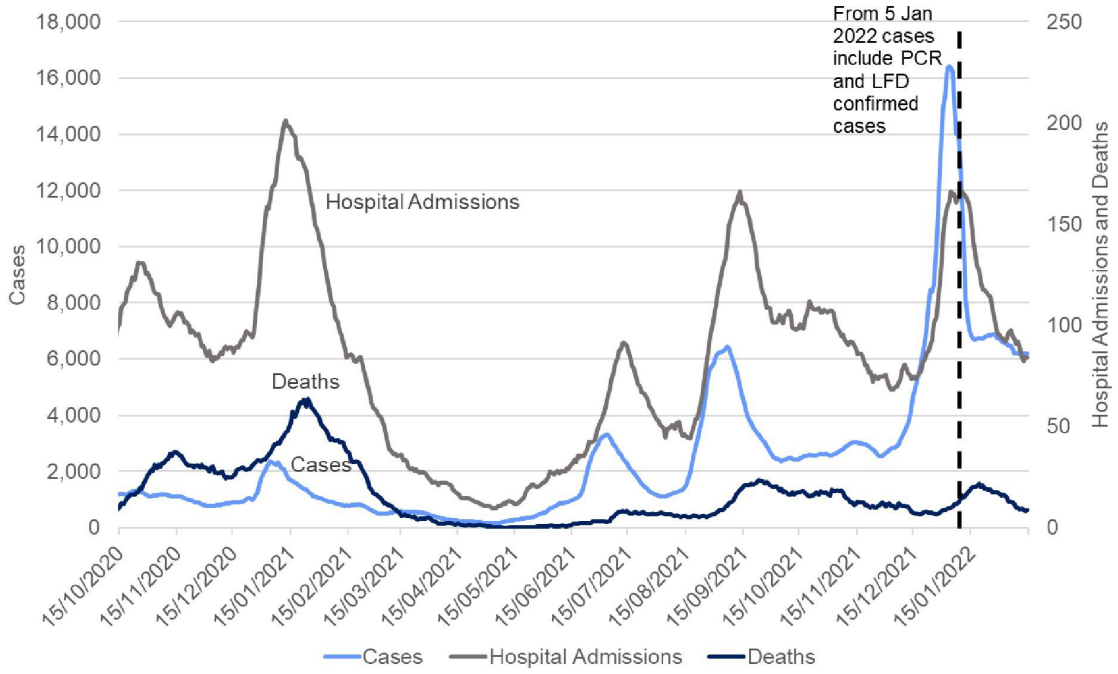
In the past four weeks, from 8 January 2022 to 4 February 2022, the age-standardised rate of hospital admissions per 100,000 were 2.9 to 3.8 times lower in individuals with their third dose or booster dose of vaccine compared to unvaccinated individuals or have received one or two doses of a COVID-19 vaccine[17].

Deaths were on a decreasing trend throughout November and December 2021, there was an average of 18 daily deaths in the first week in November, compared to over 8 in the last week in December 2021. Deaths have increased in January 2022 to over 21 deaths per day on 19 January 2022 and have since decreased, see Figure 4.

Throughout the pandemic, deaths involving COVID-19 have been highest for those aged 75 and over[18]. From the start of the vaccination programme, there have been 6,268 confirmed COVID-19 related deaths with a positive PCR result and where COVID-19 was recorded as an underlying or contributory cause on the death certificate[19]. In the week from 29 January to 4 February 2022, 74 individuals tested positive for COVID-19 more than fourteen days after receiving their booster or third dose of vaccine and subsequently died with COVID-19 recorded as underlying or contributory cause of death. The majority of these individuals had several comorbidities which contributed to their deaths and the mean age was 82 years old[20].

[12] COVID-19 & Winter Statistical Report (publichealthscotland.scot)
[13] COVID-19 Daily Dashboard | Tableau Public
[14] Based on the Scottish Index of Multiple Deprivation (SIMD): Scottish Index of Multiple Deprivation 2020 - gov.scot (www.gov.scot)
[15] Public Health Scotland COVID-19 Statistical Report
[16] This release includes analysis of 34,199 COVID-19 related admissions and deaths where ethnic group was available. For more details on the methodology please see Public Health Scotland COVID-19 Statistical Report
[17] COVID-19 & Winter Statistical Report (publichealthscotland.scot)
[18] Deaths involving coronavirus (COVID-19) in Scotland | National Records of Scotland (nrscotland.gov.uk)
[19] COVID-19 & Winter Statistical Report (publichealthscotland.scot)
[20] COVID-19 & Winter Statistical Report (publichealthscotland.scot)

Figure 4: COVID-19 case numbers, hospital admissions and deaths.[21] [22] [23]



In response to Omicron, the booster vaccination roll out was scaled up during November and December, see Figure 5. In line with advice from the Joint Committee on Vaccination and Immunisation (JCVI), a booster dose or a third dose of the vaccine is now available in Scotland, including all adults aged over 16 for whom it has been at least 12 weeks since their second dose[24]. Over 3.3 million people (70.6% of those over 12 years of age) have received their dose 3 or booster vaccine by 18 February 2022[25]. Antibody data indicates that Scotland's COVID-19 antibody levels in adults have remained high[26].

Booster vaccine uptake is at least 92% amongst both males and females aged 60 or over, and around 90% for those aged 55 to 59. However, there is a difference between male and female vaccine uptake among those aged between 18 and 49 with females showing a higher uptake compared to males[27]. The analysis shows that

[21] Seven-day moving averages of cases by specimen date and reporting date (left-hand axis) and deaths and hospitalisation (right-hand axis). Source: Public Health Scotland, data available at: Weekly COVID-19 Statistical Data in Scotland - Datasets - Scottish Health and Social Care Open Data (nhs.scot)

[22] Cases data includes Lateral Flow Device (LFD) test results from 5th January 2022 to reflect the revised testing strategy. A case is now defined as a person's first LFD or PCR positive test.

[23] Seven-day moving averages of cases by specimen date (left-hand axis) and deaths and hospitalisation (right-hand axis). Data up to 12/02/2022. Source: https://www.opendata.nhs.scot/dataset/covid-19-in-scotland/resource/2dd8534b-0a6f-4744-9253-9565d62f96c2 and Coronavirus (COVID-19): trends in daily data - gov.scot (www.gov.scot)

[24] Coronavirus (COVID-19) booster vaccination | The coronavirus (COVID-19) vaccine (nhsinform.scot)

[25] Public Health Scotland COVID-19 dashboard: https://public.tableau.com/profile/phs.covid.19#!/vizhome/COVID-19DailyDashboard_15960160643010/Overview

[26] Coronavirus (COVID-19) Infection Survey, antibody and vaccination data, UK - Office for National Statistics

[27] State of the Epidemic in Scotland – 21 January 2022 (www.gov.scot)

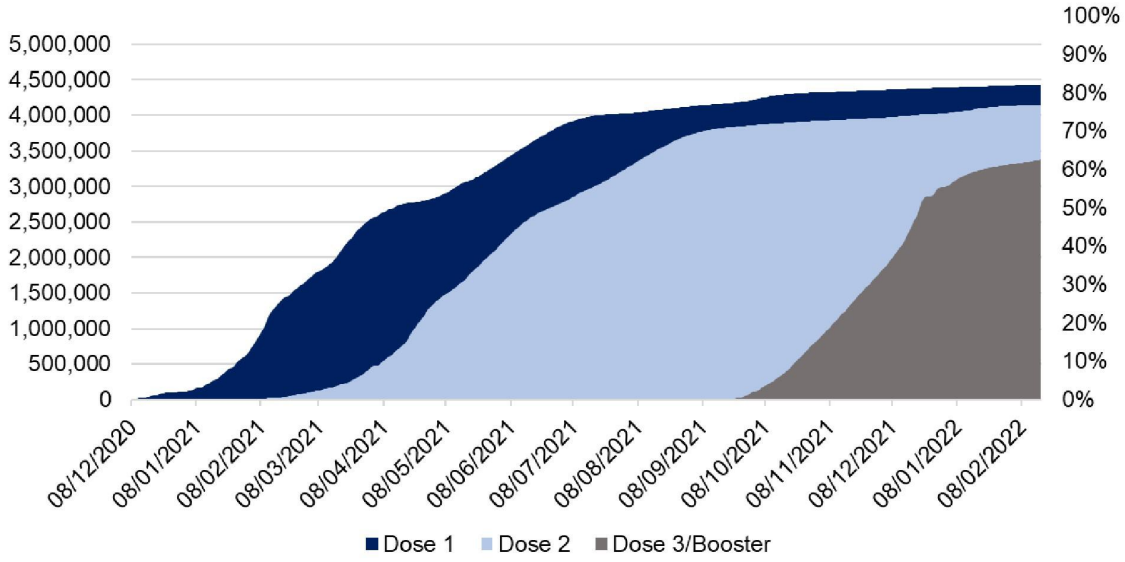
across all age groups, vaccination uptake for the third or booster dose has been the highest among White ethnic groups. Vaccine uptake was lowest in African ethnic groups, except for those aged 40 to 49 and 50 to 54 years. In these two age groups, vaccination uptake was the lowest among the Caribbean or Black group. There is variation across age within each ethnic group, with higher uptake in older age groups. These trends mirror the uptake of the second dose of the vaccine, as the third or booster dose relies on previous doses being administered.

In their report published on 2 February 2022[28], Public Health Scotland (PHS), provided an analysis on vaccination equality in Scotland[29]. Vaccination data are from 8 December 2020 to 30 January 2022, and the analysis contains comparisons by ethnicity and socio-economic deprivation by age bands. These analyses highlight differences in uptake between demographic groups and areas, but they do not examine causative factors for the inequalities, which will be numerous and complex.

In the four weeks from 8 January 2022 to 4 February 2022, in an age-standardised population, the death rate in individuals that received a booster or third dose of a COVID-19 vaccine was between 4.6 and 9.5 times lower than individuals who are unvaccinated, or have only received one or two doses of a COVID-19 vaccine.[30] [31]

[28] Public Health Scotland COVID-19 & Winter Statistical Report
[29] Uptake rates presented in the analysis use different denominators than those in the Public Health Scotland COVID-19 Daily Dashboard and will show lower rates than the daily publication. The estimates used to calculate population denominators by ethnicity and deprivation are from the CHI registration and may over-estimate the population size as they will include, for example, some individuals no longer resident in Scotland who have not deregistered with a GP in Scotland
[30] in an age-standardised population
[31] COVID-19 & Winter Statistical Report (publichealthscotland.scot)

Figure 5: Total vaccination coverage by day (data to 18 January 2022)[32] [33]



2.3 An overview of Omicron

Omicron was first reported in Scotland on 29 November 2021 from a sample taken on 23 November and it quickly became the dominant variant, with more than half of COVID-19 cases being Omicron on 17 December 2021[34] [35] [36] [37]. It has spread rapidly around the world and caused large waves of infections in many countries[38].

Omicron has a significant growth advantage over Delta, the previous dominant variant in Scotland[39]. Omicron can infect people who have been vaccinated or who have had a previous infection more readily compared to Delta. Omicron has multiple genetic mutations allowing it to evade antibodies and other immune responses developed through vaccination or natural infection[40].

The Office for National Statistics (ONS) estimates the risk of reinfection was 16 times higher in the Omicron-dominant period (20 December 2021 to 9 January 2022) compared with the Delta-dominant period (17 May to 19 December 2021)[41]. The risk of reinfection with Omicron was estimated in a modelling study carried out by

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[32] Public Health Scotland COVID-19 dashboard: https://public.tableau.com/profile/phs.covid.19#!/vizhome/COVID-19DailyDashboard_15960160643010/Overview

[33] From Thursday 11 November 2021, 'booster & dose 3' are combined under one number. Until then, the numbers reported were for booster vaccine.

[34] Omicron variant - gov.scot (www.gov.scot)

[35] Public Health Scotland COVID-19 & Winter Statistical Report (5 January)

[36] Public Health Scotland COVID-19 & Winter Statistical Report (20 December)

[37] Omicron in Scotland - Evidence Paper (www.gov.scot)

[38] Coronavirus (COVID-19) Cases - Our World in Data

[39] *12 January 2022 Risk assessment for SARS-CoV-2 variant: Omicron VOC-21NOV-01 (B.1.1.529) (publishing.service.gov.uk)

[40] *12 January 2022 Risk assessment for SARS-CoV-2 variant: Omicron VOC-21NOV-01 (B.1.1.529) (publishing.service.gov.uk)

[41] Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK - Office for National Statistics

Imperial College London, where results suggested that due to the immune evasion properties of Omicron, protection against infection reduced to 19%[42].

However, Omicron infections are generally less severe and less likely to result in hospital admission than Delta[43] [44] [45]. Preliminary data from the UK Health Security Agency (UKHSA) indicated that the risk of attending hospital or emergency care is estimated at around half for Omicron compared to Delta, and the risk of being admitted from emergency care around one third of Delta[46] [47]. Early data also indicated that the severity of disease once in hospital, assessed by, for example admission to ICU, is lower than observed in early phases of previous waves[48]. The most recent analysis showed that the risk of hospital admission with Omicron compared to Delta varied by age, with similar risk of hospital admission among children aged under 10 years old, with an approximate 75% reduction in the risk of hospital admission among those 60 to 69 years old. The risk of death was approximately 60% lower among Omicron cases compared to Delta[49].

Vaccine effectiveness against symptomatic disease with the Omicron variant is lower compared to the Delta variant and wanes rapidly. Protection against symptomatic disease from two doses of vaccine is very low (10% or less) after 20 weeks. With a booster, vaccine effectiveness varies according to the vaccine administered but ranges from around 60 to 75% two to four weeks after vaccination dropping to between 25-40% after 15 weeks[50], see Figure 6.

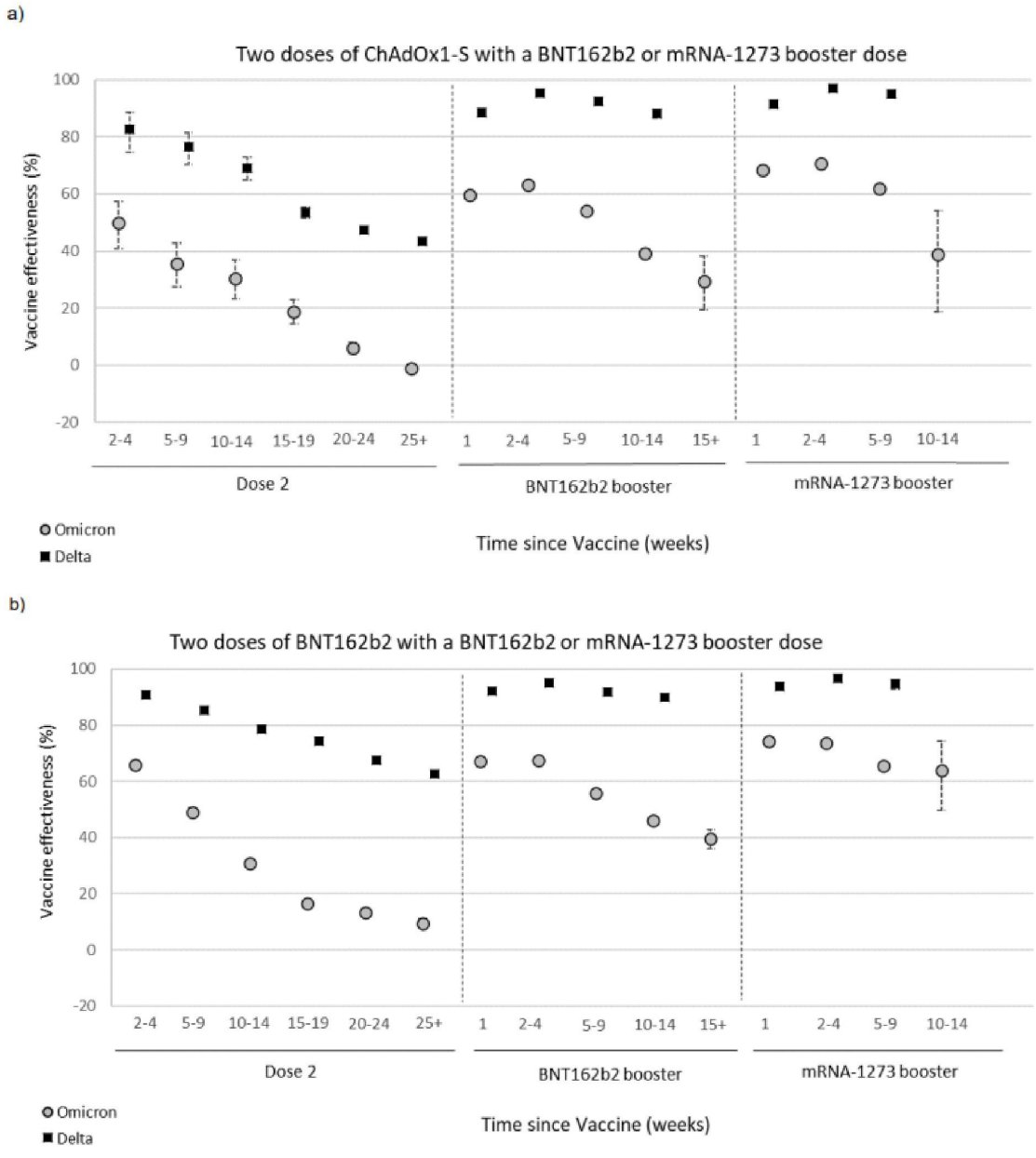
Protection against hospitalisation from vaccination is greater than that against symptomatic disease, in particular after a booster dose, with data showing vaccine effectiveness over 75% 10 to 14 weeks after receiving a Pfizer/BioNTech booster dose. Vaccine effectiveness against hospitalisation remains at 90-95% up to 9 weeks post-vaccination when receiving a Moderna booster dose[51], see Figure 7.

Protection against mortality from vaccination drops to 59% 25 weeks after the second dose. Two weeks after the booster dose protection is restored to 95% for people aged 50 or over[52].

[42] Omicron largely evades immunity from past infection or two vaccine doses | Imperial News | Imperial College London
[43] 12 January 2022 Risk assessment for SARS-CoV-2 variant: Omicron VOC-21NOV-01 (B.1.1.529) (publishing.service.gov.uk)
[44] SARS-CoV-2 variants of concern and variants under investigation- Technical briefing 34 (publishing.service.gov.uk)
[45] SAGE 102 minutes: Coronavirus (COVID-19) response, 7 January 2022 - GOV.UK (www.gov.uk)
[46] *12 January 2022 Risk assessment for SARS-CoV-2 variant: Omicron VOC-21NOV-01 (B.1.1.529) (publishing.service.gov.uk)
[47] SARS-CoV-2 variants of concern and variants under investigation (publishing.service.gov.uk)
[48] *S1476_SAGE_102_minutes.pdf (publishing.service.gov.uk)
[49] SARS-CoV-2 variants of concern and variants under investigation (publishing.service.gov.uk)
[50] COVID-19 vaccine surveillance report - week 6 (publishing.service.gov.uk)
[51] COVID-19 vaccine surveillance report - week 6 (publishing.service.gov.uk)
[52] COVID-19 vaccine surveillance report - week 4 (publishing.service.gov.uk)

Figure 6: Vaccine effectiveness (VE) against symptomatic disease.

VE by period after the second and third (booster) doses for Delta (black squares) and Omicron (grey circles) for a) recipients of 2 doses of Oxford/AstraZeneca (ChAdOx1-S) vaccine as the primary course and Pfizer/BioNTech (BNT162b2) or Moderna (mRNA-1273) as a booster; b) recipients of 2 doses of Pfizer/BioNTech vaccine as the primary course and Pfizer/BioNTech or Moderna as a booster, and c) 2 doses of Moderna as a primary course and Pfizer/BioNTech or Moderna as a booster[53].



[53] COVID-19 vaccine surveillance report - week 6 (publishing.service.gov.uk)

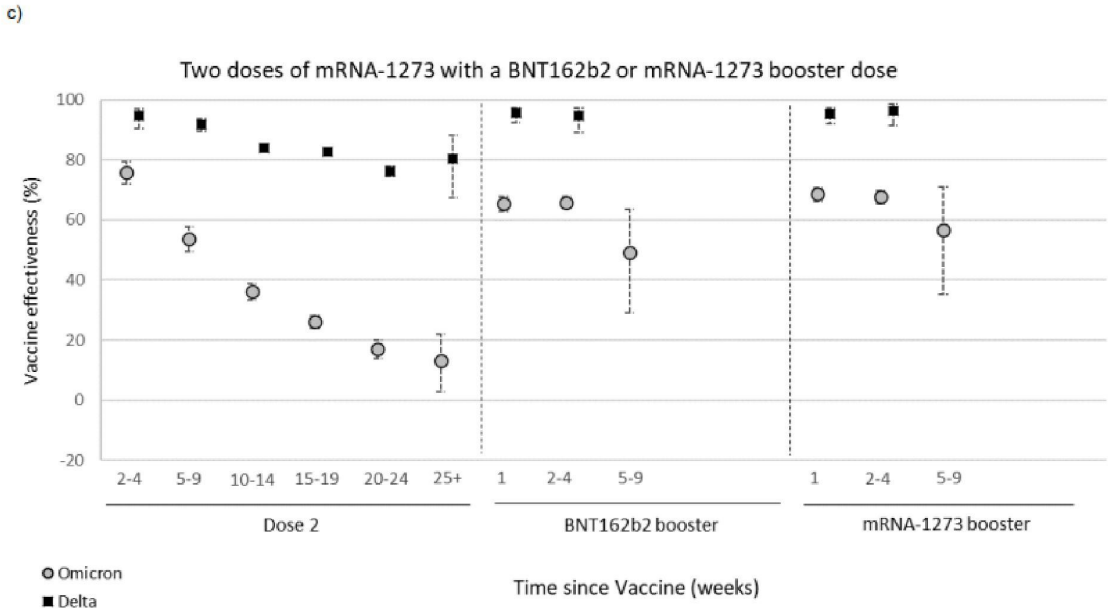
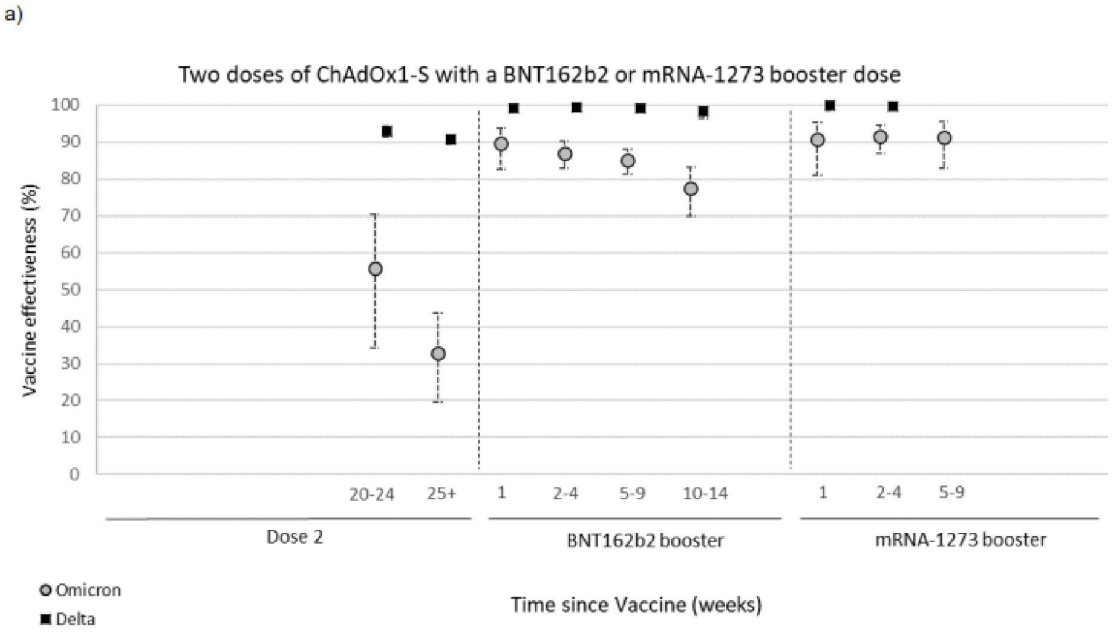


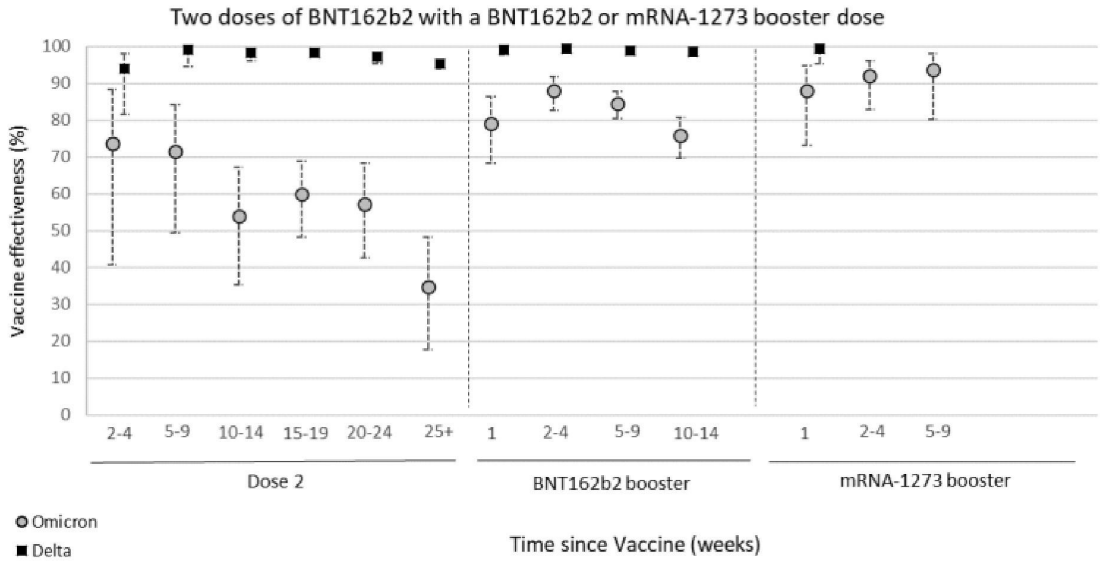
Figure 7: Vaccine effectiveness (VE) against hospitalisation.

VE by period after the second and booster doses for Delta (black squares) and Omicron (grey circles) for a) recipients of 2 doses of Oxford/AstraZeneca (ChAdOx1-S) vaccine as the primary course and Pfizer/BioNTech (BNT162b2) or Moderna (mRNA-1273) as a booster; b) recipients of 2 doses of Pfizer/BioNTech vaccine as the primary course and Pfizer/BioNTech or Moderna as a booster[54].



[54] COVID-19 vaccine surveillance report - week 6 (publishing.service.gov.uk)

b)



2.4 The impact of BA.2

A sub-lineage of Omicron, termed BA.2, was designated a VUI by the UKHSA (VUI-22JAN-01) on 19 January 2022[55]. BA.2 does not have the spike gene deletion at 69-70 that causes S gene target failure (SGTF), seen in the Omicron BA.1 sub-lineage[56]. BA.1 and BA.2 share 38 nucleotide and amino-acid mutations and BA.2 contains an additional 28 mutations and a deletion at 25-27[57] [58]; BA.1 has additional 20 mutations[59].

As of 18 February, there had been 893 cases of BA.2 reported in Scotland[60]. BA.2 has spread globally, overtaking the BA.1 lineage and making up the majority of sequenced cases in Denmark, India, Philippines, South Africa, Qatar and Sri Lanka as of 7 February 2022[61] [62].

The UKHSA risk assessment[63] of 9 February identifies with a moderate confidence, that BA.2 has an overall growth advantage over BA.1 with preliminary data showing increased household secondary attack rates in the UK (13.4% vs 10.3% in other Omicron cases)[64]. Evidence also suggests that the transmissibility of BA.2 is greater than BA.1 and/or serial interval (time from symptom onset of a primary case to

[55] COVID-19 vaccine surveillance report - week 5 (publishing.service.gov.uk)
[56] SARS-CoV-2 variants of concern and variants under investigation (publishing.service.gov.uk) 28 January 2022
[57] SARS-CoV-2 variants of concern and variants under investigation- Technical briefing 34 (publishing.service.gov.uk)
[58] CoVariants
[59] SARS-CoV-2 variants of concern and variants under investigation (publishing.service.gov.uk)
[60] Variants: distribution of case data, 18 February 2022 - GOV.UK (www.gov.uk)
[61] Nextstrain / ncov / gisaid / global
[62] CoVariants
[63] Risk assessment for SARS-CoV-2 variant: VUI-22JAN-01 (BA.2) 9 February 2022 (publishing.service.gov.uk)
[64] SARS-CoV-2 variants of concern and variants under investigation (publishing.service.gov.uk) 28 January 2022

symptom onset in their identified contacts) of BA.2 is shorter than BA.1, however there is currently no evidence to suggest that immune evasion is different between the two lineages of Omicron. There is also currently insufficient data to determine any difference in infection severity[65].

