Isle of Man Government

Reiltys Ellan Vannin



# COVID-19 Weekly Surveillance Report

*30 June 2022*

**Public Health Directorate**

# Introduction

This report is a summary of indicators which are used to understand the dynamics of the spread of COVID-19 on the Isle of Man.

This report will be published each Thursday for data up to and including the previous Sunday e.g. 12th August is for data up to 8th August.

The COVID-19 results are a combination of positive PCR and LFT tests.

The report has been compiled by the Public Health Intelligence Team using data from Manx Care, the Civil Registry and the Lateral Flow Test (LFT) system.

# Wave Surveillance

- This week saw a decrease in case numbers across all age groups. The effective reproduction number ($R_t$) was 0.7 this week, a decrease from last week's value of 5.2. It is worth noting that $R_t$ values, as seen in the daily $R_t$ table (Appendix 1), are sensitive to large fluctuations when daily case numbers are small. Therefore, consideration should be taken of other epidemiological data to gain a true understanding of patterns of spread.

- Case ascertainment and calculation of the reproduction number is, of course, dependent on patterns of testing and reporting so it is likely that there are more cases than are currently notified. This caveat has applied throughout the pandemic when COVID has been transmitting on Island, although the change to LFT self testing and self reporting may have impacted on that to an unknown extent. Further changes to testing guidance published on 1 April are likely having an additional impact. This week we has seen a decrease in seven day average daily reporting from 228 to 144.

- Over the TT period the Island saw a large influx of people, as well as a number of Bank Holidays and events that likely had an effect on patterns of spread. Over the most recent weeks we have seen the effects of this in the form of increased positive cases reported and increases in the $R_t$ number.

- It should be noted that due to the differences in testing strategies on the Isle of Man compared to the UK, comparisons are shown for guidance only.

# Waste Water Surveillance

- This week we have included the latest update from the Waste Water Surveillance pilot project. This project is a partnership between the Isle of Man government and the London School of Hygiene and Tropical Medicine. The project aims to investigate the usefulness of waste water testing to monitor levels of infectious disease on Island, including SARS-CoV-2 (the virus that causes COVID-19), enterovirus (a family of viruses which includes the 'winter vomiting bug' norovirus) and influenza. The latest report from the project is included in full in Appendix 2.

- Testing people for COVID-19 (as we have been doing using the LFT tests) is expensive and intrusive for individuals. At best, only a proportion of the population will be tested. This means that levels of infection seen from testing are always likely to be an underestimate of the true level. Waste water testing for SARS-CoV-2 RNA offers a way of sampling across the population.

- Results from the latest update show no statistically significant change in SARS-CoV-2 RNA from week ending 12 June 2022 to week ending 26 June 2022.

# United Kingdom COVID-19 Infection Survey[1]

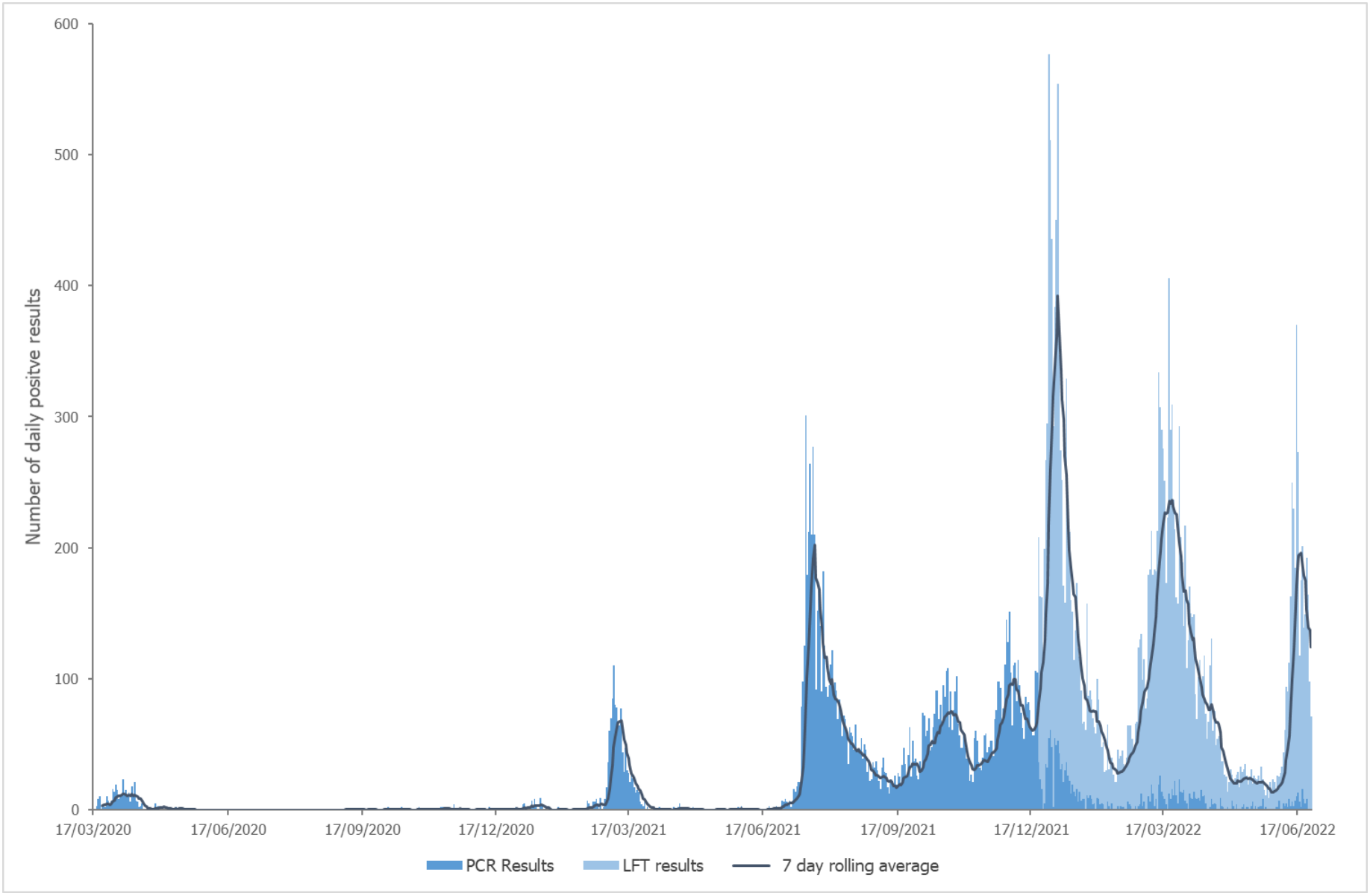
In the most recent week (week ending 18 June for England, Wales and Northern Ireland; week ending 17 June for Scotland):

- There was an increase in the percentage of people testing positive for coronavirus (COVID-19) in England, Wales, Scotland and Northern Ireland, likely caused by infections compatible with Omicron variants BA.4 and BA.5.
- In England, the estimated number of people testing positive for COVID-19 was 1,360,600 (95% credible interval: 1,285,600 to 1,438,200), equating to 2.50% of the population or around 1 in 40 people.
- In Wales, the estimated number of people testing positive for COVID-19 was 68,500 (95% credible interval: 53,300 to 85,900), equating to 2.25% of the population or around 1 in 45 people.
- In Northern Ireland, the estimated number of people testing positive for COVID-19 was 59,900 (95% credible interval: 46,900 to 74,400), equating to 3.26% of the population or around 1 in 30 people.
- In Scotland, the estimated number of people testing positive for COVID-19 was 250,700 (95% credible interval: 218,900 to 284,400), equating to 4.76% of the population or around 1 in 20 people