Current evidence suggests vaccine effectiveness against symptomatic disease is similar for BA.1 and BA.2 sub-lineages of Omicron. After 2 doses effectiveness was 10% (9-11%) and 18% (5-29%) respectively for BA.1 and BA.2, after 25+ weeks. This increased to 69% (68-69%) for BA.1 and 74% (69-77%) for BA.2 at 2 to 4 weeks following a booster vaccine and decreased to 49% (48-50%) for BA.1 and to 46% (37-53%) for BA.2 after 10 weeks post vaccination[66]. Preliminary (not yet peer reviewed) analysis of transmission of BA.1 and BA.2, in Danish households indicate that transmissibility from unvaccinated primary cases in BA.2 households was increased compared to BA.1 households with an odds ratio of 2.62 (95%-CI 1.96-3.52). This pattern of increased transmission in BA.2 households was not observed for fully vaccinated and booster-vaccinated primary cases. Susceptibility of infection with BA.2 was increased when compared to BA.1 regardless of vaccination status[67].

2.5 Changes in testing

In the last few months since the November update to the Strategic Framework, the Omicron variant has emerged and cases rates increased steeply. Part of the response was a shift in guidance to encourage the use of lateral flow testing with lateral flow devices (LFDs). Current guidance is to use LFD tests regularly when you have no symptoms. You should test twice a week, as well as before socialising or travelling[68].

Although LFDs are less sensitive than molecular tests such as PCR, they are easier to perform and provide a rapid test result, within 15-30 minutes.
How well LFDs work at detecting SARS-CoV-2 in a person, depends on many factors, such as how infectious the person is, if they have symptoms, the time since their symptoms started and how well they do the test. Although estimates for how sensitive the LFDs are when detecting COVID-19 vary between studies and situations, numerous studies found that LFDs are around 95% effective at detecting SARS-CoV-2 when used at the onset of symptoms or for cases with high viral

[65] Risk assessment for SARS-CoV-2 variant: VUI-22JAN-01 (BA.2) 9 February 2022 (publishing.service.gov.uk)
[66] COVID-19 vaccine surveillance report - week 6 (publishing.service.gov.uk)
[67] Transmission of SARS-CoV-2 Omicron VOC subvariants BA.1 and BA.2: Evidence from Danish Households | medRxiv
[68] Coronavirus (COVID-19): getting tested in Scotland - gov.scot (www.gov.scot)

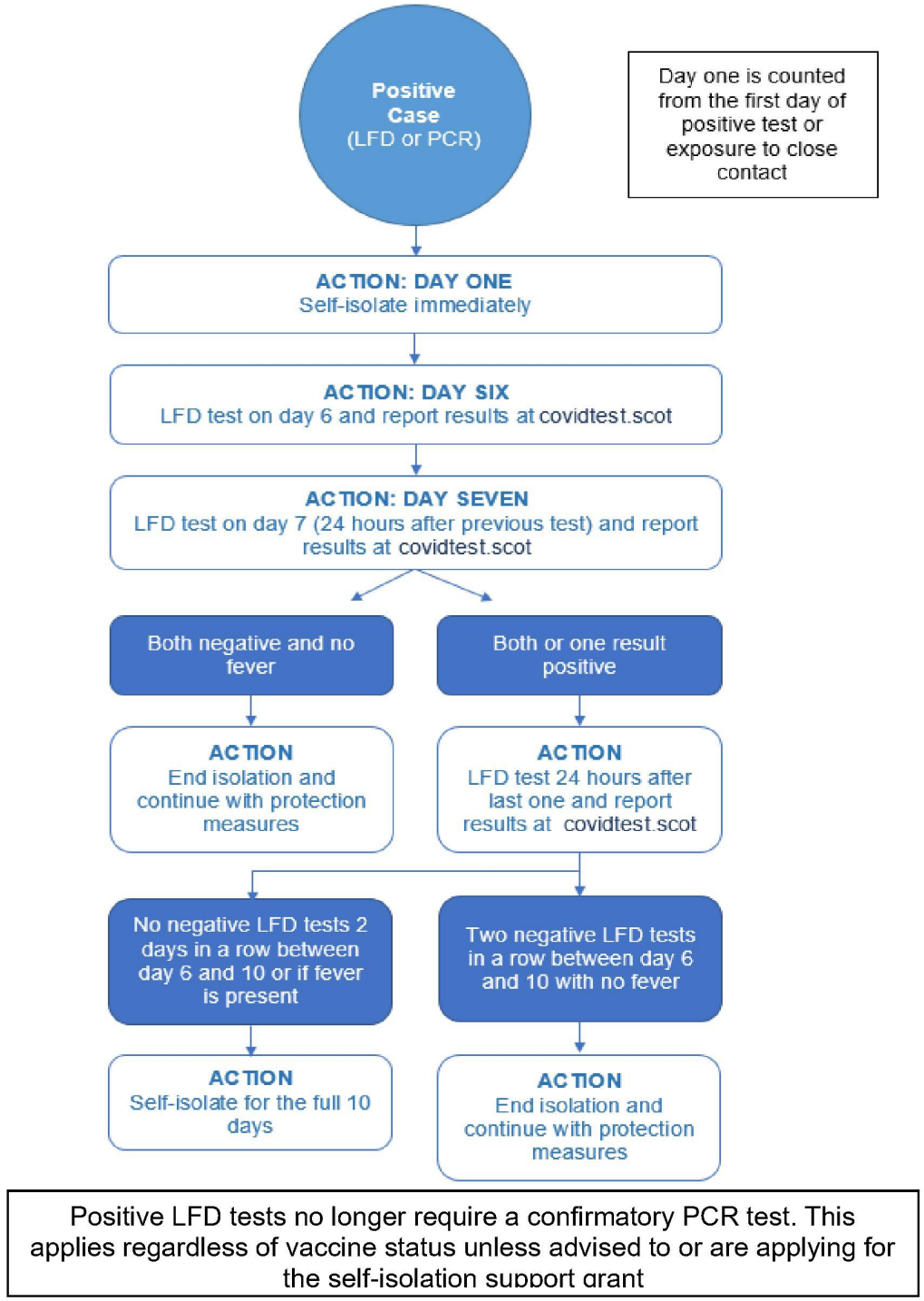
concentrations [69] [70] [71] [72] [73] [74] [75] [76]. These studies were done before Omicron emerged. However, initial data from laboratory studies indicates a comparable sensitivity of LFDs to Omicron as to that observed for previous strains of SARS-CoV-2 including Delta[77].

In general, LFDs are less sensitive than PCR at detecting the virus and it is possible to miss an infection just before the peak of infectiousness that a PCR test would pick up[78] [79] [80]. Therefore it is best to take a LFD test as close as possible before meeting other people for the best chance of detecting infectious individuals and avoiding transmission[81] [82] [83].

Current guidance is to isolate for 10 days if you've had a positive PCR or LFD test result but no symptoms. You may be able to end self-isolation early if you have 2 negative LFD test results in a row from day 6 onwards, taken 24 hours apart. The key to this regimen is that people should not end isolation early without the two negative LFD tests as there is significant risk that they could still be infectious[84] [85] [86], see Figure 8.

[69] Comparing the diagnostic accuracy of point-of-care lateral flow antigen testing for SARS-CoV-2 with RT-PCR in primary care (REAP-2) - EClinicalMedicine (thelancet.com)
[70] Comparative performance of SARS CoV-2 lateral flow antigen tests demonstrates their utility for high sensitivity detection of infectious virus in clinical specimens | medRxiv
[71] Real-life validation of the Panbio™ COVID-19 antigen rapid test (Abbott) in community-dwelling subjects with symptoms of potential SARS-CoV-2 infection - EClinicalMedicine (thelancet.com)
[72] UK evaluation_PHE Porton Down University of Oxford_final.pdf
[73] Lateral flow device performance data - GOV.UK (www.gov.uk)
[74] Frontiers | Factors that Influence the Reported Sensitivity of Rapid Antigen Testing for SARS-CoV-2 | Microbiology (frontiersin.org)
[75] Rapid, point-of-care antigen and molecular-based tests for diagnosis of SARS-CoV-2 infection - Dinnes, J - 2021 | Cochrane Library
[76] Diagnostic accuracy of rapid antigen tests in asymptomatic and presymptomatic close contacts of individuals with confirmed SARS-CoV-2 infection: cross sectional study | The BMJ
[77] SARS-CoV-2 variants of concern and variants under investigation (publishing.service.gov.uk)
[78] Diagnostics for COVID-19: moving from pandemic response to control - The Lancet
[79] Discordant SARS-CoV-2 PCR and Rapid Antigen Test Results When Infectious: A December 2021 Occupational Case Series | medRxiv
[80] 20220110_Self-isolation_Scientific-Summary_Final-clean.pdf (koha-ptfs.co.uk)
[81] https://www.ecdc.europa.eu/sites/default/files/documents/Options-for-the-use-of-rapid-antigen-tests-for-COVID-19-first-update.pdf
[82] Schools COVID-19 operational guidance - GOV.UK (www.gov.uk)
[83] A cluster randomised trial of the impact of a policy of daily testing for contacts of COVID-19 cases on attendance and COVID-19 transmission in English secondary schools and colleges
[84] Mitigating isolation: The use of rapid antigen testing to reduce the impact of self-isolation periods (medrxiv.org)
[85] Test to release from isolation after testing positive for SARS-CoV-2 | medRxiv
[86] 20220110_Self-isolation_Scientific-Summary_Final-clean.pdf (koha-ptfs.co.uk)

Figure 8: Self-Isolation and Testing Guideline for positive cases[87].



According to the Scottish Contact survey from 3 – 9 February, approximately 76% of individuals had taken at least one LFD within the last 7 days. This decreased from

[87] changes-to-self-isolation-flowchart_fp_360x268-lores-final-14jan22.pdf (nhsinform.scot)

78% for the survey from two weeks prior. Polling data shows that the proportion who reported taking a COVID-19 test 'in the past week' declined slightly – from 64% (18-19 January) to 58% (1-2 February 2022), although reporting of results has remained stable (47%).

After a decrease in the number of LFD tests that were reported between 27 December 2021 and 9 January 2022, there was a peak in reported LFD tests on 16 January 2022, with 810,225 reported tests[88]. The weekly total of tests reported in the week to 13 February decreased by 5% from the previous week leading up to 6 February. There were 714,319 reported tests in the week to 13 February[89].

2.6 Measures in Scotland to reduce the effect of Omicron[90]

The overall objective of these measures when implemented, were to slow the spread of the Omicron variant, to ensure that the National Health Service (NHS) could cope with potential patient numbers and to try and limit workforce absences from less serious illness. As data emerged that Omicron was less severe than Delta, resulting in reduced hospital admissions and patients requiring treatment within ICU, a lifting of the additional measures occurred in a stepwise manner.

The World Health Organisation (WHO) declared Omicron as a variant of concern on 26 November 2021[91], and in order to slow the introduction of Omicron into Scotland, 11 South African countries had a temporary travel ban imposed and were added to the UK red travel list meaning all travellers returning to Scotland from these countries were required to quarantine on arrival at a managed hotel for 10 days [92] [93] [94] [95]. These countries were removed from the UK red list on 15 December[96]. From 7 December[97] all arrivals into Scotland required pre-departure and arrival tests, which was scaled back to just unvaccinated individuals from 7 January 2022, with vaccinated travellers only requiring an arrival test[98]. From 11 February, fully vaccinated travellers no longer required to test[99].

On 29 November the first case of Omicron was reported in Scotland, from a sample taken on 23 November [100] [101]. In response to Omicron, the booster vaccination roll out was scaled up during November and December with those aged 18+ able to book an appointment from 15 December 2021[102].

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[88] Show all releases - Publications - Public Health Scotland
[89] COVID-19 & Winter Statistical Report (publichealthscotland.scot)
[90] See Annex A for a timeline of legislative requirements and guidance.
[91] Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern (who.int)
[92] https://www.gov.scot/news/tackling-the-threat-of-new-covid-19-variant/
[93] Red list of countries and territories - GOV.UK (www.gov.uk) (Edit from 25 November)
[94] Tackling the threat of new COVID-19 variant - gov.scot (www.gov.scot)
[95] Pre-departure test requirement for travel - gov.scot (www.gov.scot)
[96] 11 countries removed from international travel red list - gov.scot (www.gov.scot)
[97] Pre-departure test requirement for travel - gov.scot (www.gov.scot)
[98] Easing of restrictions on international travellers - gov.scot (www.gov.scot)
[99] UK open for travel with all restrictions removed for eligible vaccinated arrivals - GOV.UK (www.gov.uk)
[100] Omicron variant - gov.scot (www.gov.scot)
[101] Public Health Scotland COVID-19 & Winter Statistical Report
[102] Boosting support for the vaccination programme - gov.scot (www.gov.scot)

From 11 December 2021, all household contacts of confirmed positive cases were required to isolate for 10 days[103]. On 6 January, this regulation was ended for triple vaccinated individuals with daily testing required instead and self-isolation for positive individuals could end with two consecutive negative LFD tests from day 6 taken 24 hours apart. The need for a confirmatory PCR test was also removed[104].

On 17 December 2021, as Omicron became the dominant variant in Scotland, legal requirements were introduced for businesses to take reasonable measures to minimise transmission of coronavirus and guidance was given to limit indoor socialising to 3 households with LFD testing before meeting[105] [106] [107].

On 26 and 27 December 2021, legislation was introduced that cancelled large events, 1m physical distancing and table service was required in hospitality and leisure facilities and nightclubs were closed[108]. Limitations on large scale outdoor events were removed on 17 January 2022 with the rest of the restrictions implemented after Christmas being lifted on 24 January, along with the guidance to limit socialising indoors to 3 households[109] [110]. Vaccine certification remains in place for these events including the use of a negative test and the requirement for a third dose which were added to the certification scheme on 6 December 2021 and 17 January 2022 respectively[111] [112].

For the start of the January school term, children aged 12-15 were encouraged to get their second dose, staff and pupils were advised to perform LFD tests before returning to school and more guidance was given to schools to grouping students and increase ventilation[113] [114] [115].

2.7 Summary

This section of the paper traces the development of the pandemic since November 2021 when the previous update of the Strategic Framework was published. It covers a period of change as Omicron BA.1 emerged and became the dominant variant followed by BA.2. Over this period changes were implemented in testing and in the measures introduced to manage the emergence of Omicron which were strengthened and subsequently relaxed in a staged approach.

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[103] Evidence paper on rapid rise of Omicron cases - gov.scot (www.gov.scot)
[104] Self-Isolation and testing changes - gov.scot (www.gov.scot)
[105] Coronavirus (COVID-19) update: First Minister's speech – 17 December 2021 - gov.scot (www.gov.scot)
[106] Limiting the spread of Omicron - gov.scot (www.gov.scot)
[107] New measures required to slow the spread of Coronavirus - gov.scot (www.gov.scot)
[108] Omicron restrictions take effect - gov.scot (www.gov.scot)
[109] Large outdoor events resume from 17 January - gov.scot (www.gov.scot)
[110] Omicron measures to be lifted - gov.scot (www.gov.scot)
[111] Negative test added to certification - gov.scot (www.gov.scot)
[112] Large outdoor events resume from 17 January - gov.scot (www.gov.scot)
[113] COVID vaccine for 12-15 year olds - gov.scot (www.gov.scot)
[114] Returning to school safely - gov.scot (www.gov.scot)
[115] Keeping schools safe - gov.scot (www.gov.scot)

3. Health and Social Care in Scotland

3.1 Introduction

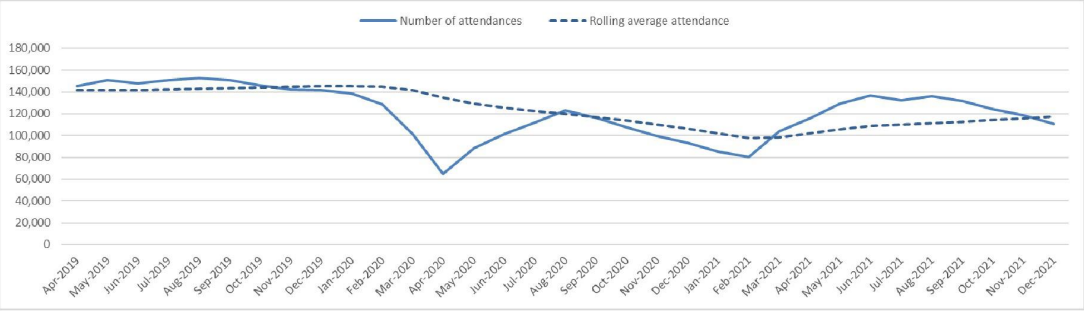
The COVID-19 pandemic has affected demand, attendances, planned and unplanned care and waiting times across NHS Scotland and social care in a number of ways. Approaching two years of the NHS being on an emergency footing, demand continues to be very significant. System capacity has been impacted by COVID-19 infection control requirements, redeployment of staff, capacity to treat COVID-19 patients, delayed discharges and COVID-19 related staff absences. The Scottish Government has published the NHS Recovery Plan that sets out key ambitions and actions to be delivered now and over the 5 years to address the backlog in care and meet ongoing healthcare needs for people across Scotland.

3.2 Hospital and GP services

Large decreases in attendances at A&E services in NHS Scotland were observed in spring 2020 and winter 2020/21. Since spring 2021 attendances at A&E have been rising and are getting closer to the pre-COVID levels. From the summer of 2021 performance against the four hour standard has dropped below 80%. During December 2021, there were 110,934 attendances at A&E services in Scotland; of these, 75.7% of attendances at A&E services were seen and resulted in a subsequent admission, transfer or discharge within 4 hours.[116]

Figure 9: Number of unplanned attendances at all A&E sites in NHS Scotland, April 2019 to December 2021

[Source: A&E activity and waiting times - Month ending 31 December 2021]

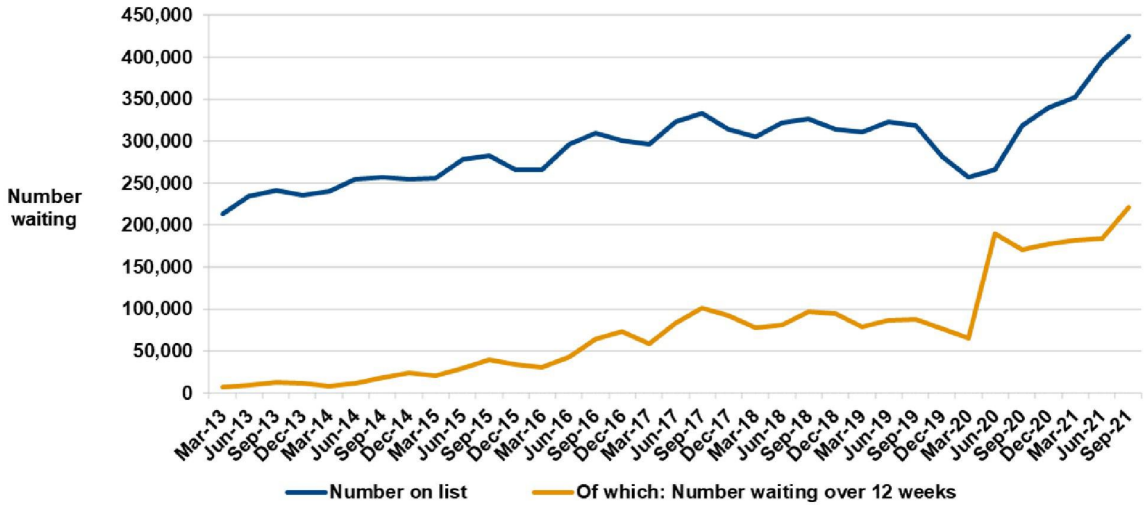


There has been a large increase in the number of people waiting to be seen as outpatients.[117] At 30 September 2021, 425,242 patients were waiting to be seen as outpatients, 33% higher than at 30 September 2020. People are also typically waiting longer to be seen. For example, 48% of people had been waiting 12 weeks or less at the quarter ending 30 September 2021, markedly down on the 73% reported on average in 2019. During the quarter ending 30 September 2021, 286,935 new outpatients were seen. This is 121% higher than the 129,944 patients

[116] A&E activity and waiting times - Month ending 31 December 2021
[117] Stage of treatment waiting times - Inpatients, day cases and new outpatients 30 November 2021

seen in the quarter ending 30 June 2020, during the first wave of the pandemic, but 22% lower than the quarterly average of 367,226 during 2019, prior to the onset of the pandemic.

Figure 10: Number of patients waiting for a new outpatient appointment at month end, NHS Scotland, 30 September 2013 to 30 September 2021 [Source: Stage of treatment waiting times - Inpatients, day cases and new outpatients 30 November 2021]



There has also been an increase in the number of patients waiting to be admitted as inpatients or day cases covered by the Treatment Time Guarantee (TTG).[118] At 30 September 2021, 106,496 patients were waiting to be admitted for treatment, 25% higher than at 30 September 2020. Of those waiting, 37% had been waiting 12 weeks or less, markedly down on the 69% reported at the end of quarters in 2019. The reduction in activity is also reflected in the number of patients admitted for treatment under TTG. During the quarter ending 30 September 2021, 45,449 patients were admitted for treatment. This is 210% higher than the 14,673 patients seen in the quarter ending 30 June 2020, during the first wave of the pandemic, but 36% lower than the quarterly average of 70,594 during 2019, prior to the onset of the pandemic.

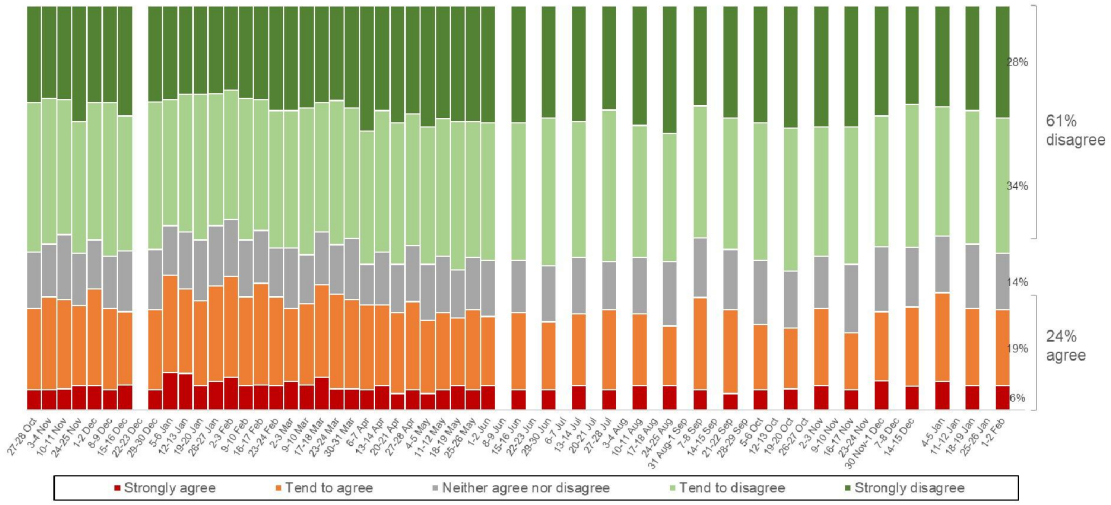
During quarter ending 30 September 2021, there were 4,011 eligible referrals for the 62-day cancer treatment standard, a 31.6% increase compared with quarter ending 30 September 2020.[119] During quarter ending 30 September, 83.1% of patients started treatment within the 62-day standard compared to 87.3% for quarter ending 30 September 2020. There were 6,329 eligible referrals within the 31-day standard during quarter ending 30 September 2021, a 27.4% increase compared with quarter ending 30 September 2020. During quarter ending 30 September, 96.7% of patients started treatment within the 31-day standard compared to 98.4% for quarter ending 30 September 2020.

[118] Stage of treatment waiting times - Inpatients, day cases and new outpatients 30 November 2021
[119] Cancer waiting times - 1 July to 30 September 2021

GP services, and the progress with plans to redesign[120] these, have been impacted by the COVID-19 pandemic. Some services were paused or altered during 2020, including the reduction of appointment times, restrictions to patient capacity and workforce reallocation. Many appointments shifted to telephone or video consultations, with face-to-face appointments offered following telephone triage where necessary.

There has been a reluctance among some to seek non-COVID-19 healthcare treatment during the COVID-19 pandemic. Since the end of October 2021 between 20-29% of people agreed or strongly agreed that they would avoid contacting a GP practice at the moment even if they had an immediate medical concern (not related to Coronavirus)[121]. Responses were broadly similar across different groups of the population. The most recent data shows that in early February 2022, the proportion of people who agree that they would avoid contacting a GP practice for immediate non-COVID-19 health concerns was 24%.

Figure 11: "I would avoid contacting a GP practice at the moment even if I had an immediate medical concern (not related to Coronavirus)" [Source: YouGov]



The COVID-19 pandemic has resulted in severe and sustained impacts on social care services over the last two years, with the latest comparable data showing COVID-19 deaths in care homes, since the start of the pandemic up to 6 February 2022, as amounting to 29% of all COVID-19 deaths in Scotland. The effects of the pandemic have been wide-ranging and have impacted on current wider social care system pressures, with for example, the number of people whose discharge from hospital was delayed increasing to almost 1,400 in December 2021, up from around 1,000 in the first half of 2021.

[120] Primary care improvement plans - implementation: progress summary - March 2021 - gov.scot (www.gov.scot)
[121] Public attitudes to coronavirus - gov.scot (www.gov.scot)

3.3 Population Health

The COVID-19 pandemic has seen the introduction of a range of restrictions at various stages of the pandemic that has affected our day to day lives in our communities and has affected how our health, education and other public services have functioned. This likely to have impacted in different ways on population health at various stages in the life-course, well beyond the direct impacts of COVID-19. Many people who have experienced severe COVID-19 disease, or died with COVID-19, have pre-existing health conditions including dementia, Alzheimer's disease, diabetes, cardiovascular disease, chronic obstructive pulmonary disease, kidney disease and other chronic conditions. Further, and to some extent associated with multi-morbidity, the health impact of COVID-19 has not been shared equally. After adjusting for age, up to December 2021, people in the most deprived areas were 2.5 times more likely to die with COVID-19 than those living in the least deprived areas[122]. Recent work by PHS and partners showed that the extent of inequality due to COVID-19 was similar to averting all annual Disability Adjusted Life Years (DALYs) due to diabetes[123].

The impact of Long-COVID has yet to be fully understood and has implications for health care in the future. An estimated 1.3 million people living in private households in the UK (2% of the population) were experiencing self-reported Long-COVID symptoms according to the ONS Infection Survey as of 2 January 2022. The equivalent estimate for Scotland, is 100,000 people and 1.9% of the population[124]. These are symptoms persisting for more than four weeks after the first suspected coronavirus (COVID-19) infection that were not explained by something else[125]. Notably, receiving two doses of a coronavirus (COVID-19) vaccine at least two weeks before a first test-confirmed COVID-19 infection was associated with a 41% decrease in the odds of self-reported Long-COVID at least 12 weeks later, relative to similar study participants who were not vaccinated when infected.

The most recently published evidence on the impact of COVID-19 on health behaviours that impact on population health is mixed. It shows a mix of both stable, positive and negative change on health behaviours, such as alcohol and tobacco consumption, diet and physical activity.

For example:

- A range of survey studies suggest that up to around a fifth of the adult population self-report drinking more than prior to the pandemic with a similar proportion drinking less[126]. This may explain why the evidence suggests an

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[122] Deaths involving coronavirus (COVID-19) in Scotland | National Records of Scotland (nrscotland.gov.uk)

[123] Inequalities in population health loss by multiple deprivation: COVID-19 and pre-pandemic all-cause disability-adjusted life years (DALYs) in Scotland | International Journal for Equity in Health | Full Text (biomedcentral.com)

[124] Confidence limits for UK and Scotland overlap

[125] Prevalence of ongoing symptoms following coronavirus (COVID-19) infection in the UK - Office for National Statistics (ons.gov.uk) Estimates presented in this analysis relate to self-reported long COVID, as experienced by study participants who responded to a representative survey, rather than clinically diagnosed ongoing symptomatic COVID-19 or post-COVID-19 syndrome in the full population.

[126] » Portman Group-YouGov research on pandemic drinking and the return to pubs

overall reduction, at least earlier in the pandemic. Alcohol sales data suggests the impact between March and July 2020 was to have reduced overall consumption levels by 6% with an observed 28% increase in off-trade sales not compensating for the loss in on-trade sales in terms of pure alcohol sold per adult in Scotland[127].

- The Scottish Health Survey found that 55% of smokers self-reported no change in their smoking habits since the start of the March 2020 lockdown, but 36% reported smoking more[128]. The Smoking Toolkit Study has tracked cigarette smoking over time and shows, for Scotland, that overall prevalence increased from 13.1% of the population in December 2020 to 16.3% in November 2021, bucking a longer-term downward trend and largely driven by those aged over 35 years[129].

- A recently published longitudinal study of a large number of people in England indicated that most people retained stable levels of physical activity (including those who were inactive) during the first strict lockdown and after all restrictions to physical activity were lifted (23 March to August 2020). However, 28.7% showed a decline in activity levels over this period compared to 9% who increased[130]. We can reasonably expect that something similar has occurred also in Scotland.

- Recent data showed a marked increase in the proportion of young children in Scotland (Primary 1, age around 5 years) who were classed as at risk of being either overweight or obese in school year 2020/21 (29.5%) compared to 2019/2020 (22.7%). The proportion had been stable for many years prior to this[131]. The largest change was observed in those living in the most deprived areas.

3.4 Mental Health

The most recently published waves of the Scottish COVID-19 Mental Health tracker Study and the Coronavirus Impact on Wellbeing survey provide insights into the population's mental health and wellbeing during the lockdown in early 2021[132]. These surveys were conducted in February and March 2021 and the key findings were:

- 39% reported feeling lonely at least some of the time
- 32% reported psychological distress to a level that indicated a possible psychiatric disorder
- 24% reported moderate to severe depressive symptoms
- 16% reported moderate to severe anxiety symptoms

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[127] The impact of COVID-19and related restrictions onpopulation-level alcohol salesin Scotland and England &Wales, March–July 2020 (publichealthscotland.scot)
[128] Scottish Health Survey – telephone survey – August/September 2020: main report - gov.scot (www.gov.scot)
[129] Scottish Health Survey 2019 - volume 1: main report - gov.scot (www.gov.scot)
[130] Longitudinal changes in physical activity during and after the first national lockdown due to the COVID-19 pandemic in England | Scientific Reports (nature.com) (Evidence from UCL study suggests little difference
[131] Primary 1 Body Mass Index (BMI) statistics Scotland - School year 2020 to 2021 - Primary 1 Body Mass Index (BMI) statistics Scotland - Publications - Public Health Scotland
[132] Scottish COVID-19 Mental Health Tracker Study: Wave 4 Report - gov.scot (www.gov.scot)

- 10% reported suicidal thoughts within the week prior to completing the survey

The following groups tended to report poorer mental health and wellbeing (e.g. higher rates of anxiety and loneliness):

- Younger adults
- Women
- Individuals with a physical and/or mental health condition
- Those with low household incomes or from lower socio-economic group
- Those who live alone.

A representative survey[133] conducted between February and April 2021 provides the most recent data on secondary school-children (11 to 18 years old). Similar to the surveys of adults; female students and those with a physical and/or mental health condition were found to report poorer mental health and wellbeing. However, in contrast with the adult samples of the other surveys, older pupils were found to report poorer mental health and wellbeing than younger pupils.

3.5 Summary

The COVID-19 pandemic has had a very substantial and sustained impact on the NHS and social care in Scotland. Organisational and individual responses to the pandemic have affected demand on the system, attendances, planned and unplanned care and waiting times across NHS Scotland. In social care, the effects of the pandemic have been wide-ranging and have impacted substantially on existing social care system pressures, with, for example, the number of people whose discharge from hospital being delayed increasing again in recent months.

There has also been an impact on the health of the Scottish people in a whole range of ways, many of which are yet to manifest themselves, or we have yet to fully understand. These negative impacts are experienced across the population, in different ways and at various stages of the life-course. However, the pandemic has clearly exacerbated existing health inequalities, exemplified by the data presented here on deaths and Disability Adjusted Life Years (DALYs)

[133] Secondary school-aged pupils in Scotland - mental wellbeing, relationships and social media: report - gov.scot (www.gov.scot)

4. Impact on society

4.1 Introduction

People's lives have been disrupted in a large range of settings by the measures that were introduced to control the virus. These restricted access to areas of life that help to maintain personal and social wellbeing including: social interactions and gatherings, work and business, access to public services, workplaces, education settings and culture, leisure and tourism activities.

The Scottish Government has collected and analysed a range of primary and secondary data and analysis, to further understand these effects. This developed an account of the impacts from a range of triangulated sources, including: public attitudes and behaviours surveys; administrative data; new research within population subgroups and places; and people's own accounts.

Experiences of the pandemic are varied, and some people were subject to a greater level of harm, because of their personal circumstances or personal identity, the stage of life they are at or where they live.

Research is ongoing, but some of the available information is presented below.

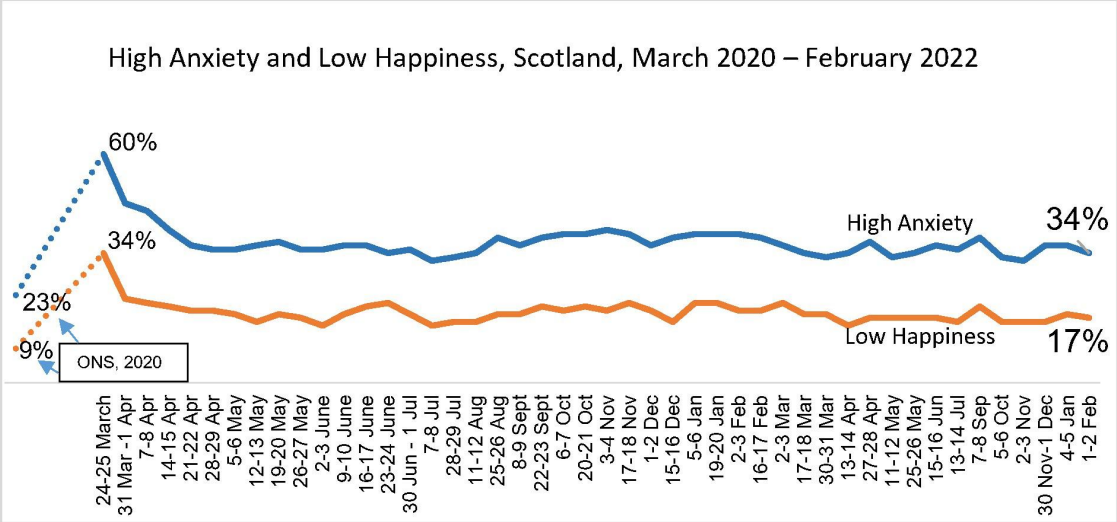
4.2 Personal wellbeing

There is evidence that the pandemic caused a large amount of psychological distress and worry. Public attitudes polling at the beginning of the pandemic showed a sharp rise in measures of high anxiety, and low happiness[134]. This picture gradually improved over further time[135] but negative impacts have been prominent for an extended period of time, and they have not returned to pre-pandemic levels[136].

In the year ending March 2021, ratings of personal wellbeing in Scotland deteriorated. Levels of life satisfaction, happiness, and the feeling that the things done in life are worthwhile declined, and anxiety increased[137].

[134] Public attitudes to coronavirus: April summary - gov.scot (www.gov.scot)
[135] Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[136] Personal well-being in the UK - Office for National Statistics (ons.gov.uk)
[137] ONS, Personal well-being in the UK: April 2020 to March 2021

Figure 12: Anxiety and Happiness in Scotland[138] [139]



By the end of November 2021, levels of depression and anxiety had improved slightly across the UK, but levels remained higher than the averages that would usually be reported[140].

The effects of the pandemic on wellbeing have not been felt equally across all social groups. Depression and anxiety have continued to be highest among young adults, people with lower household income, people living with children, those living in urban areas, women, people from ethnic minority groups, and those with a physical health diagnosis[141].

These differences are not narrowing as the pandemic continues, and this indicates ongoing inequalities in the impact on wellbeing[142]. The most recent findings suggest that depression and anxiety symptoms sharply increased again in December 2021, as the Omicron variant started to spread in Scotland. This increase was most prominent amongst younger adults[143].

Other wellbeing measures including life satisfaction and happiness also declined across the UK in early January 2022, although wellbeing overall had improved compared to a similar period last year[144]. Worry about the Coronavirus situation had fallen in Scotland by mid-January 2022, with an increased optimism that things would get better soon[145]. Ongoing impacts of the pandemic on wellbeing remain, particularly for the groups mentioned.

[138] Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)(1-2 February data will be published in March 2022)
[139] Personal well-being in the UK - Office for National Statistics (ons.gov.uk)
[140] UCL COVID Social Study Results Release 41, 9 December 2021
[141] Coronavirus (COVID-19): mental health - transition and recovery plan - gov.scot (www.gov.scot)
[142] UCL COVID Social Study Results Release 41, 9 December 2021
[143] UCL COVID Social Study Results Release 42, 14 January 2022
[144] ONS, Coronavirus and the social impacts on Great Britain: 21 January 2022
[145] YouGov, 18-20 Jan Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)

4.3 Work

The pandemic has had a significant impact on the working lives of individuals notably around job security, income, finances and workplace location. Worry about jobs and income has increased,[146] around one in ten lost their jobs or were made redundant as a result of the pandemic,[147] a significant amount reported lower income compared to pre pandemic levels[148]. Just over two fifths who are working, reported that they work from home 'all or some' of the time[149].

Around one in ten (11%) either lost their job or were made redundant during the pandemic this was a higher percentage amongst younger people and those from lower household incomes[150].

For the majority (59%), household income remained the same from May 2020 to March 2021. However, a quarter of people reported their income was lower in March 2021 than before the pandemic[151]. Since September 2021, there has been a gradual increase in concern around finances, in terms of being able to pay household bills and, to being able to provide for the household which has affected certain subgroups disproportionately[152]. Those in households with children and aged 25-34 reported lower income than pre-pandemic levels, similarly working-age adults were twice as likely to report concerns around finances over older adults[153]. Almost a third in the lowest (DE) socio-economic groups were not managing well financially and more likely to suffer from economic challenges due to the reduction in income as a result of furlough or unemployment[154]. These issues also affect those living alone and disabled people[155].

A high proportion across the UK (43%) in Dec 2020 reported changes to their work since the beginning of the pandemic, with 31% transitioning into working from home more[156]. At the end of 2019 around 4% of the Scottish public mainly worked from home[157].

Survey data indicates that, at present, just over two fifths (43%) of respondents who are working report working from home all or some of the time[158]. Home working has had some benefits such as greater autonomy and flexibility, more time for family and leisure[159] and lesser or no commute[160]. These freedoms have had particular benefit

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[146] YouGov, 18-20 Jan Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[147] Ipsos MORI Wave 2: December 2020
[148] Ipsos MORI Wave 3:
[149] YouGov, 1-2nd Feb 2022 data unpublished.
[150] Ipsos MORI Wave 2: December 2020
[151] Ipsos MORI Wave 3:
[152] YouGov, 18-20 Jan Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[153] UCL COVID Social Study
[154] COVID-19: understanding inequalities in wellbeing during the pandemic
[155] Ipsos MORI Wave 3:
[156] Ipsos MORI Wave 2: December 2020
[157] RSPH | Survey reveals the mental and physical health impacts of home working during Covid-19
[158] YouGov, 1-2nd Feb 2022 data unpublished.
[159] Working from home during the COVID-19 pandemic, its effects on health, and recommendations: The pandemic and beyond (nih.gov)
[160] A new life for the high street - A nationwide program of repurposing city and town centres should be | Policy Commons

for disabled workers, many of whom had been wanting greater remote/flexible working prior to the pandemic[161].

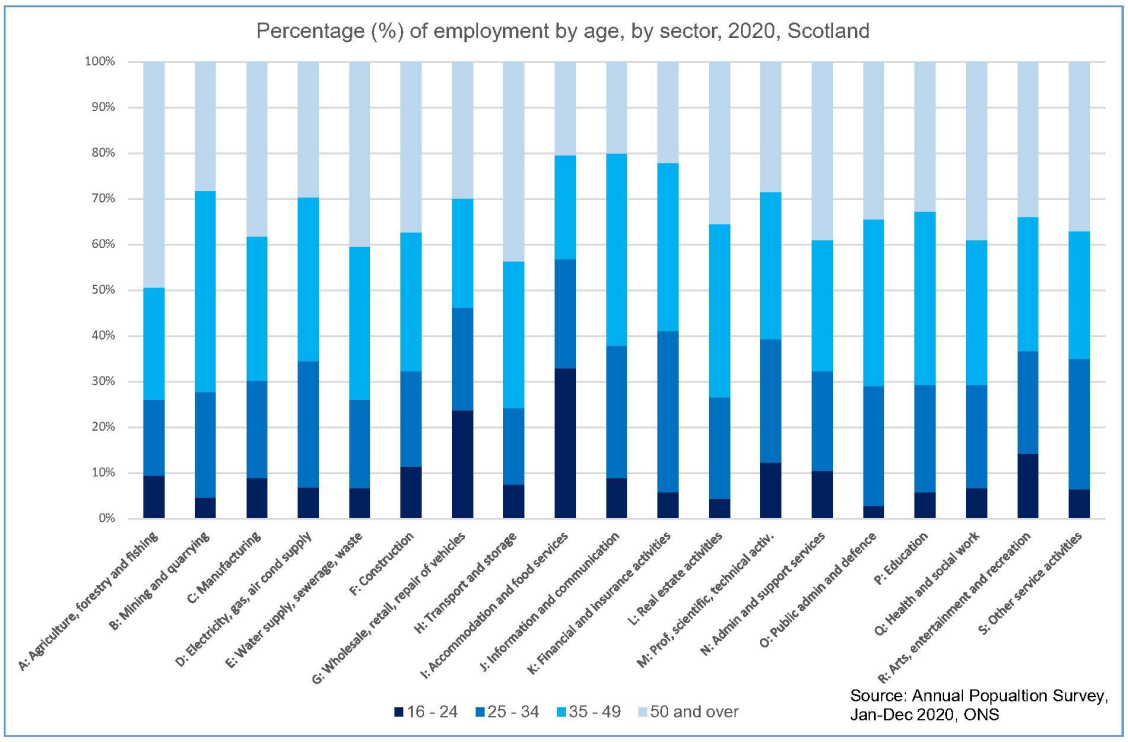
Evidence suggests home working has had negative impacts on health, wellbeing and social aspects. For example, there are reports of lower physical activity levels, increase in food consumption and a rise in musculoskeletal problems amongst home workers[162]. Just under a third self-reported working from home as worse for their wellbeing which was predominantly an issue for those in shared housing[163]. There is evidence of higher social strain in homes[164], and disconnection to colleagues due to absence of workplace interaction[165].

These effects may be felt disproportionally across the population if some have adapted to working from home better than others, for example those with more adequate physical workplace or access to technology[166].

The sectors most affected by restrictions have the highest share of employment of 16-24 year olds. For example, 33% of employment in the Accommodation and Food Services sector is in the age group 16-24, 24% in retail and 14% in Arts, respectively.

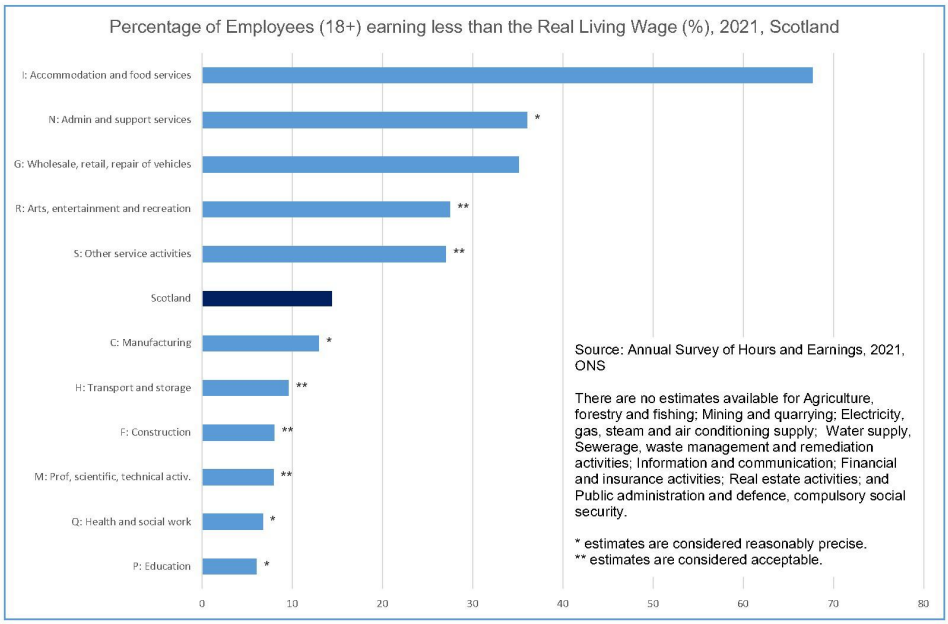
[161] How to use the surge in teleworking as a real chance to include people with disabilities | Policy Commons
[162] Working-from-home-in-the-context-of-COVID-19-A-systematic-review-of-physical-and-mental-health-effects-on-teleworkers.pdf (researchgate.net)
[163] RSPH | Survey reveals the mental and physical health impacts of home working during Covid-19
[164] Challenging boundaries of work space | The Psychologist (bps.org.uk)
[165] https://arxiv.org/ftp/arxiv/papers/2104/2104.10440.pdf
[166] Working from home during the COVID-19 pandemic, its effects on health, and recommendations: The pandemic and beyond (nih.gov)

Figure 13: Employment by age and sector 2020



The sectors most impacted by restrictions are those with higher than average proportion of employees earning less than the real living wage (£9.50). Accommodation and food Services have a particularly high proportion, with two thirds of their employees earning less.

Figure 14: Percentage of employees (18+) earning less than the Real Living Wage, 2021, Scotland.



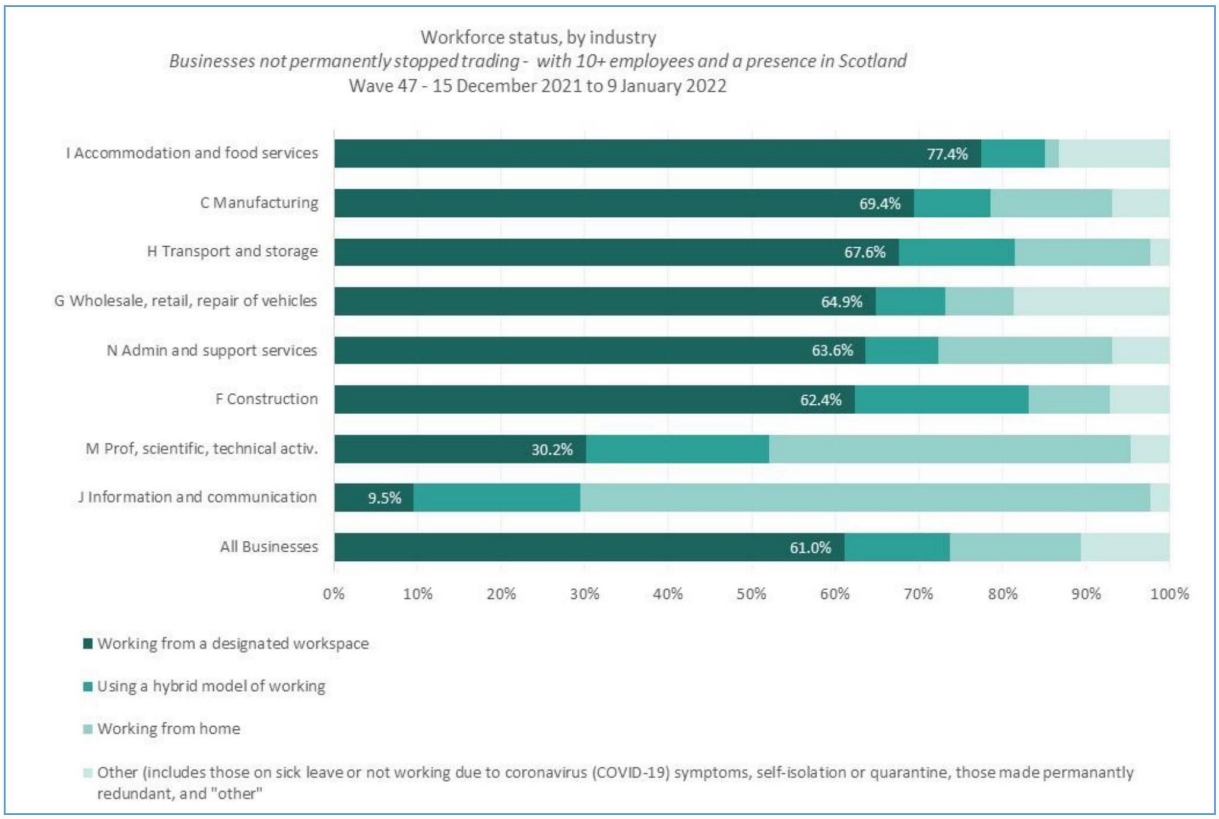
Workforce status

While rates of pay will differ depending on type of employment, sector, contract type and other factors, evidence strongly suggests that most employment types considered potentially precarious or flexible are associated with low rates of pay and/or pay insecurity.[167]

Sectors with less opportunity to work from home have been hardest hit by pandemic restrictions. The Business Insights and Conditions Survey[168] shows that the share of the workforce working from a designated workspace from 15 December to 9 January 2022) was estimated to be 61%. This share was highest in the Accommodation & Food Services sector, estimated at 77.4%. In contrast, an estimated 68.2% of workers in the Information & Communication industry sector are working from home.

[167] https://www.gov.scot/publications/young-peoples-experiences-precarious-flexible-work-evidence-review/pages/7/
[168] Business and innovation statistics - gov.scot (www.gov.scot)

Figure 15: Workforce status by industry, Business Insights and Conditions Survey



4.4 Cost of living

The UK CPI inflation rate rose to 5.4% in December 2021, its highest rate since 1992 and up from 5.1% in November. There has been a broad based increase in prices across goods and services, particularly in fuel and energy costs for transport and housing, and in the latest month, the cost of food. Further price rises are expected, particularly when Ofgem update the energy price cap in April, which could lead to more households becoming fuel poor. The Bank of England forecast inflation to peak at around 6% in the first half of 2022. Furthermore, other tax increases are scheduled for April such as the rise in National Insurance Rates for employer and employee contributions, and the end of the reduced rate of VAT for hospitality. As such, cost of living challenges are intensifying and UK average weekly earnings fell 1% in real terms (adjusted for inflation) in November – the first annual fall since July 2020. Polling carried out by YouGov for Citizens Advice Scotland found 36% of people couldn't afford their fuel bills. Of these, 80 per cent cited rising energy costs as a reason, with 65 per cent saying the rising cost of living was a problem[169].

[169] The total sample size was 1011 adults. Fieldwork was undertaken between 11th - 15th November 2021. The survey was carried out online. The figures have been weighted and are representative of all Scottish adults (aged 18+) 1 in 3 people find energy bills 'unaffordable' - CAS Launches new campaign |

4.5 Education (or Children and Young People)

Scotland's children and young people have experienced disruption to education and learning, delays to development and wider harms over three school years. Evidence is now emerging of impacts on the youngest children through to those in further and higher education.

Findings from the third round of the Covid-19 early years resilience and impact survey, published in January 2022, illustrates that Covid-19 and the measures taken to address it have had a negative impact on many young children and their families and that some of these negative effects were exacerbated when protective measures were reintroduced during the autumn and winter of 2021. There was evidence of negative impacts on relationships and development among babies and children and on concentration and learning in primary school aged children. Overall, children in low income families were most affected[170].

The 2020/21 Achievement of a Curriculum for Excellence Level (ACEL) data published in December 2021 highlighted the impact of the pandemic on literacy and numeracy in primary schools. This year's data show that the percentage of pupils achieving the expected CfE level in 2020/21 is lower than in 2018/19 for all stages and across all organisers. The size of these decreases range between three and six percentage points and are generally larger than previous changes at national level. The gap between the proportion of primary pupils (combined P1, P4 and P7) from the most and least deprived areas who achieved their expected level in literacy and numeracy has widened since 2018/19 and is now wider than at any point since 2016/17 (the first year for which comparable data is available). Before the pandemic, the year on year trend in the ACEL data was positive.

For young people, there has been a decrease in the percentage of school leavers who were in a positive destination three months after leaving school; 93.3% in 2019/20 compared with 95% in 2018/19 (the lowest since 2014/15 - 93.2%) . Whilst 72.2% of 2019/20 leavers were in Higher or Further Education (the highest rate since consistent records began in 2009/10), the percentage of school leavers in employment decreased from 22.9% in 2018/19 to 16.2% in 2019/20, (the lowest figure on record) and the percentage who were unemployed increased from 4.5% to 6%.

Among those in further and higher education, there is evidence of cumulative impacts on mental health due to a range of issues including isolation and lack of contact with lecturers, tutors and peers. The National Student Survey 2021[171] showed that only 39% of students at Scottish universities were satisfied that providers had taken sufficient steps to support mental wellbeing during the pandemic.

While online learning has allowed for the continuation of many courses, some students have disengaged with online provision and others have chosen not to take

[170] COVID-19 Early Years Resilience and Impact Survey (CEYRIS) - COVID-19 and children research - COVID-19 data and intelligence - COVID-19 - Our areas of work - Public Health Scotland
[171] https://www.officeforstudents.org.uk/advice-and-guidance/student-information-and-data/national-student-survey-nss/nss-data-provider-level/

up opportunities. Even though overall activity increased[172] in the 2020-21 academic year at Scottish colleges, there was a decrease of around 8% in enrolments to their lowest level in 10-years; with much of the decrease occurring in short courses. Courses with a practical component have been particularly adversely affected, and some students have been unable to fulfil mandatory placement elements for some degrees. Among younger students in particular there are potential social skills deficits due to lack of interaction and behavioural issues may increase as a result.

Some of these changes will have knock on effects on employment opportunities for those affected. University[173] and college statistics[174] published in 2021 showed a noticeable movement from work to further study, with increases in unemployment. Those leaving SCQF 1-6 courses (typically further education) at College were particularly affected with over a quarter of sector leavers in 2019-20 unemployed or unavailable for work 3 to 6 months after qualifying.

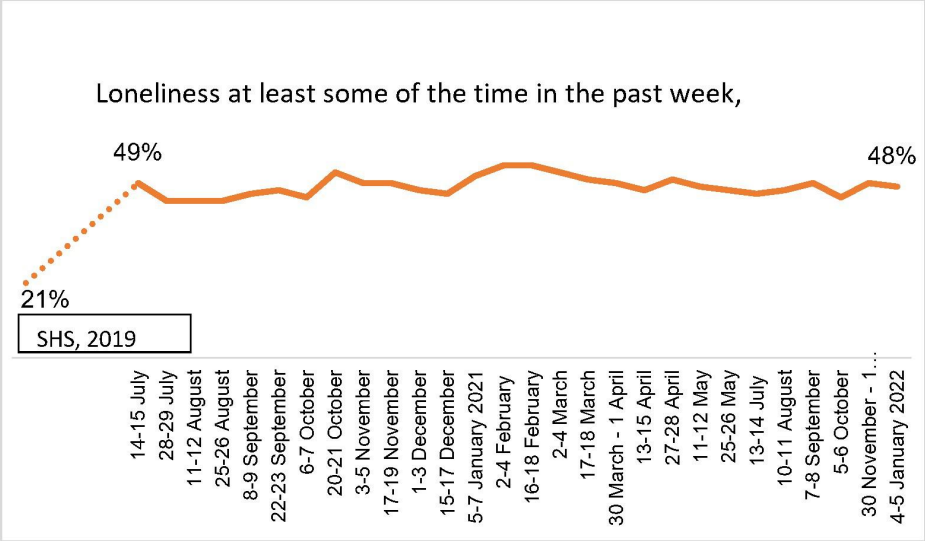
There is also increasing evidence of the wider impacts on children and young people of the pandemic For example, the proportion of Primary 1 children at risk of being overweight or obesity increased by 6.8 percentage points between 2019/20 and 2020/21, having been stable for a number of years prior to this. The most substantial increase was in the proportion of children at risk of obesity. Among children living in the most deprived areas there was an 8.4 percentage point increase between 2019/20 and 2020/21, to 35.7% at risk of overweight or obesity, compared to a 3.6 percentage point increase, to 20.8%, in the least deprived areas

4.6 Loneliness

Loneliness levels have remained high throughout the course of the pandemic, with between 44% to 54% saying they have felt lonely 'in the past week'.[175] This is over double pre-pandemic levels, where 21% of people reported experiencing loneliness 2018[176].

[172] College Statistics 2020-21 (sfc.ac.uk)
[173] GradutatOutcomes Data | HESA
[174] https://www.hesa.ac.uk/data-and-analysis/graduates
[175] Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[176] Scottish household survey 2019: annual report - gov.scot (www.gov.scot)

Figure 16: Loneliness July 2021 – January 2022, Source: YouGov



These effects of the pandemic are still being understood and further research will help to highlight the drivers of loneliness in different cases, and the specific effect that the pandemic has had.

Existing data shows that loneliness is higher amongst young adults, people living alone, those with a mental or physical health condition, people with lower household income, those living with children, amongst those from ethnic minority groups, women, and those living in urban areas[177].

4.7 Social connections

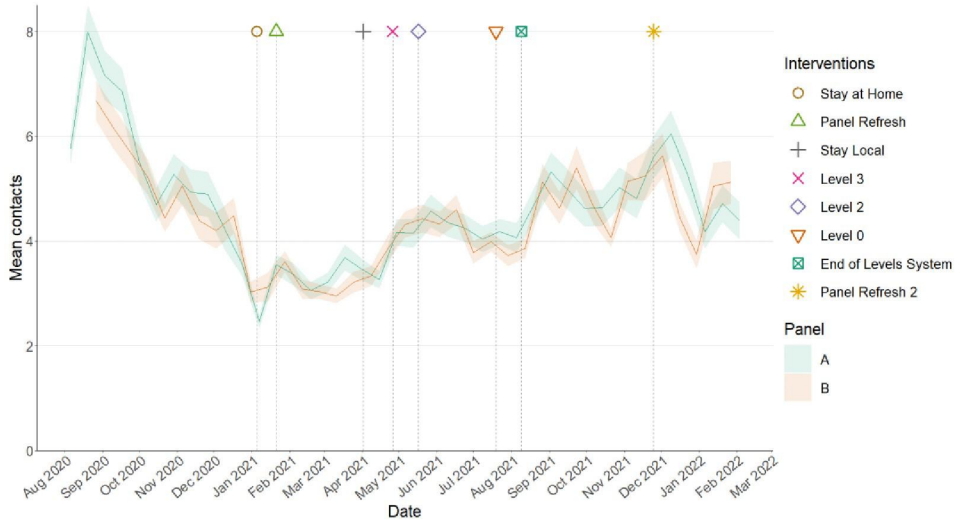
The average number of social contacts that adult Scots have per day has not recovered to pre-pandemic levels at any point over the past 22 months. It has varied to between 2 to 8 contacts. The current average number of social contacts is around 5 per day.[178] In 2017/2018, the average number of social contacts per day was 10.5.[179]

Reduced social contacts often means fewer interactions with people in broader social circles, i.e. the 'weaker' ties (colleagues, neighbours, acquaintances, etc.). In a public health crisis, these "non-essential" contacts may be vulnerable to weakening through social distancing measures. Research from Glasgow University's Institute for Health and Wellbeing, highlights the social value of these 'weaker' ties, that are usually more diverse than most people's main social core, and help to guarantee social capital and relationships that can translate into positive education, employment, health, and other societal wellbeing outcomes[180].

[177] UCL Covid-19 Social Study, 9 December 2021
[178] See the latest issue of modelling the epidemic - gov.scot for Scottish Contact Survey figures
[179] Contacts in context: large-scale setting-specific social mixing matrices from the BBC Pandemic project (medrxiv.org)
[180] COVID-19 pandemic and its impact on social relationships and health, University of Glasgow research

There is growing awareness that relational mechanisms, i.e. the quality and quantity of social contacts, can affect physical and mental health outcomes, as seen with GPs making social prescriptions. Social isolation borne from the pandemic and control measures is an example of how health and social harms intersect (harms 2 and 3 in the Scottish Government's Four Harms framework).

Figure 17: Social contacts August 2020 - February 2022 (Source: Scottish Contact Survey)



4.8 Cultural engagement

Although a large majority engaged with culture and heritage during the pandemic, much of this activity was remote, or not in a shared space setting, or based on physical attendance.

Information about cultural participation during the pandemic is available from the Scottish Household Survey[181]. These data were collected during October 2020 and January to March 2021. The results of the SHS 2020 telephone survey are not directly comparable to SHS results for previous years, because the data collection method changed during the pandemic.

In this research, although 86% of adults had been culturally engaged in the last year – this includes remote participation and also reading - and less than half had 'attended' a cultural activity. When excluding cinema, only 39% of adults had attended a cultural event or place of culture in the last year.

Cultural participation also varies by deprivation, and is lower in more deprived areas. 36% of adults living in the 20% most deprived areas had attended a cultural event or place of culture, including the cinema, compared to 53% of adults living in the 20% least deprived areas.

[181] Scottish Household Survey 2020 - telephone survey: key findings - gov.scot (www.gov.scot)

Research carried out in 2020 by Creative Scotland[182], showed that most of the population had missed cultural events and venues during the lockdown and that there was an appetite for these activities. This work anticipated a slower potential recovery than other parts of the economy, and also dependent on the nature of the art forms, and the venues where work is presented.

4.9 Summary

The pandemic has disrupted social life in areas that are important for maintaining current and future wellbeing, personally, in neighbourhoods and communities, and in wider society.

Prior to the pandemic, a wide range of inequalities already existed across the Scottish population and many of these harms have been exacerbated. The impacts have been worse for the places in Scotland, and subgroups of the population who were previously disadvantaged, or at important life-stages.

There is a future scenario within the pandemic, where a small number of protective measures are needed. This situation may be consistent with the provision of a wider range of social goods and opportunities for wellbeing than were available during the period when the most stringent restrictions were in force. This may include a more permanent return to the work, education, culture and social opportunities that create and maintain social and human capital.

In this situation worry and anxiety about the virus and the future may impact people's personal and social wellbeing, if it is disproportionate to the level of threat. This may lead to the further erosion of social relationships, social cohesion and opportunity. Messaging around the lifting of measures and restrictions should recognise the different needs and level of risk of different groups of the population.

A different scenario – with fewer or no required protective measures - may still include challenges to recover and maintain people's wellbeing across societal wellbeing outcomes. It may also have unintended negative consequences, including those who are or live with people who are clinically vulnerable.

The pandemic has led to changes in behaviours and expectations that will have a legacy after the pandemic, and society will be different in important, and uncertain ways. This requires careful sense making of public attitudes, behaviours and expectations.

An understanding of societal wellbeing, public behaviours and attitudes towards current worries and future priorities, will help to identify where further support is needed. As well as administrative and behavioural data, it is likely that ground-level research, learning from other jurisdictions, inclusive participatory data gathering, and space for reflective planning, will help ensure a societal recovery from the pandemic.

[182] Creative Scotland 2020: covid-summary-final.pdf (creativescotland.com)

5. Impact on the economy

5.1 Introduction

Many parts of the economy have been disrupted in various ways and for an extended period of time by the pandemic. Restrictions have closed businesses in some sectors and have also limited the capacity at which businesses can operate through, for example, physical distancing. Businesses less directly affected by restrictions have still been affected by the pandemic as a result of changing consumer demands and ongoing uncertainty.

5.2 The recovery of the economy

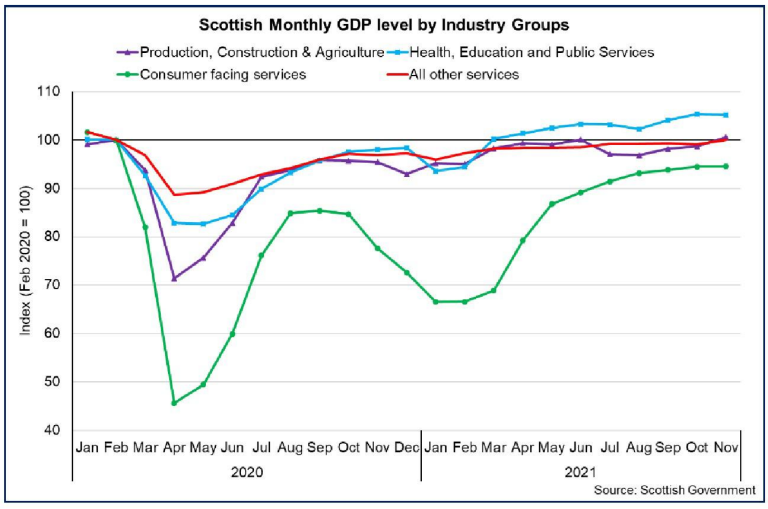
As the initial lockdown lifted, and as business and society reopened, there was a reversal of the output contraction for many parts of the domestic economy.

Overall economic output in Scotland, as measured by Gross Domestic Product (GDP), has recently returned to its pre-pandemic level of February 2020 for the first time. The economy is now 0.6% above its pre-pandemic level. Latest monthly data show Scotland's GDP grew 0.8% in November.

There remains significant differences across sectors in the pace of recovery, which continues to partly reflect the restrictions that have been in place, levels of demand across sectors at this stage of the recovery and the impact of supply chain disruptions on the pace of activity.

Within the services sector, output in consumer facing services remains 5.5% below pre-pandemic levels while output from health education and public services is 5.2% above its pre-pandemic level and output from all other services is back to the same level of output as prior to the pandemic (Figure 18).

Figure 18: Economic Output Compared to Pre-Pandemic Levels[183]



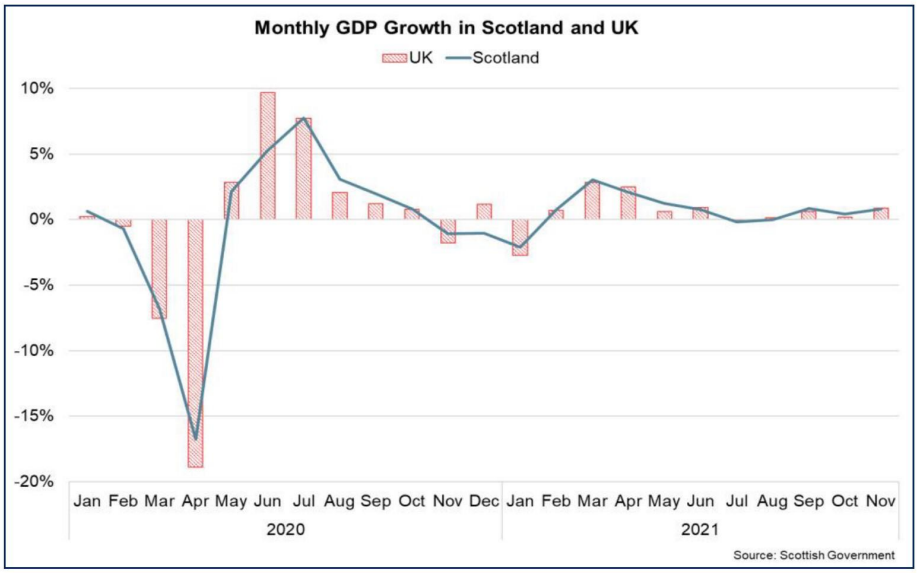
[183] GDP Monthly Estimate: November 2021 - gov.scot (www.gov.scot)

5.3 Economic output has fallen in periods of restrictions

In periods of restrictions, economic output has fallen as a result of fewer businesses trading as well as the limits placed on operational capacity, such as physical distancing.

Compared to the initial lockdown in April 2020, the impact on output has been more limited, reflecting both the lesser extent of restrictions as well as the abilities shown by many businesses to adapt their business models. For example, in April 2020 GDP fell 16.7% and in January 2021 it fell 2.1% (Figure 19).

Figure 19: Scottish Monthly GDP over the Period of the Pandemic[184]



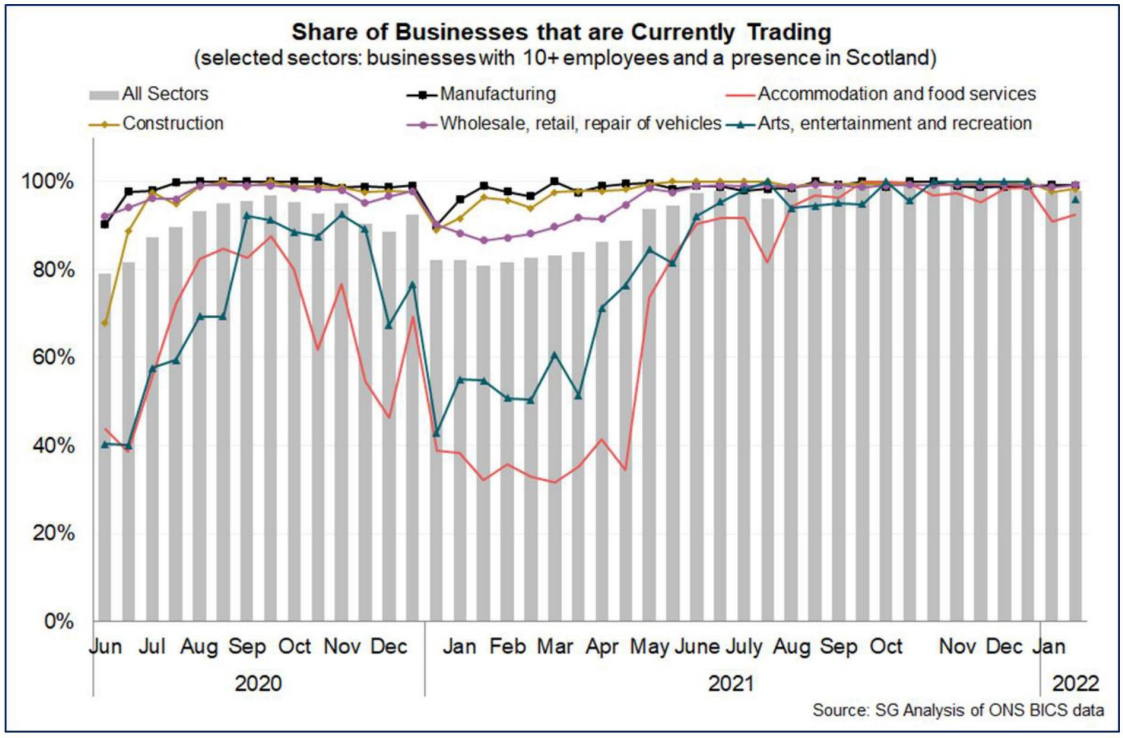
5.4 Sectoral differences in trading patterns

At the beginning of the pandemic, around 80% of businesses were trading in some form in June 2020 (earliest period for which data available). The share of businesses trading has fluctuated as restrictions have changed (Figure 20). There are notable differences across sectors with around 40% of businesses in the accommodation and food services and arts, entertainment and recreation sector trading in June 2020. Even if a business is trading, it may not be operating at the same level of output due to limits to capacity such as physical distancing.

Since August 2021, an average of 99% of businesses have been trading in Scotland and the gap between sectors that had been most directly impacted by restrictions had effectively closed. In January 2022, 98% of all businesses were trading in some form. The accommodation and food services sector reported a lower share of businesses trading at 92.6% reflecting the restrictions in place at that time.

[184] GDP Monthly Estimate: November 2021 - gov.scot (www.gov.scot)

Figure 20: Share of businesses Trading Over the Period of the Pandemic[185]

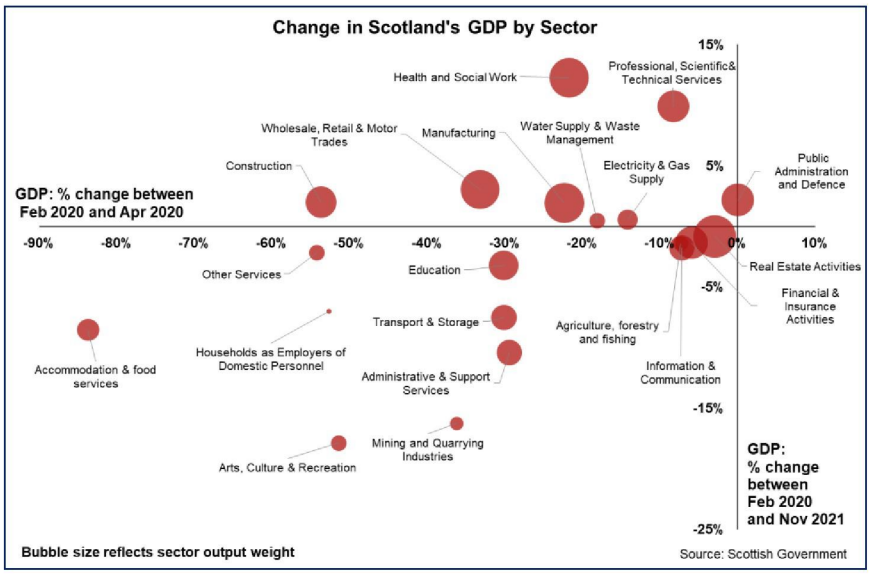


5.5 Sectoral differences in economic output and recovery

The economic recovery, at present, is K shaped and the sectors that are most impacted by restrictions remain the hardest hit. Figure 21 shows that economic output in Accommodation and Food Services fell around 85% during the first lockdown and its output is remains 8.5% below pre-pandemic levels of output. Output in the Arts, Culture and Recreation services fell around 50% during the initial lockdown and remains 17.9% below pre-pandemic levels.

[185] BICS weighted Scotland estimates: data to wave 48 - gov.scot (www.gov.scot)

Figure 21: Changes in economic Output by Sector in Initial Lockdown and Compared to Pre-Pandemic Levels[186]



5.6 Turnover and business resilience have been impacted

The financial performance of businesses also continues to vary across sectors. Figure 22 reports views on business turnover in January 2022. It shows that, 29% of all business reported having lower turnover than normal for the time of year[187].

Lower than normal turnover continues to be most widespread in the accommodation and food services sector (59%) and Arts, Entertainment and Recreation (47%).

[186] GDP Monthly Estimate: November 2021 - gov.scot (www.gov.scot)
[187] BICS weighted Scotland estimates: data to wave 48 - gov.scot (www.gov.scot)

Figure 22: Business Views on Levels of Turnover Compared to What Would Normally be Expected, By Sector[188]

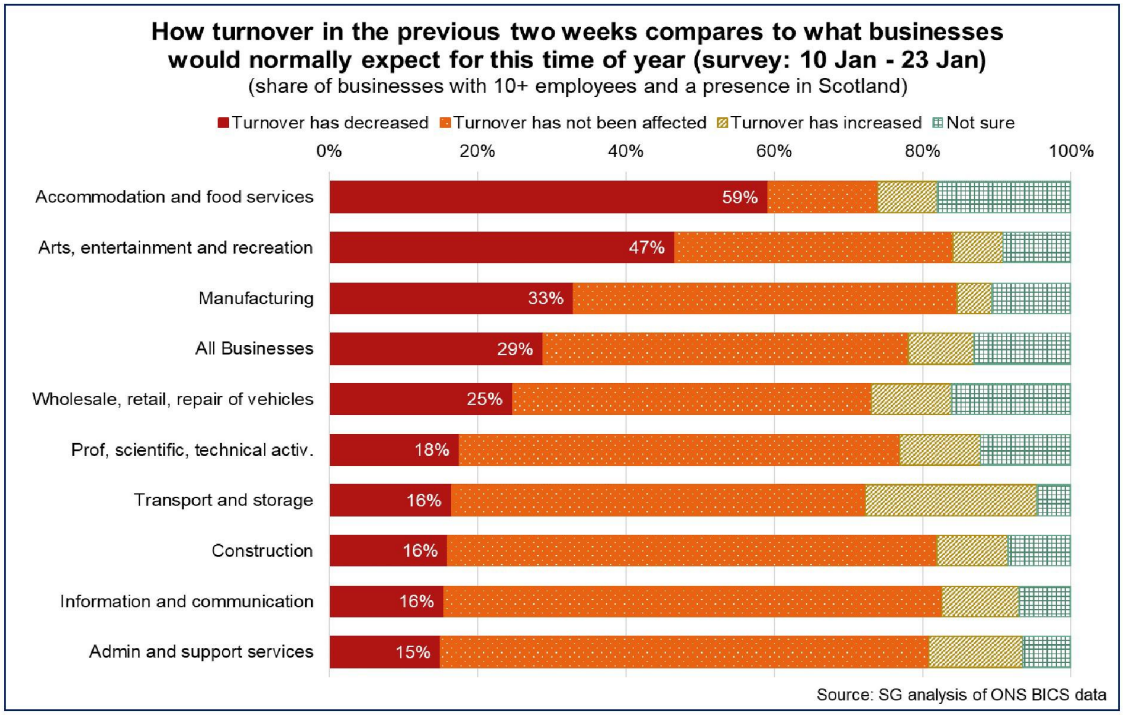
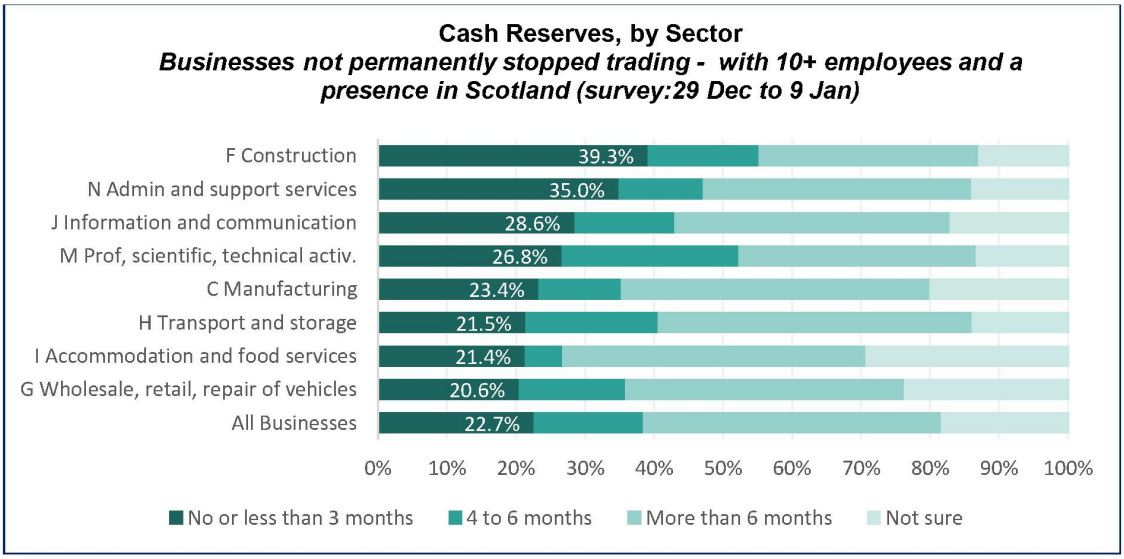


Figure 23 shows that business resilience remains a key challenge for many businesses, with data for January 2022 showing that 21.4% of Accommodation and Food Services businesses have no or less than 3 months of cash reserves.

Figure 23: Business Views on Cash Reserves, By Sector[189]

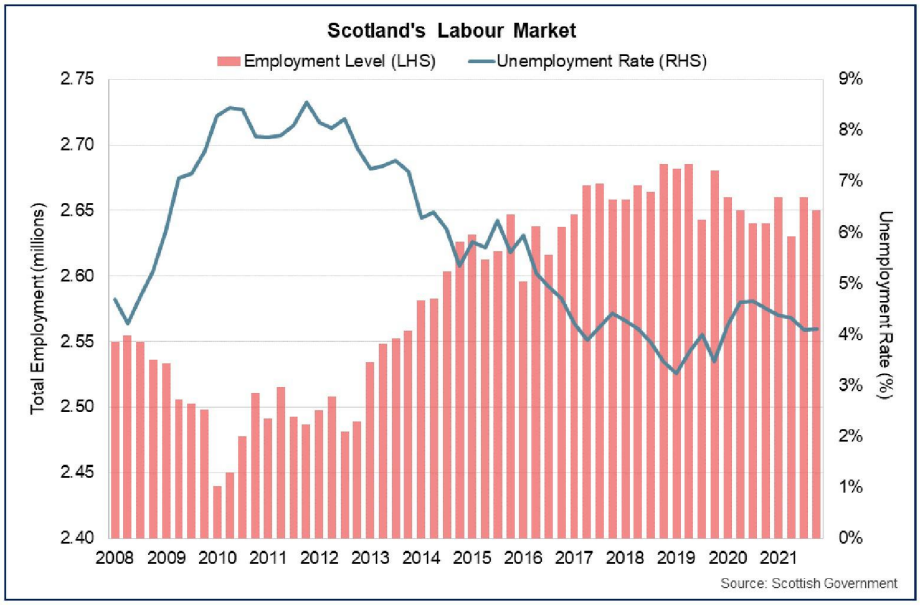


[188] BICS weighted Scotland estimates: data to wave 48 - gov.scot (www.gov.scot)
[189] BICS weighted Scotland estimates: data to wave 47 - gov.scot (www.gov.scot)

5.7 Labour market headline indicators are strong

The headline labour market indicators compare well against historical trends, reflecting the success of the furlough scheme in protecting jobs. The latest labour market statistics for October to December 2021 show that 2.65 million people were employed in Scotland, an employment rate of 74.1% (up 0.8 percentage points over the year), and the unemployment rate was 4.1% (down 0.5 percentage points over the year) (see Figure 24).

Figure 24: Trend in Employment and Unemployment Rate 2008-2021[190]



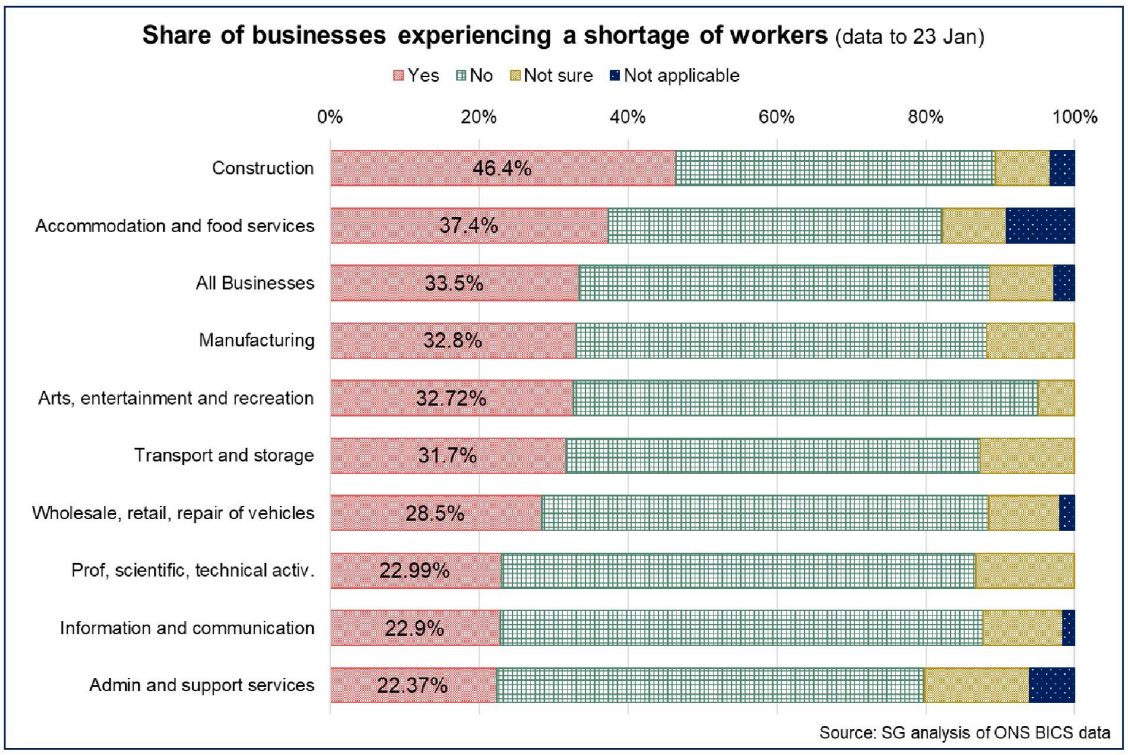
The furlough scheme supported 911,900 unique jobs in Scotland (11.7 million across the UK) and at the end of the scheme in September, 80,800 jobs were being supported - 50.9% of furloughed employments on flexible furlough and the remaining 49.1% fully furloughed[191].

5.8 Labour shortages

Many sectors are currently experiencing staff shortages in part as a result of supply and demand imbalances as the economy has reopened. Figure 25 shows that at the end of January 37.4% of businesses in Scotland in the Accommodation and Food Services sector are currently experiencing staff shortages as the economy has re-opened.

[190] Labour market trends: February 2022 - gov.scot (www.gov.scot)
[191] Coronavirus Job Retention Scheme statistics: 16 December 2021 - GOV.UK (www.gov.uk)

Figure 25: Business Views on Staff Shortages, By Sector[192]



Self-isolation rules have amplified this challenge. Latest surveys[193] show that 3.2% of the workforce were estimated to be on sick leave or not working because of coronavirus (COVID-19) symptoms, self-isolation or quarantine, this is the highest the figure has been since comparable estimates began in June 2020. The Accommodation & Food Services industry sector reported the highest absence share (6.0%).

5.9 Working from home and city centre economies

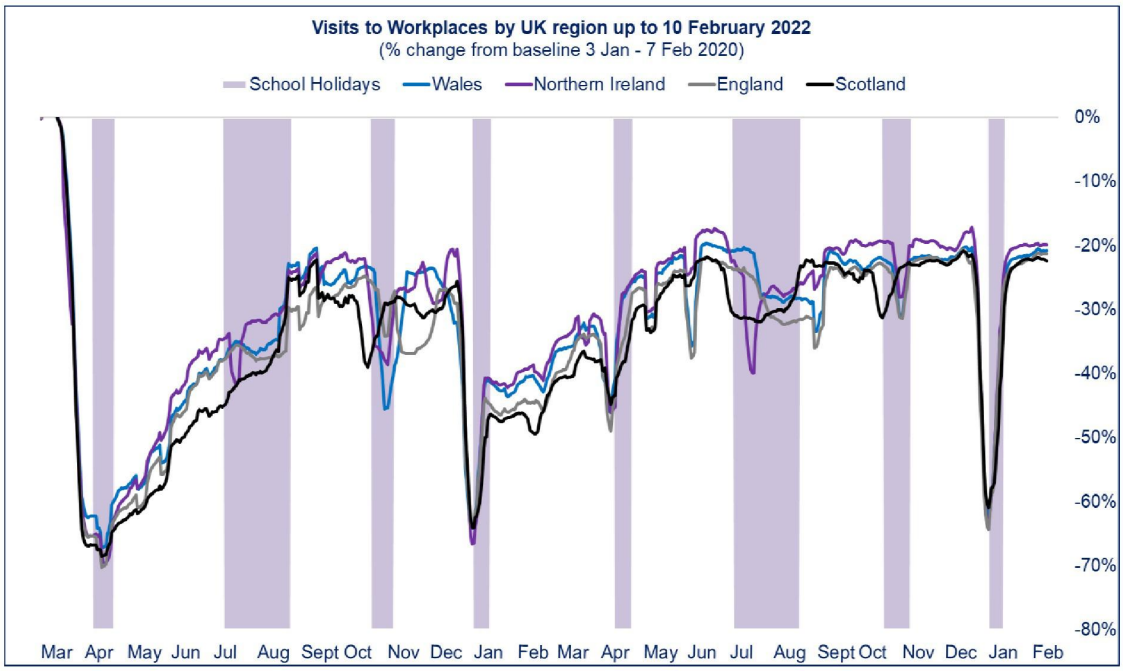
Visits to workplaces have remained consistently below pre-pandemic levels throughout the pandemic but the level has fluctuated as restrictions have varied throughout the UK (see Figure 26). As at 10 February 2022, visits to work places in Scotland are around 22% below their pre-pandemic level. In periods of lockdown, visits to workplaces have been around 60% to 70% below pre-pandemic levels.

There is also evidence that visits to work places continue to vary across Local Authorities in Scotland with cities continuing to be amongst the areas in which visits remain furthest below pre-pandemic levels. For example, in the 7 day period to 10th February 2022 visits to workplaces in Edinburgh remain 31% below and those in Glasgow 26% below pre-pandemic levels[194]. Working from home affects businesses

[192] BICS weighted Scotland estimates: data to wave 48 - gov.scot (www.gov.scot)
[193] Business Insights and Conditions Survey (BICS) Wave 47, 2022
[194] The figures are taken from COVID-19 Community Mobility Reports published by Google and represent 7-day moving averages to control for daily volatility. The daily estimate for the 10th February 2022 itself, show visits to work places in Edinburgh and Glasgow were 41% and 36% below pre-pandemic levels, respectively.

most reliant on office trade, hospitality, retail, which tend to be in city centre locations.

Figure 26: Visits to Workplaces Compared to Pre-Pandemic Levels Over the Period of the Pandemic[195]



5.10 Summary

Many parts of the economy have been disrupted in various ways and for an extended period of time by the pandemic. Restrictions have closed businesses in some sectors and have also limited the capacity at which businesses can operate through, for example, physical distancing. Businesses less directly affected by restrictions have still been affected by the pandemic as a result of changing consumer demands and ongoing uncertainty. This has had a negative impact on economic output at repeated points throughout the pandemic and prolonged period of restrictions in some sectors has weakened business resilience.

As the initial lockdown lifted, and as business and society reopened, there was a reversal of the output contraction for many parts of the domestic economy. However, not all sectors have recovered at the same rate - the economic recovery is at present K shaped with the sectors that have been most impacted by restrictions remaining furthest below their pre-pandemic levels of output. Moreover, even with economic output back or close to pre-pandemic levels, the economy would have grown during the pandemic period, highlighting forgone output growth from the pandemic.

Restrictions such as working from home have had a negative impact on city centre economies in particular, as a result of loss of the associated footfall from office trade in the hospitality and retail sectors.

[195] The figures are taken from COVID-19 Community Mobility Reports published by Google and represent 7-day moving averages to control for daily volatility

The headline labour market indicators compare well against historical trends, with unemployment at 4.1% in the period October to December 2021. This reflects the success of the furlough scheme in protecting jobs and underlines the important role of financial and business support in protecting the productive capacity in the economy.

A future scenario within the pandemic could still pose economic challenges, even without restrictions. This is because consumers could change their behaviour, for example in response to any new variant, and voluntarily stay away from some settings, resulting in lower consumption in these sectors of the economy. Self-isolation rules could also lead to work absences with potential adverse consequences for productivity. Although businesses have adapted their business models throughout the pandemic, ongoing uncertainty makes business planning more difficult.

6. Looking to the future

6.1 Introduction

This section of the paper looks to the future. It starts off by examining scientific developments, presents the latest evidence on non-pharmaceutical interventions, looks at evolving public attitudes and expectations and considers issues of inequalities. As all countries are grappling with pandemic management there is a summary of the experience of other countries facing the same challenges.

Having presented updated evidence on the tools available to manage the pandemic, the next stage is to consider a range of plausible futures using a 'four worlds' model to illustrate what the future may hold and to outline the various implications of each scenario. These futures are not predictions but useful heuristic tools to support planning.

Data and analysis has played a key role in managing the pandemic to date. For the future there will be a need to develop a suite of indicators that can be used as signals of change and consider how these are reported. Finally, learning from previous experience enables enhanced management in the future and brief details are set out about how this will be achieved.

6.2 The evolving science and trajectory of the epidemic

Almost two years into the SARS-CoV-2 pandemic, it's now accepted that the most likely future scenario for the virus and its associated disease, COVID-19, is one of transition to become endemic, rather than achieving regional elimination.

This means that the virus is not expected to disappear but will be always present in a population within a geographic area[196]. However, it is not known how long the transition to a relatively stable endemic state will take, and how this transition will be in terms of incidence and disease severity. Endemic diseases are not only mild in severity, they can be both widespread and cause serious illness and death (e.g. malaria or tuberculosis)[197] [198].

Once endemic, it is likely that SARS-CoV-2 will have winter peaks of varying size and circulate alongside influenza and other respiratory viruses. Previous pandemics involving influenza have lasted 1-3 years. Pathogens arising from these, such as influenza A H1N1 (1918), influenza A H3N2 (1968), influenza A H1N1 (2009) moved on to become endemic with winter peaks in incidence that were largely predictable[199]. After the initial waves these diseases were associated with declining fatality rates partly due to immunity from natural exposure and vaccination tailored towards the anticipated changes and dominant strains.

An optimistic view for SARS-CoV-2 is that enough people will develop and retain sufficient natural or vaccine mediated immunity to prevent large scale hospitalisation

[196] Endemic: MedlinePlus Medical Encyclopedia
[197] COVID-19: endemic doesn't mean harmless (nature.com)
[198] Covid in Scotland: What happens when the virus becomes endemic? - BBC News
[199] Influenza: The Once and Future Pandemic (nih.gov)

and death and that this may also assist in reducing transmission. However this would only be the case if a variant which escapes natural and vaccine immunity does not present itself. Even without an escape variant it is hard to anticipate how long it would take to reach a situation where SARS-CoV-2 falls into an annual cycle like influenza which could be many years.

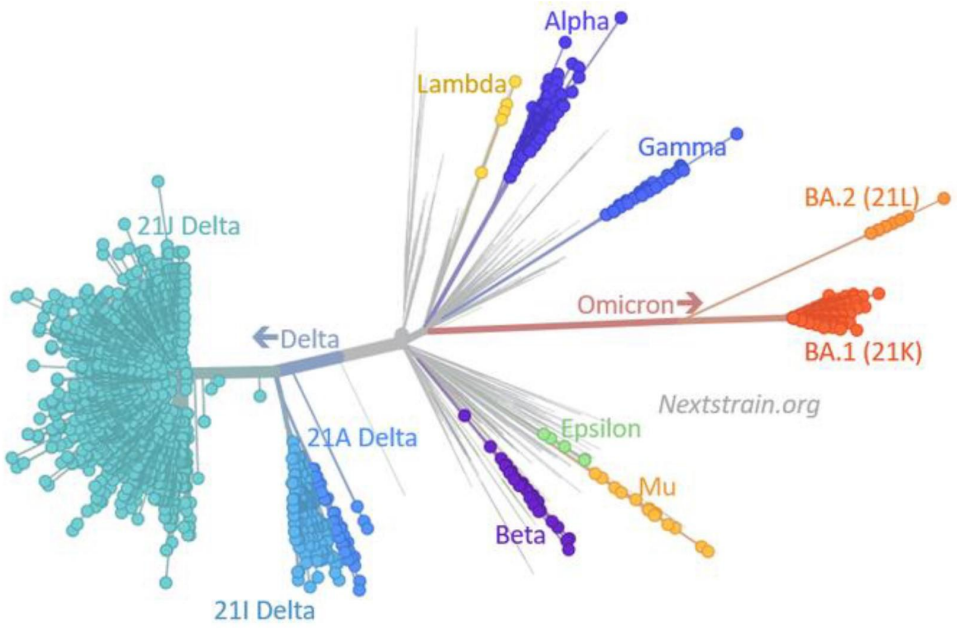
SARS-CoV-2 is likely to become the fifth coronavirus that infects humans to become endemic; previous types have demonstrated seasonal waves of infection but to this point it has been unclear whether they do so through waning immunity or viral mutation and immune evasion. More recent studies suggest that it is this latter mechanism that is the most important and is best seen in the study of coronavirus 229E. The emergence of Delta and Omicron variants of SARS-CoV-2 strengthen this theory[200].

New lineages of SARS-CoV-2 have replaced the pre-existing dominant variant very rapidly. In Scotland, Alpha was replaced by Delta which was then replaced by Omicron, all of which were genetically distinct and from different antigenic clusters, see Figure 27– SARS-CoV-2 lineages; Figure 28 - variants in Scotland. This instability and higher degree of antigenic "shift" or "jump" means that it is much more difficult to predict what future scenario we are most likely to face. The next variant of global importance may not be an offspring of Omicron. Although Omicron is less severe than the previous variant Delta, it is not a given that SARS-CoV-2 will continue to become less severe over time, and it is possible that the next variants will be more severe and may evolve from the wild-type strain or another lineage.

[200] A human coronavirus evolves antigenically to escape antibody immunity (plos.org)

Figure 27: Diagram showing variants of concern and the genetic distance between them (where distance is in mutations).

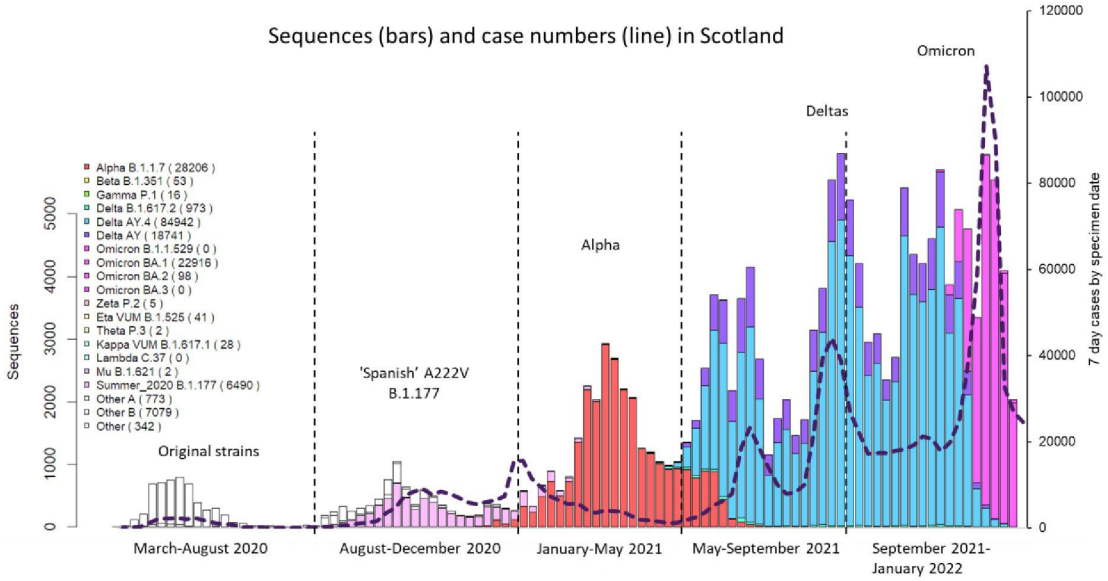
Figure created by Dr Emma Hodcroft, University of Bern, using Nextstrain [201]. Hadfield et al., Nextstrain: real-time tracking of pathogen evolution, Bioinformatics (2018)[202].



[201] Nextstrain / ncov / gisaid / global / 2022-01-26
[202] Nextstrain

Figure 28: Diagram of number of sequences of each lineage in Scotland, as well as 7 day case numbers.

The figure was made using data accessed on 31 January from the public COG-UK data set [203] [204] using an R script adapted from Dr Samantha Lycett, Roslin Institute, University of Edinburgh[205].



The genomes of viruses change over time through a number of mechanisms, sometimes resulting in small changes in the genome of the virus and sometimes resulting in larger changes and the emergence of new variants. In immunocompromised people, infections and therefore the replication of virus may be prolonged. This increases the potential for emergence of variants. Case studies have documented the emergence of unusually high numbers of genetic changes in immunosuppressed individuals treated with convalescent plasma. All the current SARS-CoV-2 VOCs have multiple mutations across the genome. Single point mutants on top of VOCs such as Alpha and Delta have not (yet) emerged to dominate over the existing VOCs. This implies current variants either evolved during long term persistent infection, or under circumstances of intense transmission with wide selection bottlenecks or in places of sustained but undocumented transmission[206].

The number of emerging variants will depend on the number and stringency of disease control measures adopted by Governments. Global vaccination is likely to

[203] https://www.cogconsortium.uk/tools-analysis/public-data-analysis-2/
[204] COG-UK is supported by funding from the Medical Research Council (MRC) part of UK Research & Innovation (UKRI), the National Institute of Health Research (NIHR) and Genome Research Limited, operating as the Wellcome Sanger Institute.
[205] SL received support from Chief Scientist Office Project (COV/EDI/20/11), Scottish Government Rural and Environment Science and Analytical Services Division as part of Centre of Expertise on Animal Disease Outbreaks (EPIC), and the BBSRC Institute Strategic Programme grant to Roslin Institute (BB/J004235/1)
[206] Long term evolution of SARS-CoV-2, 26 July 2021 - GOV.UK (www.gov.uk)

reduce the global incidence and therefore the likelihood of emergence of variants however, it is yet unknown how levels of vaccination affect the relative risk of the emergence of immune escape variants[207].

At this stage in the pandemic, with high population immunity as a result of natural exposure and vaccination, it is more likely that the future evolutionary path will be one that will promote immune evasion[208]. The outcome would be seasonal waves, propelled largely by spread in older adults, who could develop severe symptoms. Annual vaccination would reduce disease severity and slow transmission, but fast evolution would mean the vaccines wouldn't always be well matched to circulating viral strains[209]. The fast spread of a variant would increase the population's immunity but it could also create favourable conditions for emergence of new potentially more severe, more transmissible, drug resistant or vaccine escaping variants[210]. However, there is a limit to the amount of changes to the virus genome that can occur for it evolve into a more efficient variant.

With antiviral therapies becoming more widespread, it is likely that adaptation to evade therapy in addition to immunity are going to become more important for this SARS-CoV-2, and therefore surveillance to monitor drug resistance and vaccine escape are going to be more critical as we move toward a more stable endemic state.

In the short to medium term, it is likely that the Omicron variant will work in our favour; a very transmissible but less virulent variant that may act to increase natural immunity in the population that may protect us to a degree and offer a period of relative stability, particularly as we approach spring and summer 2022.

However, in the longer term, population immunity will wane and new variants may additionally become more immune evading. It is possible that we will see further waves of infection and some may be severe, especially after population immunity has decreased. During the dynamic phase of transition, another major antigenic shift with sufficient ability to confer significant immune escape is almost certain to trigger a large wave of infection and this may not be seasonal if the degree of immune escape is substantial.

6.3 Variant surveillance

Variants of concern (VOCs), variants being monitored (VUMs) internationally[211] and the number of new variants in each of the 4 nations in the UK are reported weekly[212]. UKHSA also publish risk assessments of variants indicating their biological properties and giving a level of risk for different properties and an indication of confidence of the assessment[213].

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[207] International vaccination: Potential impact on viral evolution and UK public health, 21 July 2021 - GOV.UK (www.gov.uk)
[208] Long term evolution of SARS-CoV-2, 26 July 2021 - GOV.UK (www.gov.uk)
[209] Beyond Omicron: what's next for COVID's viral evolution (nature.com)
[210] Long term evolution of SARS-CoV-2, 26 July 2021 - GOV.UK (www.gov.uk)
[211] Tracking SARS-CoV-2 variants (who.int)
[212] COVID-19 variants: genomically confirmed case numbers - GOV.UK (www.gov.uk)
[213] Investigation of SARS-CoV-2 variants of concern: variant risk assessments - GOV.UK (www.gov.uk)

New variants are identified by genomic sequencing, and variants are monitored using genomic sequencing, genotyping (allele specific PCR detection of specific mutations) or a proxy (such as SGTF)[214]. Currently sequencing in Scotland is carried out on a surveillance sample of PCR positive cases. Samples from patients in hospital, and international travellers are prioritised.

Adequate surveillance, internationally and domestically, both at borders and across the population is needed to provide early warning of emerging variants. Borders surveillance in particular is important, with effective genomic sequencing provision of positive cases from international travellers.

Genomic sequencing of wastewater is being undertaken as a research programme. Samples from locations covering approximately 70-75% of the population of Scotland are being sequenced weekly to identify dominant variants and to detect VOCs and VUIs.

6.4 Vaccinations

NERVTAG (New and Emerging Respiratory Virus Threats Advisory Group), via SAGE published advice on three likely routes of potential long term evolution of the virus in July 2021[215]. One of the proposed scenarios describes a variant which could cause severe disease in a greater proportion of the population than has occurred to date. The second scenario assumes emergence of SARS-CoV-2 variants which are able to escape immunity elicited by past strains or vaccination. The third option talks about emergence of a drug resistant variant after the expanded use of anti-virial therapies. SAGE suggested a number of potential solutions to each scenario which involve regular vaccination schedules, ongoing vaccine development to ensure continued good levels of protection and reducing transmission to minimise risk of recombination and introduction of new variants.

SAGE 105 meeting minutes, published on 11 February 2022, included an update on the long-term evolution of the virus. They comment that variants will continue to emerge, and that the scenarios listed above remain valid, including the emergence of variants that are less susceptible to current vaccines, resistant to antiviral drugs, or with differing disease severity (high confidence). The milder disease associated with Omicron may be an exception and new dominant variants may have disease characteristics similar to Delta for example. They suggest that future dominant variants may evolve from variants that are not part of the current dominant global landscape. They recommend further analysis of the origin of different SARS-CoV-2 variants, particularly focused on immune compromised hosts where longer term (persistent) infections can become established that could assist viral evolution, along with potential zoonotic crossover events from animal to human. They also recommended that antiviral therapies should only be used when necessary and that if a highly immune escaping variant emerged, access to effective antivirals will be critical (medium confidence)[216].

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[214] SARS-CoV-2 variants of concern and variants under investigation- Technical briefing 34 (publishing.service.gov.uk)
[215] Long term evolution of SARS-CoV-2, 26 July 2021 - GOV.UK (www.gov.uk)
[216] S1509_SAGE_105_minutes.pdf (publishing.service.gov.uk)

To date, all licensed vaccines in the UK have been designed based on the original strain of SARS-CoV-2 that was circulating in Spring 2020. However, there are many vaccines in development worldwide at different stages of the clinical trial and regulatory pipeline[217].

Waning immunity is when a person's immune response decreases over time after an initial infection or vaccine[218]. Data from numerous studies indicate that neutralising antibodies last from 5-7 months[219] for up to one year[220] after SARS-CoV-2 infection. Individuals with severe illness produce more antibodies[221] and vaccination of individuals who have already been infected induces higher levels of protection than following vaccination alone[222] [223]. However, Omicron can infect people who have been vaccinated or who have had a previous infection more readily than compared to previous variants such as Delta[224]. We do not know how long vaccines will work to give good protection against hospitalisation and death, but there is evidence that vaccine effectiveness decreases with time, and antibodies start to decrease several weeks or months after the second and third vaccine dose[225] (see section 2.3).

Pfizer and BioNTech have started clinical trials of a new SARS-CoV-2 vaccine that specifically targets the Omicron variant. Moderna are planning to begin trials of its own Omicron-specific vaccine and the University of Oxford and AstraZeneca have also started working on a new version of their vaccine[226].

It is also important to invest in vaccines which provide cross-protection against a broader spectrum of variants and potentially other coronaviruses, and maintain capacity to rapidly develop vaccines with updated or different spike protein variants[227] [228]. Early studies on immune responses in mice (non-peer reviewed) reported that antibodies elicited through Omicron infection or Omicron specific vaccines were not effective at inducing an immune response against other SARS-CoV-2 variants[229] [230].

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[217] COVID-19 vaccine tracker and landscape (who.int)
[218] Waning immunity | definition of waning immunity by Medical dictionary (thefreedictionary.com)
[219] How long does covid-19 immunity last? | The BMJ
[220] One year later: SARS-CoV-2 immune response and vaccination of healthcare workers post-infection - Journal of Infection
[221] How long does covid-19 immunity last? | The BMJ
[222] One year later: SARS-CoV-2 immune response and vaccination of healthcare workers post-infection - Journal of Infection
[223] Reduced Risk of Reinfection with SARS-CoV-2 After COVID-19 Vaccination — Kentucky, May–June 2021 | MMWR (cdc.gov)
[224] 12 January 2022 Risk assessment for SARS-CoV-2 variant: Omicron VOC-21NOV-01 (B.1.1.529) (publishing.service.gov.uk)
[225] COVID-19 vaccine weekly surveillance reports (weeks 39 to 5, 2021 to 2022) - GOV.UK (www.gov.uk)
[226] Pfizer and BioNTech start trials of new Omicron-specific jab - BBC News
[227] Long term evolution of SARS-CoV-2, 26 July 2021 - GOV.UK (www.gov.uk)
[228] COVID-19: endemic doesn't mean harmless (nature.com)
[229] Omicron-specific mRNA vaccine induced potent neutralizing antibody against Omicron but not other SARS-CoV-2 variants | bioRxiv
[230] Limited cross-variant immunity after infection with the SARS-CoV-2 Omicron variant without vaccination | medRxiv

There are many possible innovations in vaccine development, for example, vaccines which are more effective against infections and produce a longer lasting immune response would be very useful[231].

Examples are the vaccine in development by Valneva which contains an adjuvant which may help to make it more effective in older people[232] and Vaxart are developing an oral vaccine which could tackle the issue of needle phobia[233].

Akston Biosciences have recently received approval to conduct a Phase II/III clinical trial for a vaccine which is stable at room temperature for at least six months unlike the current licenced vaccines. This vaccine could potentially be used in regions where storing and transporting vaccines at low temperature is difficult[234].

Further vaccine development (including mRNA vaccines, which produce the most potent responses), development of multivalent or pan-coronavirus agents, treatment and vaccine clinical trials, especially in those who are immunosuppressed will all form part of the future of vaccination.

6.5 Treatments

When the pandemic spread across Scotland and the UK from March 2020, no effective therapies for SARS-CoV-2 were available to clinicians. Rapidly, however, large scale clinical trials have allowed us to have a sound evidence base to introduce effective therapies that have been shown to be effective. There are broadly two classes of therapies that have been developed: those targeting the virus itself (antiviral therapy), and those targeting the host inflammatory response (anti-inflammatory therapy). Resistance to antiviral drugs can occur when mutations spontaneously arise and give the mutated virus a survival advantage in the presence of an antiviral drug[235]. The Therapeutics Taskforce is responsible for the provision of treatments for COVID-19 in the UK[236] [237].

The regularly used existing anti-inflammatory steroid called dexamethasone was successful in clinical trials at reducing Covid related death (in specific sets of patients) and days spent in hospital[238]. It was rapidly included in treatment for hospitalised patients requiring oxygen for COVID-19 and as it targets the host response it is not affected by any of the different variants of SARS-CoV-2 that have emerged and remains a standard of care.

Another anti-inflammatory therapy is the use of antibodies targeting Interleukin-6 (IL-6). Two of these therapies called tocilizumab and sarilumab have shown benefits in clinical trials in intensive care patients with COVID-19, and those in hospital requiring oxygen support[239]. They are now used as standard of care for patients with COVID-

[231] What will tomorrow's Covid-19 vaccines be like? - BBC Future
[232] COVID-19 – VLA2001 – Valneva
[233] Vaxart COVID-19 Oral Vaccine — Precision Vaccinations
[234] Akston Biosciences | COVID-19 Vaccine
[235] NERVTAG: Antiviral drug resistance and the use of directly acting antiviral drugs (DAAs) for COVID-19 (publishing.service.gov.uk)
[236] The COVID-19 Therapeutics and Antivirals Taskforce - GOV.UK (www.gov.uk)
[237] COVID-19 therapeutic agents: technical briefing 1 (publishing.service.gov.uk)
[238] Dexamethasone in Hospitalized Patients with Covid-19 | NEJM
[239] Interleukin-6 Receptor Antagonists in Critically Ill Patients with Covid-19 | NEJM

19 who have clear evidence of an inflammatory response and a need for oxygen therapy. As they target the host response to infection, their effects are not altered with infection from different SARS-CoV-2 variants.

Other potential anti-inflammatory therapies have been tested in trials or are under evaluation. At the current time, none of these are licensed for use for COVID-19 in the UK. However, there are promising preliminary results for several agents. For example, a drug directly targeting inflammatory pathways called baricitinib has been shown to have potential benefit and further trial evidence will establish its role in the future[240].

Remdesivir is an antiviral drug originally developed for the treatment of hepatitis C, and as a potential treatment for viral hemorrhagic fevers such as Ebola virus disease. A number of trials of Remdesivir for the treatment of COVID-19 have been carried out[241] [242]. The current UK wide interim commissioning policy recommends its use as one possible therapy for community treatment of patients within 7 days of onset with COVID-19 who have a pre-specified risk factor for possible progression to severe disease[243]. It is also an option in the treatment of such high-risk patients who acquire COVID-19 while in hospital and not requiring supplemental oxygen[244] as well as patients admitted with COVID-19 who are receiving oxygen therapy[245]. There is no resistance to Remdesivir yet reported, but as with any antimicrobial agent, this may well arise in the future.

Molnupirivir is a directly acting oral antiviral drug that inhibits SARS-CoV-2 replication. The current UK commissioning policy on the use of Molnupirivir is to recommend its potential use in non-hospitalised patients within 5 days of onset of symptomatic COVID-19 who are at risk of progression to severe disease[246]. However, it is designated as a third-line treatment with Paxlovid as first line, and Remdesivir as second line. As with any anti-microbial, there is a risk of drug resistance developing, although this has not yet been detected.

Paxlovid (nirmatrelvir plus ritonavir) prevents SARS-CoV-2 replication and the drug targets a protein that does not show significant variation in SARS-CoV-2 variants so far described. The current UK commissioning policy on the use of Paxlovid is as a first line therapy in the treatment of non-hospitalised patients within 5 days of symptom onset who are at risk of progression of disease[247]. It is also a first-line therapy for consideration in treating patients with hospital-onset COVID-19 at risk of

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Tocilizumab in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial - The Lancet

[240] Efficacy and safety of baricitinib for the treatment of hospitalised adults with COVID-19 (COV-BARRIER): a randomised, double-blind, parallel-group, placebo-controlled phase 3 trial - PubMed (nih.gov)

[241] Repurposed Antiviral Drugs for Covid-19 — Interim WHO Solidarity Trial Results | NEJM

[242] Early Remdesivir to Prevent Progression to Severe Covid-19 in Outpatients - PubMed (nih.gov)

[243] Antivirals or neutralising monoclonal antibodies (nMABs) for non-hospitalised patients with COVID-19 - CAS-ViewAlert (mhra.gov.uk)

[244] Interim_Clinical_Commissioning_Policy.pdf

[245] Interim clinical commissioning policy: Remdesivir for patients hospitalised with COVID-19

[246] Antivirals or neutralising monoclonal antibodies (nMABs) for non-hospitalised patients with COVID-19 - CAS-ViewAlert (mhra.gov.uk)

[247] Antivirals or neutralising monoclonal antibodies (nMABs) for non-hospitalised patients with COVID-19 - CAS-ViewAlert (mhra.gov.uk)

progression to severe disease[248]. Again, as with all of these antiviral therapies, emergence of resistance remains a risk although not yet currently seen with Paxlovid.

Monoclonal antibodies are artificial laboratory synthesised antibodies that target the SARS-CoV-2 virus. The currently used antibodies bind extremely tightly to the viral 'spike' protein which is essential for virus entry into cells. Hence, they neutralise viral action and thus abrogate the effects of the infection. Ronapreve is a combination of 2 antibodies, however, it has no activity against the omicron variant of SARS-CoV-2, which is now completely dominant in Scotland. Hence, it effectively has become redundant although it might retain activity against future variants. Sotrovimab is another antibody directed against the SARS-CoV-2 spike protein, with different specificity to Ronapreve. It retains activity against the omicron variant. A number of trials have shown that it of benefit in treating patients early in the course of infection[249]. Future variants may not be neutralised by Sotrovimab, but its target is an evolutionarily conserved part of the spike protein that is not directly in the receptor binding domain of the protein and so far retains good activity against all variants of SARS-CoV-2. A number of other monoclonal antibody therapies have been developed and trials of these agents in patients with COVID-19 are underway.

The development of the therapies together with vaccination have greatly improved the outcomes of patients who develop COVID-19. Many more therapies have been developed and are undergoing investigation[250] [251]. Importantly, we will need to know what additional benefit every therapy gives in those who have been vaccinated and in the context of the clinical severity of a particular variant – currently omicron produces a milder disease with less risk of hospitalisation or death in a vaccinated population. However, this may not necessarily be the case for any future variant that arises, so the range of treatments currently available remain important.

6.6 The efficacy of different interventions

Scotland, like other nations, responded to the pandemic in a number of ways to reduce the number of infections, hospitalisations and deaths at the peak of the infection waves. The measures put in place have varied from total lockdown in the first wave to the current restrictions of face covering mandates, COVID-19 vaccine certification in specific settings or testing and checks for international travellers.

The vaccine certification scheme for Scotland was announced on 1 September, 2021 and became enforceable in law on 18 October, 2021. Proof of evidence of vaccination status came into effect for higher risk settings:

- Late night venues open after midnight with alcohol, music and dancing;
- Live indoor unseated events of 500 or more people;
- Live outdoor unseated events of 4,000 or more people; and
- Any event of 10,000 or more people.

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[248] Interleukin-6 inhibitors (tocilizumab or sarilumab) for adult patients hospitalised due to COVID-19 - CAS-ViewAlert (mhra.gov.uk)
[249] Antivirals or neutralising monoclonal antibodies (nMABs) for non-hospitalised patients with COVID-19 - CAS-ViewAlert (mhra.gov.uk)
[250] COVID-19 treatments | European Medicines Agency (europa.eu)
[251] MHRA guidance on coronavirus (COVID-19) - GOV.UK (www.gov.uk)

The scope of the certification scheme in Scotland was narrower than most comparator countries. The certification scheme was modified on 6 December, 2021 to allow individuals to provide proof of a negative COVID-19 test within the previous 24 hours as an alternative to vaccination. The scheme was further amended on 17 January, 2022 to add the requirement that a booster/third dose was necessary to be considered fully vaccinated in response to the immune escape properties of the Omicron variant.

The aims of the vaccine certification scheme were to:

- Reduce the risk of transmission of Coronavirus;
- Reduce the risk of serious illness and death thereby alleviating current and future pressure on the National Health Service;
- Reduce the risk of settings specified in the scheme being required to operate under more restrictive protections, or to close;
- Increase the protection enjoyed by those using settings covered by the scheme and their contacts.

The Scottish Government published two evidence papers covering vaccine certification[252] [253], however, little published evidence exists on the overall effectiveness of vaccination schemes in terms of increasing vaccine uptake or to reduce transmission rates.

One study looking at the impact of certification schemes in France, Germany and Italy, based on counterfactual modelling, suggested that the incentives created by certification increased vaccine uptake by 13% in France, 6.2% in Germany and 9.7% in Italy by the end of 2021. Without the increase in vaccination driven by certification, they estimate hospital admissions (and deaths) would have been 31.3% (31.7%) higher in France, 5.0% (5.6%) higher in Germany, and 15.5% (14.0%) higher in Italy in the period between their introduction and the end of 2021. The researchers also state that in terms of economic impact, the absence of certificates and resulting lower levels of vaccination would have resulted in estimated losses of €6bn in France, €1.4bn in Germany and €2.1bn in Italy by the end of 2021[254].

Direct comparisons to the success (or otherwise) of the certification scheme within Scotland cannot be made as certificates were introduced later in the pandemic in Scotland (October) compared to France, Germany and Italy (July and August). Vaccinations levels were much higher in Scotland at the time of the announcement of the certification scheme compared to when the schemes were announced in France, Germany and Italy, thereby reducing the overall impact of vaccine certification in Scotland. Indeed, comparison of vaccination rates across the 4 UK nations suggests that there was a minor impact on vaccine uptake when the certification scheme was announced in Scotland. At that time, the rate of overall increase in first and second doses was similar across all 4 UK nations, however, they were all starting from an already high level of vaccination uptake and coverage. Several countries including Denmark and Ireland have already abolished their certification schemes.

[252] Coronavirus (COVID-19) vaccine certification: evidence paper - gov.scot (www.gov.scot)
[253] Coronavirus (COVID-19) vaccine certification: evidence paper update - gov.scot (www.gov.scot)
[254] Microsoft Word - WP 2022 01 certificates (bruegel.org)

The general expert view is restrictions or packages of measures are most effective in combination. It is difficult to estimate the effectiveness of each individual intervention or measure on reducing transmission, however, vaccines are the best tool we have to reduce severe disease, death and transmission in the population [255] [256] [257] [258] [259]. Physical distancing is also an established way of reducing transmission of viruses, including SARS-CoV-2[260] [261] [262].

A study estimated the effectiveness of 17 non-pharmaceutical interventions in Europe's second wave and found that business closures, educational institution closures, and gathering bans during the second wave reduced transmission, but the reduction was smaller than in the first wave. They found smaller effects for closing educational institutions in the second wave possibly due to the safety measures put in place during the second wave which made schools safer compared to the first wave[263]. Recent expert opinions are that the harms caused by closing schools during a peak in infections, outweigh possible benefits of any reduction in transmission this may bring, and that school closure should be considered only as a last resort[264].

The UK expert group SPI-B found that there was no sign of decline in effectiveness of interventions when they were reintroduced for a second or third time[265]. The effectiveness of introducing individual interventions or packages of non-pharmaceutical intervention (NPI) measures will depend on the epidemiological context in which measures are introduced, baseline public behaviours in place at the time of the implementation and public adherence to NPIs[266].

In Autumn 2021 when cases were high, but before the start of the Omicron wave, SPI-B, SPI-M and EMG advised that reintroduction of working from home (WFH) guidance may have the largest impact on transmission in England out of the 'Plan B' measures (which also were wearing of face coverings in specific settings and introduction of certification schemes) proposed by UK Government[267]. They also advised that vaccine-only certification may only have a very small direct impact on transmission.

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[255] SPI-B: Behavioural considerations for maintaining or reintroducing behavioural interventions and introducing new measures in autumn 2021, 14 October 2021 - GOV.UK (www.gov.uk)
[256] SPI-B, SPI-M and EMG: Considerations for potential impact of Plan B measures, 13 October 2021 - GOV.UK (www.gov.uk)
[257] EMG and NERVTAG: Update on transmission and environmental and behavioural mitigation strategies, including in the context of Delta, 13 October 2021 - GOV.UK (www.gov.uk)
[258] EMG, SPI-M and SPI-B: Considerations in implementing long-term 'baseline' NPIs, 22 April 2021 - GOV.UK (www.gov.uk)
[259] EMG and NERVTAG: Update on transmission and environmental and behavioural mitigation strategies, including in the context of Delta, 13 October 2021 - GOV.UK (www.gov.uk)
[260] HM Government Social Distancing Review:Report (publishing.service.gov.uk)
[261] Coronavirus disease (COVID-19): How is it transmitted? (who.int)
[262] EMG and SPI-B: Non-Pharmaceutical Interventions (NPIs) in the context of Omicron, 15 December 2021 - GOV.UK (www.gov.uk)
[263] Understanding the effectiveness of government interventions against the resurgence of COVID-19 in Europe | Nature Communications
[264] Schools should still be the last to close and first to open if there were any future lockdown | The BMJ
[265] SPI-B: Behavioural considerations for maintaining or reintroducing behavioural interventions and introducing new measures in autumn 2021, 14 October 2021 - GOV.UK (www.gov.uk)
[266] SPI-B, SPI-M and EMG: Considerations for potential impact of Plan B measures, 13 October 2021 - GOV.UK (www.gov.uk)
[267] SPI-B, SPI-M and EMG: Considerations for potential impact of Plan B measures, 13 October 2021 - GOV.UK (www.gov.uk)

Increasing the range of settings, time-limiting certificates based on last vaccination date, and including proof of a negative test, could increase the potential impact on transmission[268]. They considered other measures that would have a lasting impact are regular asymptomatic rapid antigen testing at the workplace, improved ventilation in schools and workplaces and improved public awareness of the requirement to take a test if symptomatic[269].

In the event of a rapid increase in infections, Juniper (Joint Universities Pandemic and Epidemiological Research) consortium advised that in addition to vaccination certification, face coverings in specific settings and working from home were additional measures that should be considered. Some measures would take longer to implement but would have a lasting impact (listed first), while others are more immediate (but less sustainable) and are listed last.

1. Improved ventilation in schools and workplaces
2. Improved public awareness of hospital capacity status including non COVID pressure
3. Boosters and increased vaccine uptake
4. Test, Trace and Isolate (TTI) (Test and Protect in Scotland)
5. Changes to restrictions and potential lockdowns
6. Antivirals and pharmaceuticals.
7. Travel restrictions [270]

A UKHSA rapid review on the effectiveness of face coverings published in November 2021 suggests that face coverings reduce the spread of COVID-19 in the community[271]. There are preliminary findings from a Department for Education study indicating face coverings may have a potential positive effect in reducing pupil absence. However, there is a high level of statistical uncertainty and the study is yet to be peer reviewed. The benefits of face masks in reducing transmission need to be balanced with the drawbacks, for example, there is evidence from previous studies that pupils find communication and learning more difficult when wearing face coverings[272].

Outcomes are worse for older age groups and some clinical vulnerable people when infected with SARS-CoV-2 and measures to minimise transmission are even more important to protect these cohorts[273].

[268] SPI-B, SPI-M and EMG: Considerations for potential impact of Plan B measures, 13 October 2021 - GOV.UK (www.gov.uk)
[269] SPI-B, SPI-M and EMG: Considerations for potential impact of Plan B measures, 13 October 2021 - GOV.UK (www.gov.uk)
[270] Research and analysis overview: JUNIPER: Control options for mitigating a rapid rise in infection, 12 October 2021 - GOV.UK (www.gov.uk)
[271] The effectiveness of face coverings to reduce transmission of COVID-19 in community settings. A rapid review Nov 2021
[272] Coronavirus (COVID-19) and the use of face coverings in education settings (publishing.service.gov.uk)
[273] COVID-19 advice - High risk groups | WHO Western Pacific

6.7 Public attitudes and expectations

Polling has shown the Scottish public taking a cautious approach throughout the pandemic, with sustained high levels of adherence to the Coronavirus rules and regulations, and a continued belief in the importance of the protective measures that have been in place to manage the spread of Coronavirus[274]. However there have been practical and emotional barriers for some that have affected their ability to adhere to restrictions. This includes, for instance, people's living arrangements, caring responsibilities, availability of food, finances, and health conditions[275].

As the pandemic continues, and following the emergence of the Omicron variant, there are signs that people expect control measures will need to continue.

Polling on restrictions in January 2022 found that 53% of Scottish respondents supported removing some restrictions but not others, with only 17% in favour of removing all of the restrictions and 24% in favour of keeping them all[276].

People are supportive of, and expect to live with some protective behaviours, with 76% agreeing they are happy to follow some rules and guidance if it means they can do the things that matter to them, and 75% agreeing they have a responsibility to follow the rules and guidance from the Scottish Government to keep others safe[277]. Polling suggests the majority of Britons (91%) continue to feel a face covering is important in slowing the spread of COVID-19, alongside booster vaccines (89%) and social distancing (87%)[278].

In Scotland based polling, the behaviours most likely to be considered sensible to still be doing in April/May of this year are respiratory and hand hygiene-related behaviours (e.g. washing/sanitising hands (72%), and covering mouth when coughing (75%) and wearing face coverings in shops/on public transport (68%). Around two thirds (64%) mention keeping up with Covid vaccinations, with slightly smaller proportions citing following self-isolation rules (60%) and using LFD tests (54%). Meeting up with restricted numbers of friends is least likely to be mentioned, at 33%[279].

6.8 Persistent inequalities

Throughout this paper inequalities have been identified. Many of the factors that contribute to these inequalities have been brought together in an analysis of enduring transmission. Enduring transmission can be defined as an area of early increasing prevalence and/or slower decline in prevalence[280], compared to the national average, despite highly restrictive non-pharmaceutical interventions. The drivers are multifaceted and can be both static (population density) or dynamic (public health intervention).

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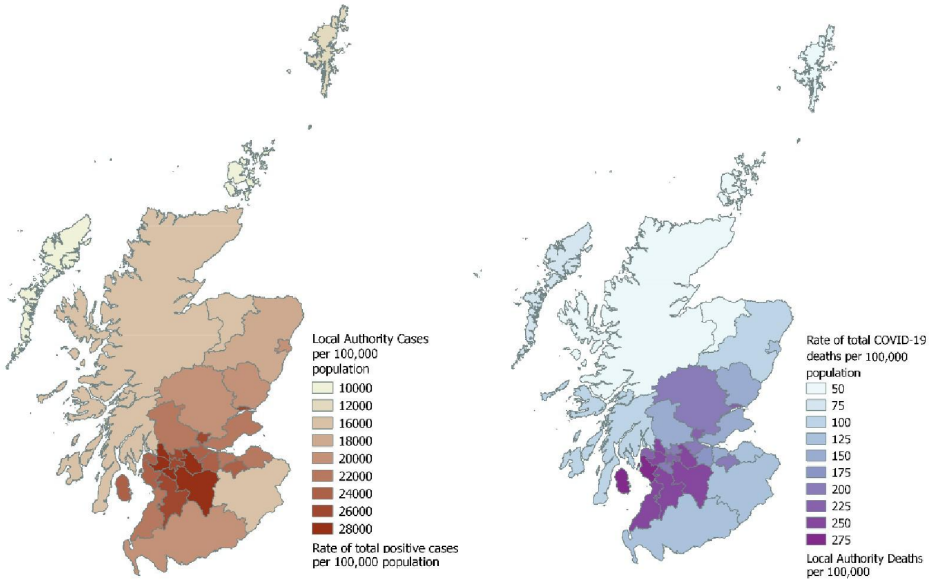
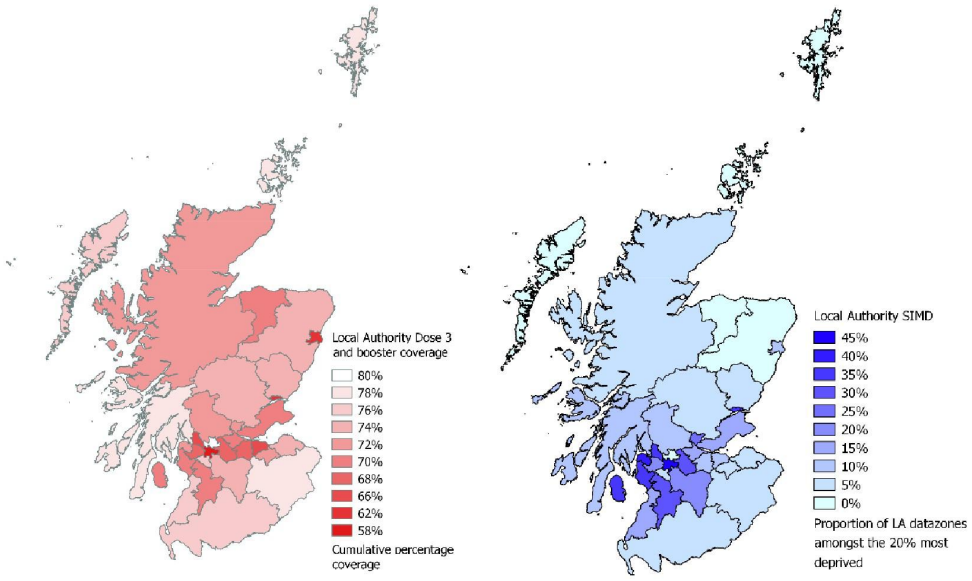
[274] Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[275] Barriers to adherence with COVID-19 restrictions, January 2021
[276] YouGov Daily Question, 19 January 2022
[277] YouGov, 18-20 Jan Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[278] ONS, Coronavirus and the social impacts on Great Britain: 21 January 2022
[279] YouGov, 18-20 Jan Public attitudes to coronavirus: tracker - data tables - gov.scot (www.gov.scot)
[280] Cross organisation study: Risk factors associated with places of enduring prevalence and potential approaches to monitor changes in this local prevalence, 22 April 2021 - GOV.UK (www.gov.uk)

Data relating to elevated rates of cases, compared to the national average, can be considered against demographic and deprivation data to review the potential role of social and economic factors in sustained local transmission. The patterning of areas of enduring transmission observed in Scotland are not explained by socioeconomic deprivation alone. Other drivers of high case rates are likely to be contributing factors to sustained transmission in these areas and are the subject of ongoing research.

Figure 29 below shows how cases, booster coverage and deaths have varied across the country along with a visual showing the distribution of datazones.
Figure 29: A composite of maps of Scotland showing LA cumulative cases, cumulative deaths, booster coverage and proportion of datazones amongst the most deprived. Data to 14 Feb 2022[281] [282] [283]



[281] Daily COVID-19 Cases in Scotland - Total Cases By Local Authority - Scottish Health and Social Care Open Data (nhs.scot)
[282] COVID-19 Vaccination in Scotland - Datasets - Scottish Health and Social Care Open Data (nhs.scot)
[283] Scottish Index of Multiple Deprivation 2020v2 local and national share calculator - gov.scot (www.gov.scot)



6.9 International experiences

6.9.1 Lifted restrictions

Denmark lifted its COVID-19 restrictions on 1 February, 2022, declaring that COVID-19 no longer qualifies as a critical threat[284]. This included ending COVID-19 certification, working from home and facemasks. Recommendations remain for testing and the use of protective measures (certification, face coverings etc.) in high risk areas, such as at hospitals[285]. Both Sweden and Norway have lifted most remaining COVID-19 restrictions, including on social distancing and indoor events[286] [287] and the Dutch government announced that it will lift the majority of COVID-19 restrictions by 25 February[288].

Ireland lifted most restrictions on 22 January 2022, including certification, social distancing, event capacity restrictions and night clubs reopening. From the 24 January, a phased return to offices began. Remaining restrictions including face coverings, self-isolation and protective measures in school are due to reviewed on 28 February[289].

The Prime Minister announced on 9 February, 2022, that the UK Government may lift all domestic regulations a month ahead of their original schedule of 24 March, should data remain supportive[290].

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[284] Denmark Covid restrictions lifted despite increase in cases - BBC News
[285] Rules and regulations (coronasmitte.dk)
[286] Majority of COVID-19 restrictions to be removed on 9 February 2022 - Government.se
[287] National recommendations and rules - regjeringen.no
[288] 3 steps to reopen the Netherlands | News item | Government.nl
[289] COVID-19 restrictions in Ireland (citizensinformation.ie)
[290] Covid-19: Government plans to remove all remaining restrictions in England a month early | The BMJ

Northern Ireland lifted all remaining COVID-19 restrictions on 15 February 2022, announcing that the remaining measures are going to be put in guidance issued to the general public. The use of COVID-19 certificates in nightclubs, face coverings, track and trace requirements and the cap on 30 people allowed in private homes were all removed from law. Guidance on working from home where possible have not been changed[291].

The Welsh Assembly announced the outcomes from the latest review of their coronavirus regulations (10 February, 2022) on 11 February. They stated that their domestic COVID Pass will no longer be required from 18 February, however, this does not impact international travel requirements. From 28 February, face coverings will only be required in shops, on public transport and health and care settings, with an expectation that the legal requirement to wear face coverings will end across all settings by end of March, 2022. They also announced that the requirement for wearing a face covering upon return to schools will be made at local levels (through local guidance framework)[292].

6.9.2 Levels approach to Covid regulation

Chile, Italy and Israel have adopted a levels approach, with regions being allocated a level based on case numbers which determines their level of openness. Chile has 5 levels (Restriction, Transition, Preparation, Initial Opening, and Advanced Aperture) with the majority currently in either Transition or Preparation[293]. Italy has three levels (white, yellow and orange) with the majority in yellow[294] and Israel has a 4 level traffic light approach with red indicating a restraining policy (e.g. lockdowns); orange prevention policies (e.g. high risk closures); yellow a cautious reopening and green a return to normal[295]. The majority of Israel's local councils are currently in red (but not at the strictest form of a lockdown).

South Africa and Australia have a national level plan for emerging from the COVID-19 pandemic. South Africa range from levels 1 to 4 (4 being most restrictive) and are currently in an adjusted version of level 1. Australia have laid out a 4 part plan for reopening based on vaccination levels and are currently in Phase D; a 'Post-Vaccination Phase' of re-opening[296].

The Norwegian government are currently updating their infection control measure guidance and are due to publish in spring a revised pandemic management strategy and emergency preparedness plan[297].

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[291] Minister Swann Announces Easing Of Covid Regulations | Department of Health (health-ni.gov.uk)
[292] Plenary 15/02/2022 - Welsh Parliament (assembly.wales)
[293] Gob.cl - Step by Step (www.gob.cl)
[294] Covid-19, frequently asked questions and table of activities allowed | www.governo.it
[295] Homepage - Corona Traffic Light Model (Ramzor) Website (health.gov.il)
[296] National Plan (australia.gov.au), National Cabinet Statement | Prime Minister of Australia (pm.gov.au)
[297] Development of packages of infection control measures - regjeringen.no

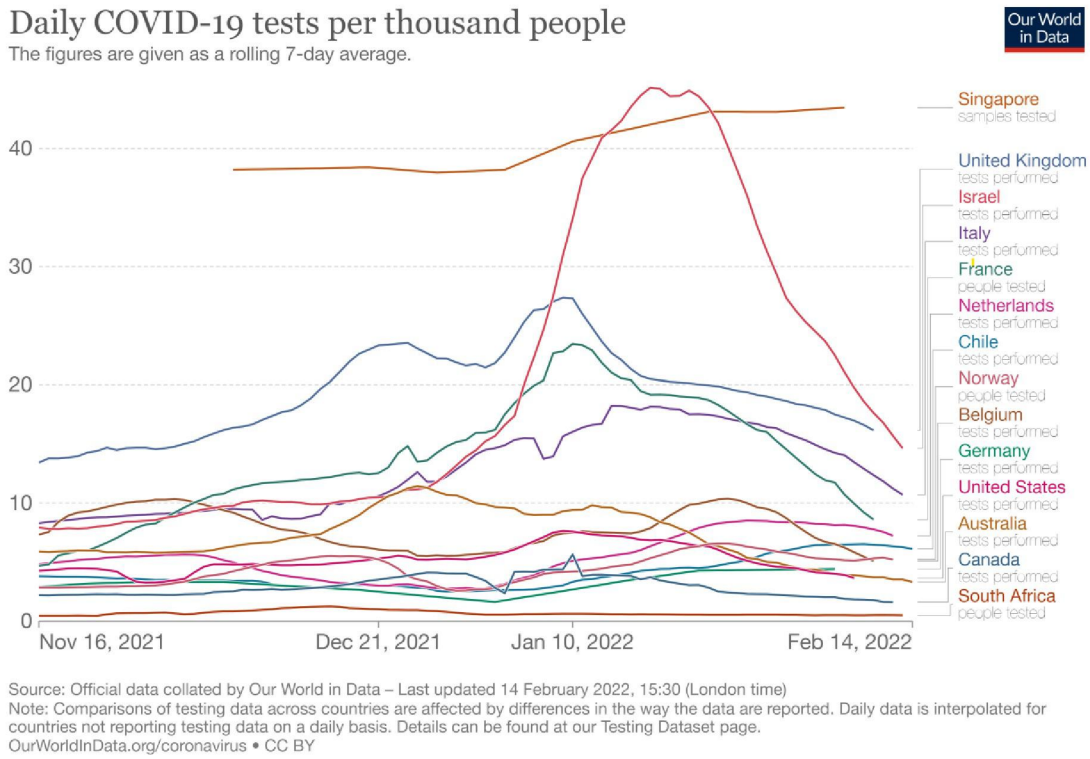
A range of current restrictions have been collated for comparator countries; Australia (New South Wales)[298], Austria[299], Belgium[300], Canada (Ontario)[301], Chile (level 3 region)[302], France[303], Germany[304] (Berlin)[305], Israel (Red region)[306], Netherlands[307], Norway[308], Singapore[309] [310], South Africa[311] and the USA (California)[312].

Daily tests per 1000 people vary but across the majority of comparators, testing has decreased since January echoing the shift to treat COVID-19 as an endemic disease, see Figure 30[313].

[298] COVID-19 rules | NSW Government
[299] Latest Information on the Coronavirus Situation in Austria
[300] What are the current measures? | Coronavirus COVID-19 (info-coronavirus.be)
[301] COVID-19 public health measures and advice | COVID-19 (coronavirus) in Ontario
[302] Gob.cl - Step by Step (www.gob.cl)
[303] Info Coronavirus Covid-19 | Gouvernement.fr
[304] What do you currently need to know about corona (Englisch) (integrationsbeauftragte.de)
[305] Measures against the corona virus - Berlin.de
[306] Homepage - Corona Traffic Light Model (Ramzor) Website (health.gov.il)
[307] Coronavirus measures in brief | Coronavirus COVID-19 | Government.nl
[308] National recommendations and rules - regjeringen.no
[309] gov.sg | Home (www.gov.sg)
[310] COVID-19 Rules and Restrictions in Singapore (Feb 2022) - SingaporeLegalAdvice.com
[311] Regulations and Guidelines - Coronavirus COVID-19 | South African Government (www.gov.za)
[312] Current safety measures - Coronavirus COVID-19 Response (ca.gov)
[313] Coronavirus (COVID-19) Testing - Our World in Data

Figure 30: Daily COVID-19 tests per thousand people since 16 November 2021 in the UK and comparator counties (Australia, Belgium, Canada, Chile, France, Germany, Italy, Israel, Netherlands, Norway, Singapore, S. Africa and USA).

Source: Coronavirus (COVID-19) Testing - Our World in Data, Accessed 16 February 2022.



Facemasks are mandatory indoors and on public transport in the majority of comparator countries, with Singapore also requiring them outdoors. Germany and Austria specify that mask must be of a FFP2 standard.

A version of certification used for events, indoor hospitality and indoor leisure facilities, is widely used in comparator countries, with Singapore, Canada (Ontario) and Australia (New South Wales) only accepting proof of vaccination. In Norway, the use of certification is governed by local municipalities[314] and in Germany (Berlin), a 2G+ model (vaccination or recovery plus testing) is required for certain events, indoor hospitality and leisure unless booster vaccinated.

Most comparator countries encourage a work from home option where possible, with Belgium only allowing one day a week in work, Singapore at 50% reoccupation and Germany (Berlin) only allow people in work if it cannot be done from home. Austria and Germany (Berlin) require proof of vaccination, testing or recovery with Singapore

[314] COVID-19 certificate - helsenorge.no

requiring proof of vaccination or recovery. In Canada (Ontario), you must answer screening questions (including recent travel, vaccination status and symptoms) before attending work. The majority of comparators that allow a return to offices require staff to wear face coverings and/or implement social distancing.

The majority of comparators have capacity restrictions on events and indoor spaces, ranging from 25 in Canada (Ontario) to 2000 in Germany (Berlin). Nightclubs are shut or activities restricted in just under half of the comparators. Private gatherings are restricted in the Netherlands, Singapore and Germany (Berlin). In the Netherlands, you can meet 4 people from one household a day; in Singapore it's restricted to 5 vaccinated people from different households a day and in Germany (Berlin) unvaccinated individuals are restricted to 2 people from one other household per day.

All comparator countries have reopened face to face teaching with the majority requiring face coverings and antigen testing. In Germany (Berlin), the decision remains with the parents if they want their children to attend school in person. In France, Baccalaureate speciality exams have been delayed from March to May 2022.

The minority of comparator countries have made vaccination mandatory, primarily seen for healthcare and education workers[315] [316]. In Italy, vaccination is mandatory for anyone over 50 years and in Austria anyone over the age of 18[317] [318].

6.9.3 International perspectives on the future.

The World Health Organisation (WHO) and the United Nations (UN) have made recommendations on how to recover from the pandemic. Early on in the pandemic the WHO made a manifesto of recovery focusing on improving the environment and investing in essential services[319]. The UN Research Roadmap for COVID-19 Recovery focuses on 5 pillars of recovery (health systems and services; social protection and basic services; economic response and recovery programs; macroeconomic policies and multilateral collaboration; and social cohesion and community resilience)[320]. The UN Research Roadmap aims to better equip researchers, research funding agencies, Governments, UN entities and other international institutions to harness and share collective knowledge and innovation in order to catalyse transformative changes and achieve the Sustainable Development Goals (SDGs).

The European Union (EU), have developed a Recovery and Resilience Facility to help the EU emerge stronger and more resilient from the current crisis. It is helping to fund the recovery of Member States from the pandemic and their resilience to cope with future ones[321]. The main focus for investment is on climate neutrality and digital transitions with Member States being allocated almost 40% of spending to

[315] Vaccination requirements for workers | NSW Government
[316] Vaccine mandates | The Institute for Government
[317] Italy makes vaccines mandatory for over-50s – POLITICO
[318] Austria's Covid vaccine law comes into force amid resistance - BBC News
[319] WHO Manifesto for a healthy recovery from COVID-19
[320] UN Research Roadmap for the COVID-19 Recovery | United Nations
[321] Recovery and Resilience Facility | European Commission (europa.eu)

climate and 26% on digital improvements. Many EU countries have allocated investment to the development and improvement of their health care systems including the construction of the Northern Estonia Medical Campus, 5 new centres of expertise in infectious diseases in Lithuania and upgrades to the Clinic for Infectious Disease in Ljubljana, Slovenia. Full details of plans can be found **here**. In Germany, the newly launched Centre for Pandemic Vaccines and Therapeutics works towards building infrastructure to provide safe and efficient vaccines and therapeutics as quickly as possible in the event of a pandemic[322]. In France, the development of the EMERGEN consortium is improving sequencing capacity for COVID-19 and other diseases[323].

Outside of the EU, Canada announced it is establishing a Centre for Research on Pandemic Preparedness and Health Emergencies working to develop research for pandemic and health emergency preparedness, prevention, response, and recovery that contributes meaningfully to timely, equitable and effective responses and recovery[324]. In the USA, the Biden-Harris administration have announced a Government wide review and update of the US national bio-preparedness policies, focusing on improving medical defences, ensuring situational awareness, strengthening public health systems and developing core capability[325]. In addition, the US National Centre for Epidemic Forecasting and Outbreak Analytics has been created[326].

Ensuring that lessons are learnt is included in the majority of recovery and preparedness schemes, such as Italy's "PanFlu"[327]. The OECD recommends further investigation into the effectives of lockdowns and other restrictions due to the impact on individual liberties, domestic violence, alcohol consumption, and mental health[328].

The idea of 'living with COVID-19' is now being debated in several countries, including Italy, the Netherlands, New Zealand and Spain, however, only Denmark and South Korea have set out comprehensive strategies for what 'living with COVID-19' will look like throughout 2022.

Denmark has created a three-phased strategy that includes the administration of an additional booster dose (i.e. fourth overall) for the most vulnerable, scaling back free antigen testing but encouraging people to conduct self-funded testing throughout the spring. They also plan to monitor COVID-19 through waste water testing and sequence analysis during spring and summer and may consider additional vaccination and the return of some NPI measures during autumn and winter[329]. South Korea published a '2022 Joint Action Plans for fight against Covid-19'. The two main objectives are to bring a timely recovery to the current crisis and a gradual movement to a new normal, and establish the foundation for "living with COVID-19"

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[322] Paul-Ehrlich-Institut - ZEPAI - Center for Pandemic Vaccines and Therapeutics (pei.de)
[323] Consortium Emergen : point d'étape sur son déploiement (santepubliquefrance.fr)
[324] Centre for Research on Pandemic Preparedness and Health Emergencies - CIHR (cihr-irsc.gc.ca)
[325] American Pandemic Preparedness: Transforming Our Capabilities (whitehouse.gov)
[326] CDC Stands Up New Disease Forecasting Center | CDC Online Newsroom | CDC
[327] National Strategic-Operational Plan for Preparedness and Response to an Influenza Pandemic (PanFlu) 2021-2023 (salute.gov.it)
[328] First lessons from government evaluations of COVID-19 responses: A synthesis (oecd.org)
[329] EURACTIV.com – EURACTIV is your one-stop-shop for in-depth news about policies and politics from EU institutions and national capitals.

by building a sustainable disease control and prevention system[330]. The plan promotes vaccination and boosters; expansion of antiviral treatments; 'revamp' of NPIs toward more targeted measures; increase in financial support for (vaccinated or recovered) self-isolators; and expansion of contact-tracing and genomic surveillance.

6.10 Summary

Looking forward, the ability to manage the pandemic has changed significantly over the past two years. A better understanding of the science of the pandemic, the emergence of variants, the range of effective vaccines available, the development of new treatments and the efficacy of different interventions all contribute to a new range of tools to manage the pandemic in the future. Public understanding has developed, and the importance of monitored public attitudes has been highlighted. However there are areas of persistent inequality that have emerged and will need to be researched and addressed. Finally, Scotland is not alone in tackling the pandemic and can continue to learn from the experiences of other countries in the future.

[330] Ministry of Health & Welfare : News & Welfare Services > Press Release View Content (mohw.go.kr)

7. Plausible scenarios

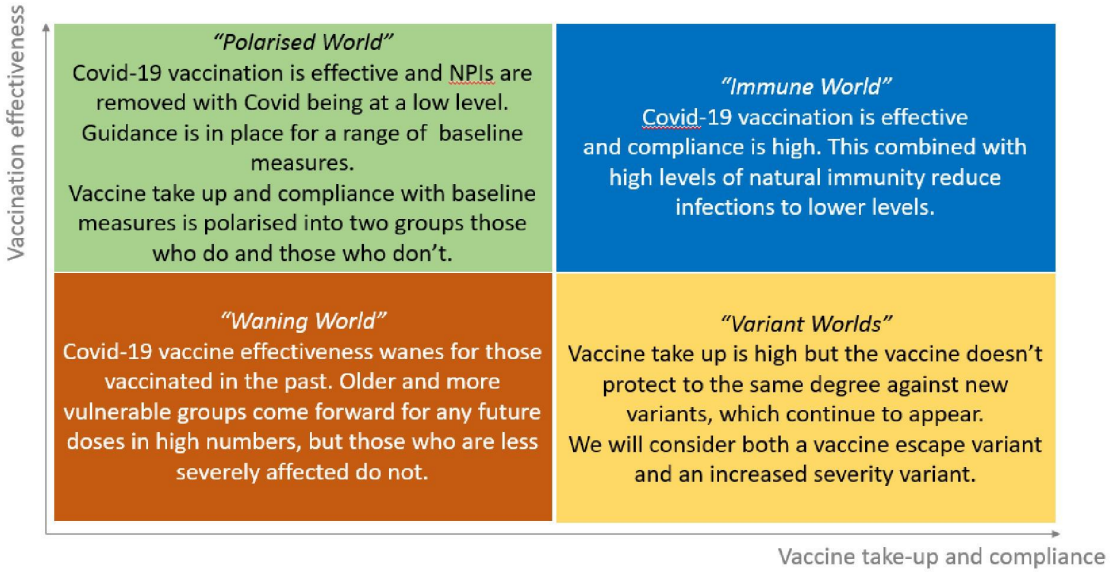
7.1 The four worlds

What may happen in the future around SARS-CoV-2 is uncertain and therefore there are a number of possible COVID-19 futures that may occur in the future. For example, the current Omicron wave may dissipate leaving low levels of COVID-19, or a new variant may emerge potentially having vaccine escape or increased severity, or people's behaviours may change. One approach to this uncertainty is to model alternative versions of the future through the development of different COVID-19 scenarios.

Given what we know about COVID-19 these possible futures range from a world where immunity reduces COVID-19 hospitalisations and deaths to low levels, through to variant world where a variant with immune escape enters Scotland and COVID-19 hospitalisations and deaths could increase. In between these two extremes could be possible futures where vaccine effectiveness wanes or where people's behaviour becomes polarised between those who continue with COVID-19 precautions e.g. hand washing etc. and those who don't (see Figure 31).

The scenarios we provide in the next section look at what could happen for planning purposes, not to forecast what will happen. These scenarios include no changes from the current baseline measures. The assumptions are based on our most up to date knowledge, but do not include the effect of future changes in treatment of COVID-19 e.g. widespread use of antivirals or changes in behaviour in response to high levels of infections e.g. in variant world. Therefore, in the most extreme scenarios the peak may be lower than suggested if behaviour or restrictions changed.

Figure 31: Potential scenarios for the future



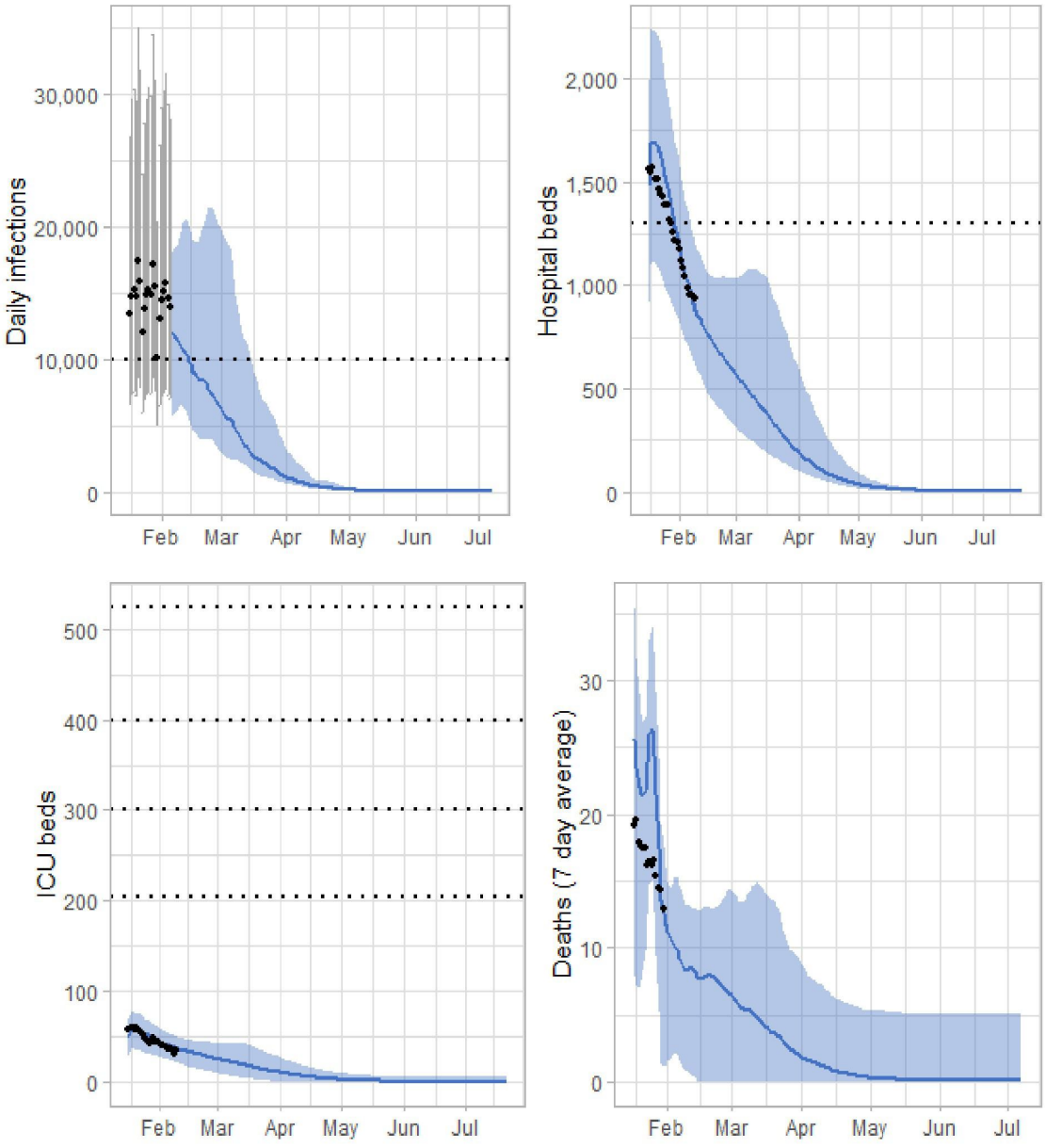
There is no linear progression between the worlds and all are plausible. Each world inherently contains a different threat level requiring a different approach to management.

7.1.1 Immune World

In this possible future vaccines and natural immunity are effective at keeping COVID-19 at low levels. Baseline measures and LFD testing are in place to protect the vulnerable e.g. elderly and immune compromised and adhered to by the public to high levels. New variants may emerge in Scotland but for the foreseeable future infections are based around Omicron.

Infections may decrease from current levels over the coming weeks and months to very low levels. Likewise hospital and ICU occupancy may follow this trend relieving the pressure on healthcare services. Issues with vaccine waning and new variants are not considered in this world and therefore levels of infections remain low (<1,000 per day) (see Figure 32).

Figure 32: Potential infections, hospital occupancy, ICU occupancy, and deaths trajectory in Immune World[331]



In Immune world COVID-19 in Scotland reduces below epidemic levels, becoming endemic. Cases of COVID-19 therefore spring up only as rare outbreaks which are controlled through public health measures. People's lives return to something close to normality e.g. physical distancing is not needed but people still choose to self-isolate and hygiene is good. As vaccines are effective, take-up of first/second/third doses are good and boosters become part of an annual cycle like flu. The numbers of people who need medical treatment or hospitalisation for COVID-19 remain low.

[331] Coronavirus (COVID-19): trends in daily data - gov.scot (www.gov.scot)

The focus moves away from COVID-19 response and into recovery. This includes addressing learning losses, treating Long Covid and working through the hospital backlog. Wellbeing measures improve with reduced anxiety and increased happiness. Those from the highest risk groups feel they can reintegrate without government interventions. The economy begins to recover from the effects of COVID-19. Travellers do not face significant issues with trips overseas.

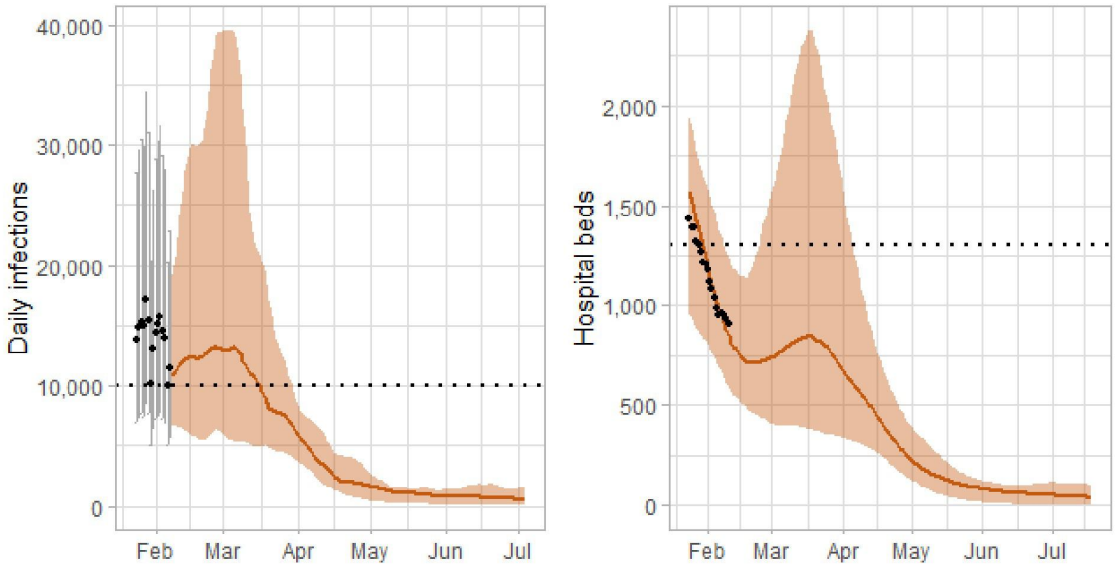
7.1.2 Waning world

In this world COVID-19 vaccines are effective over several months, but waning then occurs. It is hard to keep pace with booster vaccinations which become increasingly difficult to justify. Demands for vaccines throughout the rest of the world and the increasing reluctance of people in Scotland to keep being boosted reduces the overall immunity levels of the population.

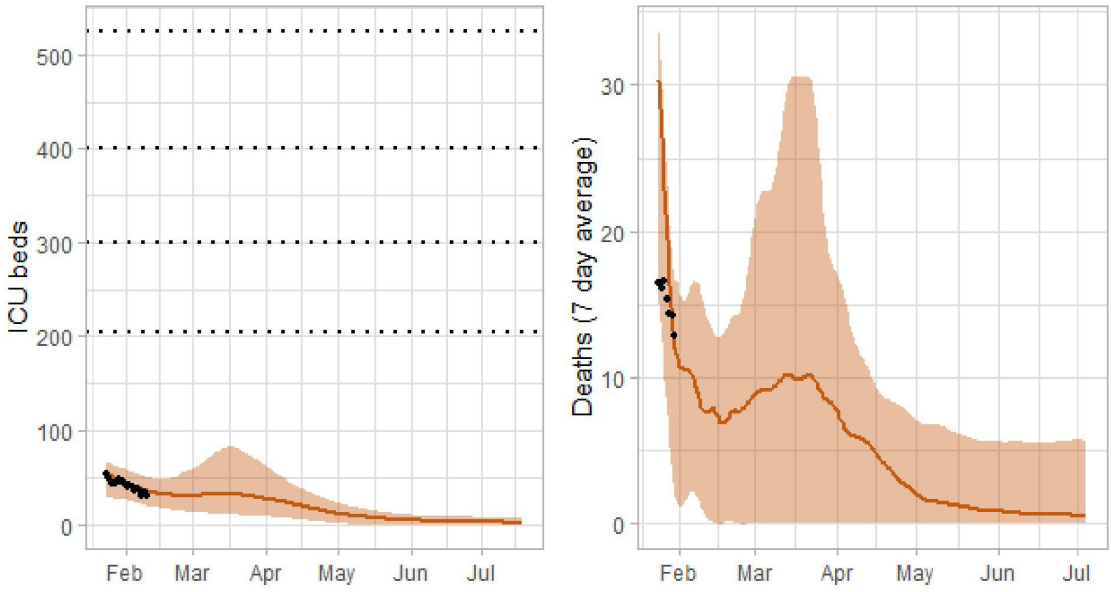
Infections may not substantially decrease from current levels initially before falling in March as the natural immunity begins to offset the waning of vaccine acquired immunity.

Impacts on hospital/ICU occupancy and deaths are uncertain. While at relatively low levels infections may be between 500 – 2,000 per day by summer. These levels would be higher than has been observed in summer 2020 and 2021 and higher than what may happen in immune world (see Figure 33).

Figure 33: Potential infections, hospital occupancy, ICU occupancy, and deaths trajectory in Waning World[332]



[332] COVID-19 vaccine weekly surveillance reports (weeks 39 to 7, 2021 to 2022) - GOV.UK (www.gov.uk)



The number of people who need medical treatment or hospitalisation for COVID-19 rises particularly in vulnerable/older age groups where it is increasingly difficult to deliver an effective booster regime.

The focus continues to be on COVID-19 response and it is harder to shift on to recovery. Hospitals are still dealing with increasing cases of COVID-19 putting pressure on healthcare services and workforce which also puts pressure on other public services and budgets. Work is ongoing on rectifying learning loss but continued cases of COVID-19 within education settings with children and staff being off school slows the effectiveness of this work.

The population becomes segmented as the most vulnerable due to vaccine waning lead restricted lives or accept significant risk of serious illness and experience high levels of anxiety and low levels of wellbeing. The rest of the population live a more normal life accepting the possibility of infection with mild illness. Anxiety reduces but does not disappear, likewise wellbeing increases but there is still concern about infection. The economy continues to be impacted by workforce absences, the self-shielding actions of a proportion of the population and risk adverse behaviours.

7.1.3 Polarised world

In this world, vaccines and natural immunity are effective at reducing infections. Baseline guidance remains in place, with face coverings, physical distancing and some testing. The approach followed relies on individual risk assessment and behaviours. However society becomes polarised as some continue to take up vaccines and follow guidance while others are more reluctant. COVID-19 becomes a disease associated with those who don't or can't get full vaccine benefit and can't or don't adopt a risk based approach maintaining baseline measures.

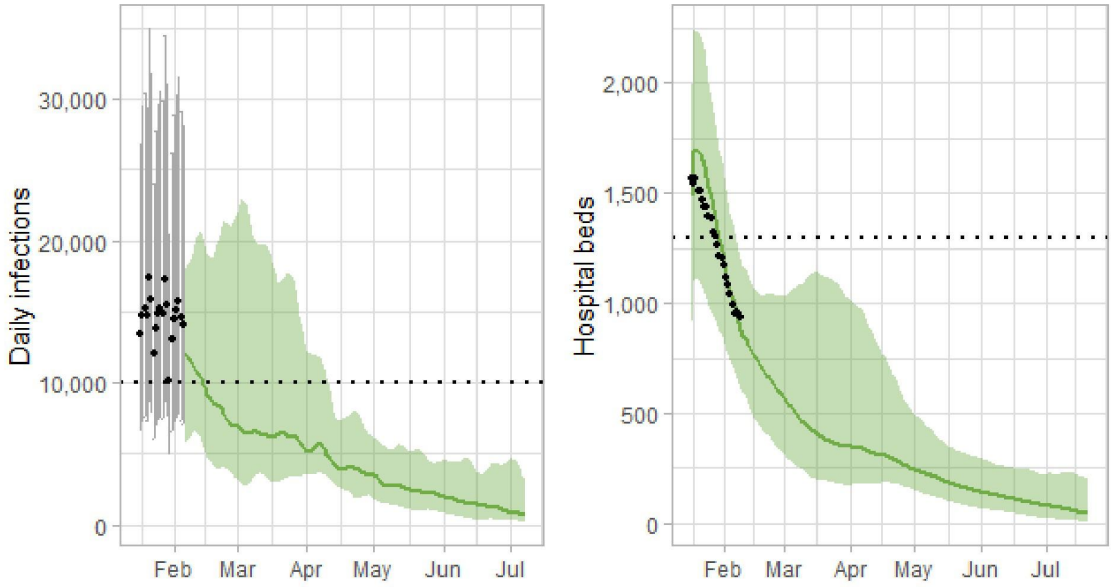
Infections may decrease from current levels over the coming weeks and months to low levels but more slowly than in other scenarios due to various groups behaving differently across society.

This world assumes that infections continue to decrease in the coming weeks with behavioural changes beginning to occur in response to this and to the better weather from March. Unvaccinated adults and those with 1 dose are assumed to return to pre-pandemic behaviours within 6 weeks. Adults with 2 doses are assumed to return to these behaviours over 12 weeks, with those with 3 doses assumed to have no significant changes in behaviour.

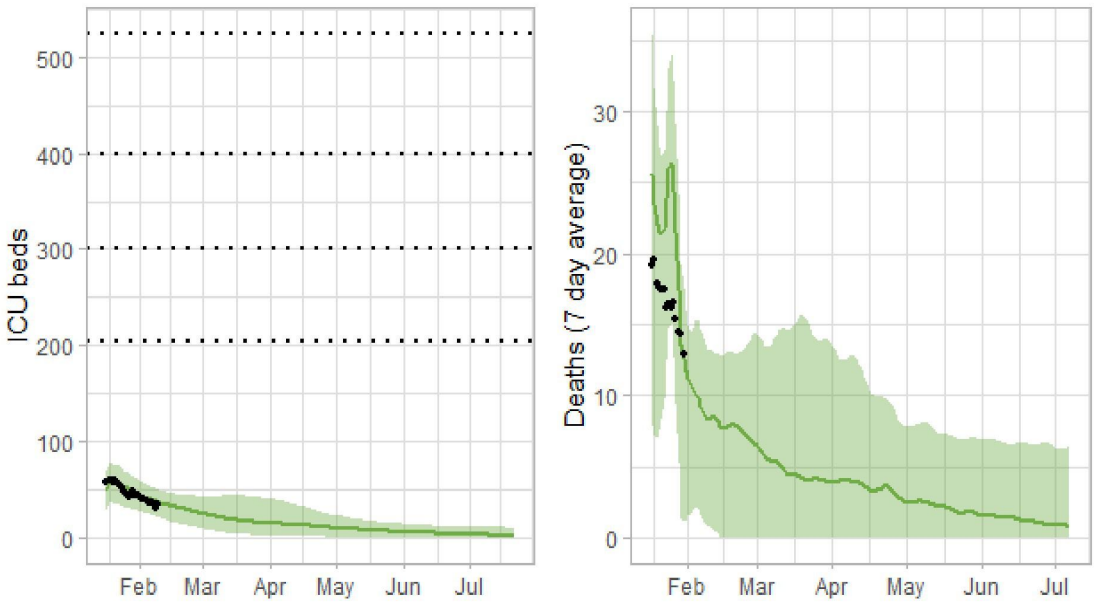
Vaccine waning is included in this world whereby only some of those with 3 doses come forward for a potential 4th dose.

While at relatively low levels infections may be between 1,000 – 5,000 per day by summer. These levels would be higher than has been observed in summer 2020 and 2021 and higher than what may happen in immune world (see Figure 34).

Figure 34: Potential infections, hospital occupancy, ICU occupancy, and deaths trajectory in Polarised World[333]



[333] COVID-19 vaccine weekly surveillance reports (weeks 39 to 7, 2021 to 2022) - GOV.UK (www.gov.uk)



Cases of COVID-19 spring up and are hard to control in those who are not vaccinated or vulnerable. People's lives return to a "new normal" but, due to polarised groups in society with some following and some not following the guidance on baseline restrictions, infections remain.

Vaccines are effective so older and more vulnerable people come forward for future doses in high numbers but those who are less severely affected do not. Vulnerable groups such as the very elderly and immune compromised are at risk from infection from those not vaccinated or boosted.

The focus remains on COVID-19 and it the shift onto recovery is slower. Existing learning losses are harder to rectify and continue to accrue due to infections within education settings. The hospital backlog is difficult to address as hospitals are still dealing with COVID-19 cases. The population becomes polarised in to those whose wellbeing improves e.g. lower risk people and those whose wellbeing deteriorates e.g. higher risk or poorer people whose levels of anxiety increase as COVID-19 circulates. They continue to experience greater illness, greater poverty or disruption to their income. The economy continues to be impacted from the effects of COVID-19. Unvaccinated travellers continue to face significant uncertainty with trips.

7.1.4 Variant world – vaccine escape with same severity as Delta

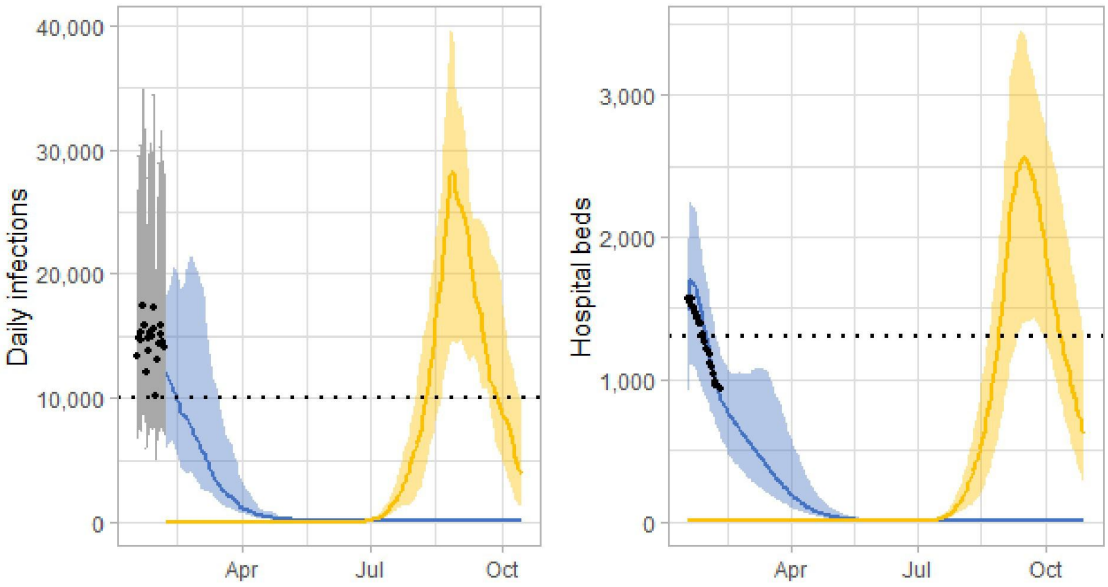
In this possible future a variant with vaccine escape emerges in Scotland presenting a challenge even for fully vaccinated people. This new variant leads to increased transmission, but not to increased severity. Baseline measures – face coverings, LFD, physical distancing remain and, in this scenario other NPIs may need to be put in place for a short time. This world is similar to what has happened in Scotland with the emergence of Omicron.

Omicron may be reduced to low levels within Scotland as a new variant takes over. This causes a new wave of COVID-19 infections. However this wave is not accompanied by significant numbers with serious illness and vaccines continue to

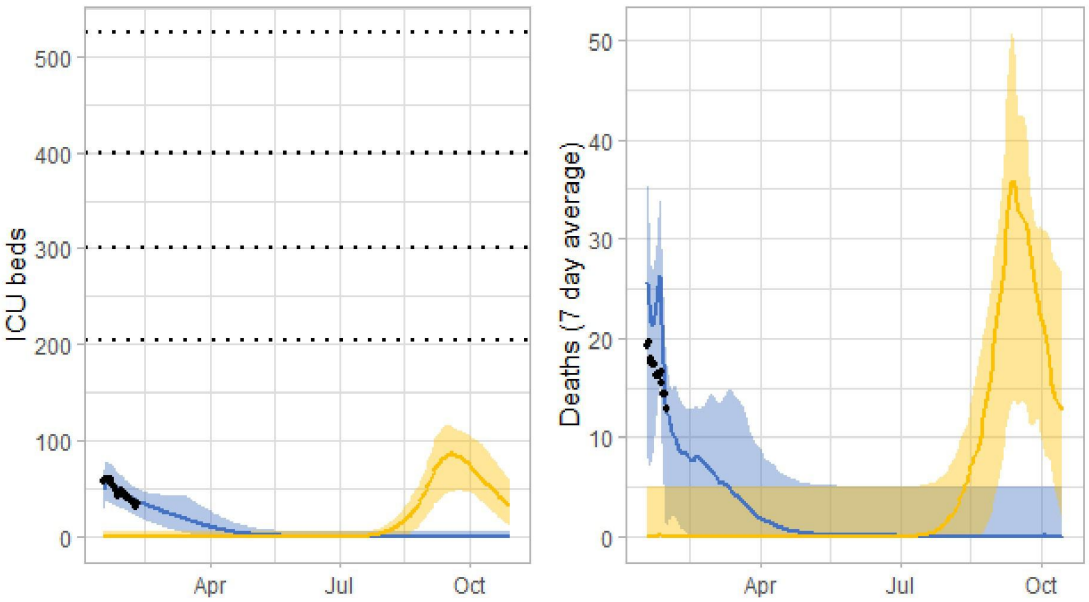
protect. People's lives are disrupted due to the increasingly high levels of infections leading to time off work ill or isolating.

To show the potential impact assume a new variant appears in Scotland as people return from their summer holidays and return to work and school. The timing is uncertain and a potential new variant may appear sooner than the summer or significantly later but has currently been lined up with the summer holidays to show illustratively what could happen. The new variant may cause Omicron infections to decrease significantly or disappear entirely (Immune world has been used to illustrate this). The new variant is modelled with similar transmissibility and vaccine escape as Omicron with severity characteristics similar to Delta. It could lead to high levels of infections leading to hospital occupancy rising above capacity restrictions. With sustained high levels of infection we could again see increased staff absences in a number of sectors that were affected by this in the recent Omicron wave.

Figure 35: Potential infections, hospital occupancy, ICU occupancy, and deaths trajectory in Variant World with the same severity as Delta[334]



[334] Coronavirus (COVID-19): trends in daily data - gov.scot (www.gov.scot)



The focus remains on COVID-19 and it is hard to shift on to recovery. Continued infections within education settings and staff shortages make some school closures necessary. The COVID-19 strain on hospitals is high due to the very high numbers of infections and workforce pressures grow making it difficult to address the hospital backlog. Wellbeing measures deteriorate with people reporting low happiness and general 'tiredness with it all'. The economy continues to be impacted from the effects of COVID-19 with many people off work. Travellers may not want to come to the UK as the new variant sweeps through.

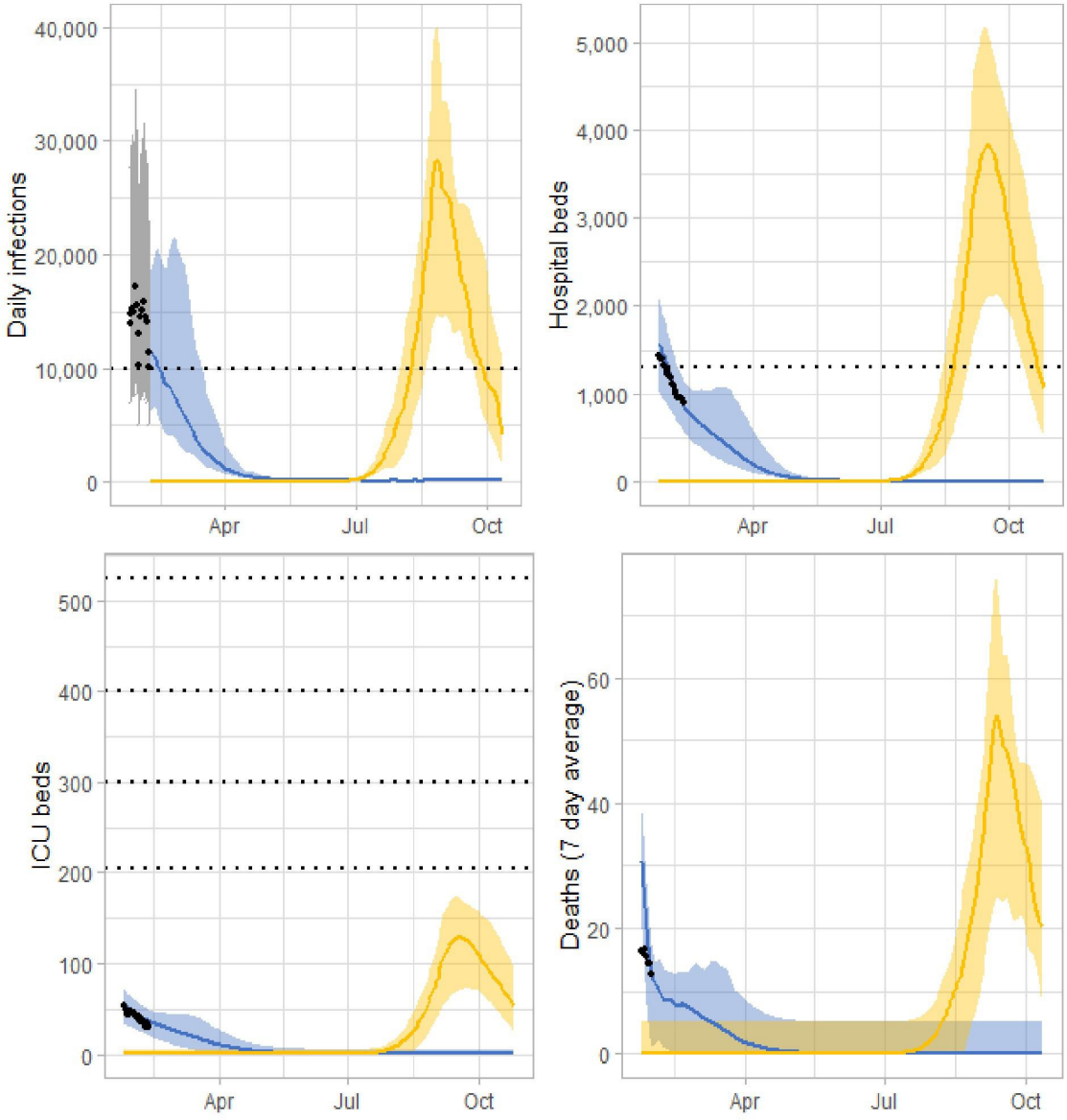
7.1.5 Variant world – vaccine escape with increased severity compared to Delta

As with the other example of Variant world, a new variant appears in Scotland as people return from their summer holidays and return to work and school. The timing is uncertain but has currently been lined up with the summer holidays where reduced travel restrictions may make it more likely that a new variant is brought into Scotland.

The new variant may cause Omicron infections to decrease significantly or disappear entirely. It is modelled with similar transmissibility and vaccine escape as Omicron with severity characteristics 50% higher than Delta, purely for illustrative purposes.

It could lead to high levels of infections leading to hospital occupancy rising well above capacity restrictions. With sustained high levels of infection we could again see increased staff absences in a number of sectors that were affected by this in the recent Omicron wave.

Figure 36: Potential infections, hospital occupancy, ICU occupancy, and deaths trajectory in Variant World with the increased severity compared to Delta[335]



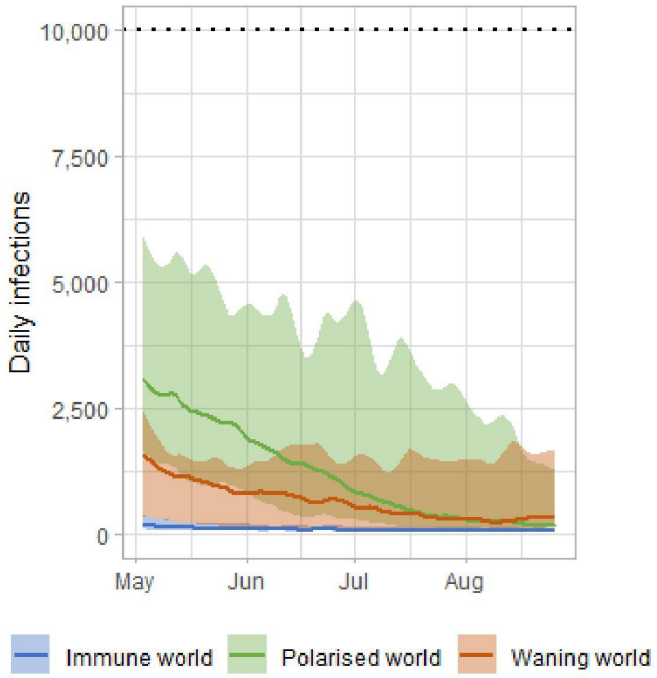
7.1.6 Background levels of COVID-19

In each of these possible futures there will be a background level of COVID-19 to plan for and manage. When comparing the worlds, Figure 37 shows the period May to September and what the background levels may look like. This ranges from under 1,000 COVID-19 infections in Scotland per day to over 5,000 in May, potentially dropping to below 2,500 in August (see Figure 37). If a new variant appeared it could be substantially higher. Depending on this background level of COVID-19 different

[335] Coronavirus (COVID-19): trends in daily data - gov.scot (www.gov.scot)

levels of pressure will be put on the public sector in Scotland as different numbers of people become sick and need medical treatment.

Figure 37: Potential background level of infections over Summer 2022 under different Worlds scenarios[336]



7.2 Summary

The four worlds plausible scenarios as presented in this section should not be considered predictions. It is difficult to ascertain which of these scenarios may be the more likely and in reality the situation is likely to move from one to the other and not in a linear fashion. Instead they provide some illustration of what each world could look like and the issues to be considered. Over the coming months they will be updated as circumstances change to support ongoing planning and management of the pandemic.

[336] COVID-19 vaccine weekly surveillance reports (weeks 39 to 7, 2021 to 2022) - GOV.UK (www.gov.uk)

8. Data and Analysis

8.1 Introduction

Scottish Government decision making through the pandemic has been based on a range of factors including scientific evidence, modelling, behavioural research, statistics and analysis. Much of this has necessarily been 'new' and was delivered at pace with partners, including Public Health Scotland and UKHSA, to rapidly develop new data collections and reporting over the course of the pandemic.

The Scottish Government is fully committed to transparency and has sought to develop and publish appropriate information about COVID-19 as it has become available. This has included rapid data and intelligence to support and inform decision making such as case numbers, hospital and ICU occupancy, deaths, vaccinations, and other COVID-19 related data covering schools, care homes and NHS absences. Key sources of information have included reporting of headline daily data on the SG Coronavirus web pages, a weekly State of the Epidemic Paper, Research Findings and sharing the latest ONS Infection Survey results. Public Health Scotland has also developed significant new and interactive reporting on the PHS Daily Dashboard, Education Surveillance Dashboard and continued to develop the content of its PHS weekly COVID-19 statistical report.

To provide public information on the four harms approach the 4 harms dashboard and two key papers were published[337,338,339].

It is now time to consider what evidence, data and analysis will be required going forward. Work is underway with Public Health Scotland and other partners to review the content and frequency of all Scottish Government current data reporting to identify what is required to support resilience and recovery in the future. This will involve prioritising the modelling, data and analysis that is essential to support the future monitoring and surveillance of COVID-19. We also need to establish the data and evidence required to monitor the wider harms of COVID-19 in the future. A data and reporting strategy will be published in Spring to support implementation of the Strategic Framework following consultation with users and the public are consulted on any planned changes.

8.2 Signals and indicators

Maintaining a robust evidence base for the management of future threats is an essential part of planning for the future to support evidence informed decision making. Developing an appropriate set of indicators to monitor developments suitable to this stage of the pandemic is crucial. As outlined in 8.1 above a data strategy will be published in Spring 2022 setting out what data will be collected and

[337] COVID-19 in Scotland (data.gov.scot)
[338] Coronavirus (COVID-19): framework for decision making - assessing the four harms - gov.scot (www.gov.scot)
[339] Coronavirus (COVID-19): framework for decision making - supporting evidence - gov.scot (www.gov.scot)

published which will set out the approach to monitoring societal and economic issues alongside health issues.

Table 1: outlines range of data and indicators that are being considered to monitor the pandemic.

Direct COVID-19 Harms	**Other Health Harms**
• COVID-19 prevalence: estimates of positivity in the community from the ONS COVID-19 Infection Survey for example, prevalence estimates from waste-water analysis, COVID-19 confirmed cases including by age group / within care homes. • Hospitalisation: COVID-19 related hospital and ICU occupancy and admissions, forecasts of hospital and ICU occupancy • Infection Fatality Rates • COVID-19 related deaths • Vaccination: levels of vaccination in the population, and by demographics	• Excess mortality (NRS) • Long COVID estimates (ONS) • People avoiding GPs (SG polling) • A&E attendances • Emergency and Elective admissions • Delayed discharges from hospital
Societal impacts	**Economic impacts**
• Trust in Government • Education: % of school openings with pupils not in school because of COVID-19 reasons • Financial stress: Crisis grant applications • Finance/work: Perceived threat to job and opportunities for quality work. • Loneliness and isolation: Self-reported loneliness in the last week. • Personal wellbeing, anxiety and happiness • Cultural and leisure participation • Public services: Accessibility and use of public services, and public transport	• Monthly GDP, overall and by sector, compared to pre-pandemic levels. • Weekly visits to recreation and retail, compared to pre-pandemic levels. • Weekly visits to workplaces, compared to pre-pandemic levels. • Business turnover in previous two weeks, relative to normal, by sector. • Difficulty in filling staff vacancies in the last month compared to normal, by sector. • Weekly economic uncertainty index (a forward looking indicator)

The process of developing the data strategy will involve detailed consideration of these suggested indicators to arrive at a final agreed set for publication.

8.3 COVID-19 Recovery Learning and Evaluation

Learning from the experiences of the last two years is an important part of developing future strategy and approaches to monitoring. As part of the implementation of the COVID-19 Recovery Strategy, a Learning and Evaluation Group has been established to support robust organisational learning from the Scottish Government's approach to the pandemic. This is looking retrospectively to bring together evidence from research, evaluation and routine data on studies conducted during the pandemic to better understand how particular groups and organisations have been affected and also how public services have responded and

adapted, with a particular focus on social and economic aspects. It will also look ahead to deliver and oversee a coherent and pragmatic programme of evaluation and learning to address key COVID-19 evaluation questions. The group is chaired by Professor Linda Bauld, interim Chief Social Policy Adviser, and is made up of academics, representatives from a range of organisations and Scottish government officials and advisers and will continue to meet over the next two years.

8.4 Summary

Data, research and analysis has played a central role in tackling the pandemic. This will not change but the precise nature of the data required to be collected, monitored and published will change over time as the pandemic itself changes. The need to focus on the full range of harms remains essential as does the importance of learning from experiences to date.

9. Conclusion

This paper provides the evidence supporting the strategic framework and outlines how we intend to use evidence as we move into the next stage of the pandemic. It sets out the current situation concerning COVID-19, health, societal and economic issues. It looks to the future at the evolving science, at the latest public attitude data, at persistent inequalities and experiences elsewhere in the world. To assist in managing the pandemic in the future a range of plausible scenarios are presented along with a discussion of data and analysis for the future.

By bringing all this evidence together in one publication the intention is to provide an appreciation of the range of issues faced and the science and analysis available to assist in managing and recovering from COVID-19.

The evidence base surrounding COVID-19 and its impacts will continue to evolve in the coming years and we will continue to publish evidence as new insights become available.

Annex A

Table 2 – Legislative requirements and guidance made in Scotland to tackle COVID-19 since 16 November 2021		
Date introduced	**Legislative requirements**	**Guidance**
Restrictions in place as of 16 November 2021 (publication of the last Strategic Framework report)	Vaccine Certification for • Late night premises with music, which serve alcohol at any time between midnight and 5am and have a designated place for dancing for customers; • Indoor events (unseated) with 500 or more people; • Outdoor events (unseated) with 4,000 or more people; and • Any event with more than 10,000 people. Face coverings required in most indoor public settings and on public transport (unless exempt). Hospitality and entertainment venues required to collect contact details for Test and Protect. COVID-19 Scotland's Strategic Framework Update - November 2021 (www.gov.scot) Fully vaccinated travellers returning to Scotland required to take a LFD test on the second day after their arrival. Unvaccinated travellers, or travellers from countries where certification is not recognised, must self-isolate for 10 days on arrival and take PCR tests on day two and day eight. Final countries taken off the red list (www.gov.scot)	Good hand hygiene and surface cleaning; Promotion of good ventilation; Test and Protect, including self-isolation when necessary. Encourage a greater degree of working from home than pre-COVID-19 COVID-19 Scotland's Strategic Framework Update - November 2021 (www.gov.scot) Third dose offered to those aged 50+, unpaid carers who are 16+, those aged 16+ who are household contacts of immunosuppressed individuals, care home residents, frontline health and social care workers and those aged 16 and on the highest risk list. Online portal for autumn/winter vaccination programme - gov.scot (www.gov.scot) Covid-19 booster vaccinations underway (www.gov.scot)
26 November 2021	WHO announced Omicron (B.1.1.529) as a Variant of Concern (VOC) Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern (who.int)	
26 November 2021	All travellers returning to Scotland from South Africa, Namibia, Lesotho, Eswatini, Zimbabwe and Botswana will be required to self-isolate and take two PCR tests (Days 2 & 8).	

	Self-isolation for all travellers returning from six African countries - gov.scot (www.gov.scot)	
27 November 2021	South Africa, Namibia, Lesotho, Eswatini, Zimbabwe and Botswana added to UK travel red list, with the requirement to quarantine on their arrival in managed accommodation for 10 days. A flight ban was also in place. Tackling the threat of new COVID-19 variant - gov.scot (www.gov.scot) Red list of countries and territories - GOV.UK (www.gov.uk) (Edit from 25 November)	
28 November 2021	Angola, Malawi, Mozambique and Zambia added to UK travel red list, with the requirement to quarantine on their arrival in managed accommodation for 10 days. Tackling the threat of new COVID-19 variant - gov.scot (www.gov.scot)	
23 November 2021	Specimen data of first Omicron case in Scotland. Public Health Scotland COVID-19 & Winter Statistical Report	
29 November 2021	First Omicron case reported in Scotland. Omicron variant - gov.scot (www.gov.scot)	
30 November 2021		Booster expanded to 40+ 16-17 year olds can book 2nd dose. Booster jab roll-out continues - gov.scot (www.gov.scot)
6 December 2021	Negative test within 24h added to vaccine certification scheme. No changes to the rest of the scheme. Negative test added to certification - gov.scot (www.gov.scot) Nigeria added to UK travel red list, with the requirement to quarantine on their arrival in managed accommodation for 10 days. Pre-departure test requirement for travel - gov.scot (www.gov.scot)	
7 December 2021	People arriving in Scotland from abroad (including vaccinated individuals) will need to take pre-	

	departure and arrival COVID-19 tests to help stem the spread of the Omicron variant. Pre-departure test requirement for travel - gov.scot (www.gov.scot)	
10 December 2021		People urged to defer work Christmas parties to slow the spread of the virus. Strongly advised to do LFD testing in advance of meeting up with others. Evidence paper on rapid rise of Omicron cases - gov.scot (www.gov.scot)
11 December 2021	All household contacts of any confirmed COVID-19 case must isolate for 10 days regardless of vaccination status - even if they initially get a negative PCR test. Evidence paper on rapid rise of Omicron cases - gov.scot (www.gov.scot)	
12 December 2021		Care home staff asked to undertake daily LFD testing in addition to their weekly PCR test, and all social care staff are also being encouraged to undertake daily LFD testing. Social care staff urged to get booster - gov.scot (www.gov.scot)
13 December 2021		Booster expanded to all 30+ Vaccine boosters available to over 30s - gov.scot (www.gov.scot)
15 December 2021	Passengers returning from Angola, Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, Nigeria, South Africa, Zambia, and Zimbabwe will not have to stay in a managed quarantine hotel on arrival in Scotland. Pre-departure and arrival tests still required. 11 countries removed from international travel red list - gov.scot (www.gov.scot)	Booster expanded to all 18+ year olds. Boosting support for the vaccination programme - gov.scot (www.gov.scot)

17 December 2021	Omicron dominant variant in Scotland. Coronavirus (COVID-19) update: First Minister's speech – 17 December 2021 - gov.scot (www.gov.scot)	
17 December 2021	Businesses legally required to take reasonable measures to minimise transmission of coronavirus, e.g. • Enabling home working for those who are able to work from home, • Masks should be worn in all businesses, • Retail and hospitality businesses should consider reasonable measures to reduce crowding and manage queues, • Workplace testing is being extended and businesses with more than 10 employees are encouraged to sign up to receive free lateral flow test kits to ensure staff are able to test regularly. Limiting the spread of Omicron - gov.scot (www.gov.scot)	Guidance for visiting hospitals and adult care homes updated • No more than two households should meet with a resident at any one time inside the care home, • Residents are asked to avoid larger gatherings when visiting friends and family out with the care home, • Staff testing increased to daily and all visitors should test before every visit. Advice on visiting care homes and hospitals - gov.scot (www.gov.scot) Guidance updated on reducing social interaction at home or in indoor public places to a maximum of three households at any time, with everyone encouraged to take a LFD test before meeting. New measures required to slow the spread of Coronavirus - gov.scot (www.gov.scot)
26 December 2021	Attendance at large events limited to: • 100 people for indoor standing events, • 200 people for indoor seated events, • 500 people for all outdoor events (seated or standing) Omicron restrictions take effect - gov.scot (www.gov.scot)	
27 December 2021	One metre physical distancing between adults in all indoor hospitality and leisure settings, including: • Pubs, bars, restaurants, cafes and other settings where food	

	and drink is served for consumption on-site, • Leisure settings including gyms, theatres, cinemas, bingo and snooker halls and bowling alleys, • Museums, galleries and other visitor attraction. Table service required in settings where alcohol is served for consumption on the premises. Nightclubs closed. Omicron restrictions take effect - gov.scot (www.gov.scot)	
3 January 2022		12-15 year olds encouraged to take their 2nd dose. Gap after 1st dose reduced to 12 weeks. COVID-19 vaccine for 12-15 year olds - gov.scot (www.gov.scot)
Start of January 2022 term		School staff and secondary school pupils are advised to take a test before returning to school (night before or morning of) and then done twice weekly. Returning to school safely - gov.scot (www.gov.scot) Changes to guidance for schools for start of January term: • A strengthened approach to minimising contacts, primarily through the reintroduction of groupings where practical, • A strengthened approach to self-isolation for household contacts of positive cases, • Tightened restrictions on school visitors, • Updated guidance on regular ventilation and CO2 monitoring,

		• Measures aimed at increasing the uptake of regular asymptomatic testing, • An update to guidance on school visits and trips, • A requirement for schools and local authorities to provide essential support for particular groups, including vulnerable children and young people, in the event of temporary school closures at a local level, • Staff eligibility for voluntary exemption from self-isolation under critical worker guidance. Keeping schools safe - gov.scot (www.gov.scot)
6 January 2022	Can end self-isolation if no symptoms and 2 negative LFD tests on or after day 6 taken 24h apart. Triple vaccinated close contacts do not need to self-isolate if LFD test negative every day for 7 days and remain symptom free. Any close contacts who are not fully vaccinated (3 doses) will still have to self-isolate for 10 days and take a PCR test. No need to take a PCR test to confirm following a positive LFD. Self-Isolation and testing changes - gov.scot (www.gov.scot)	
7 January 2022	Removal of pre-departure test requirement for those fully vaccinated or under 18 arriving in Scotland. Removal of need to self-isolate until negative test. Arrival test still required. Easing of restrictions on international travellers - gov.scot (www.gov.scot)	
17 January 2022	Large outdoor events can resume without physical distancing or capacity limits. Will require 50% of	

	attendees to be checked in line with the vaccine certification scheme. Booster required if more than 4 months post-2nd dose to be considered fully vaccinated for certification scheme.	
18 January 2022		Children aged five to 11 years old who have specific medical conditions which place them at greater risk from COVID-19 invited for their first vaccination. Children aged 12-15 who are at particular clinical risk from COVID-19 invited for booster vaccination. Boosters provided for those aged 16+. Vaccinations for youngsters with specific medical conditions - gov.scot (www.gov.scot)
20 January 2022	People transferring from hospitals to care homes will no longer need to isolate if they have had a negative PCR test in the previous 48 hours, so long as they have no symptoms of a respiratory virus and have not been exposed to COVID-19 over the previous 14 days. The isolation period for care home residents testing positive for COVID-19, or for close contacts of COVID-19 cases, is also being cut from 14 days to 10 days Restrictions eased for care home residents - gov.scot (www.gov.scot)	
24 January 2022	Limits on attendance at indoor public events, the requirement for 1m physical distancing, table service in hospitality venues, ban on non-professional indoor contact sports and the requirement for nightclubs to close will be removed. Omicron measures to be lifted - gov.scot (www.gov.scot)	Removal of guidance to limit gatherings to 3 households. Omicron measures to be lifted - gov.scot (www.gov.scot)

26 January 2022		Distance Aware launched Distance Aware - gov.scot (www.gov.scot)
28 January 2022	Requirement for 2m distancing reduced to 1 m for indoor settings where people have a specific exemption from the need to wear a face covering. Face coverings will no longer be required for any adult taking part in organised activities when they are directly interacting with children under the age of five Coronavirus (COVID-19) update: First Minister's statement – 25 January 2022 - gov.scot (www.gov.scot)	
31 January 2022	Return to hybrid working Changes to working from home advice - gov.scot (www.gov.scot)	
10 February 2022	Secondary school pupils will not need to wear face coverings in classrooms from 28 February. Facemask will still be required in communal areas and when moving around inside school buildings. COVID-19 school rules to be eased - gov.scot (www.gov.scot)	
11 February 2022	All testing requirements will be removed for eligible fully vaccinated international arrivals, with only a Passenger Locator Form (PLF) now required. Arrivals who are not recognised as fully vaccinated will only need to take a pre-departure test and a PCR test on or before day 2 after they arrive in the UK. UK open for travel with all restrictions removed for eligible vaccinated arrivals - GOV.UK (www.gov.uk)	

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