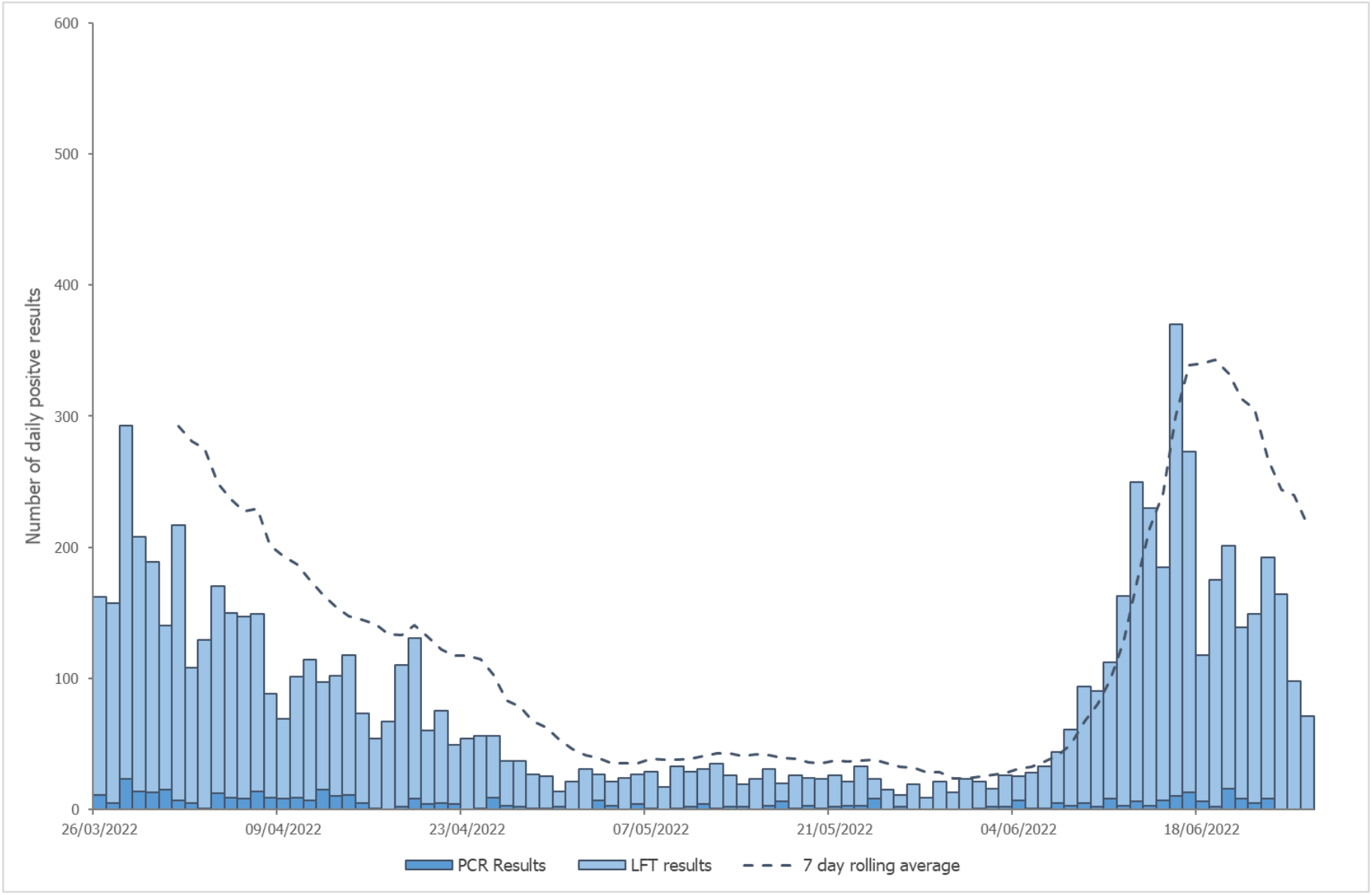
# Key Points

- The current 7-day average for reported positive results is 144.
- The trend of case numbers reported from testing shows a decrease this week.
- The effective reproduction number ($R_t$) was 0.7 this week.
- The snapshot of the Hospital shows 21 patients currently admitted with a COVID positive status.

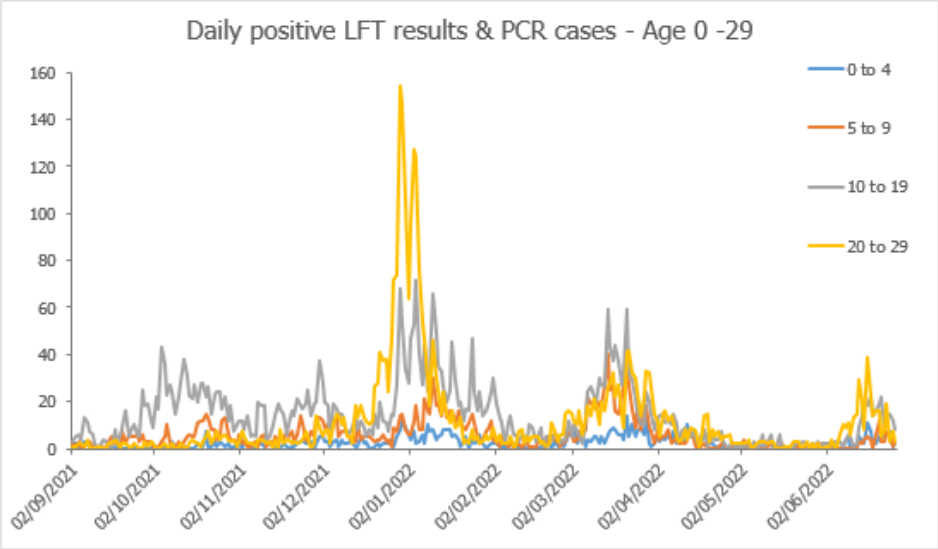
# Positive COVID-19 Tests – Whole Pandemic

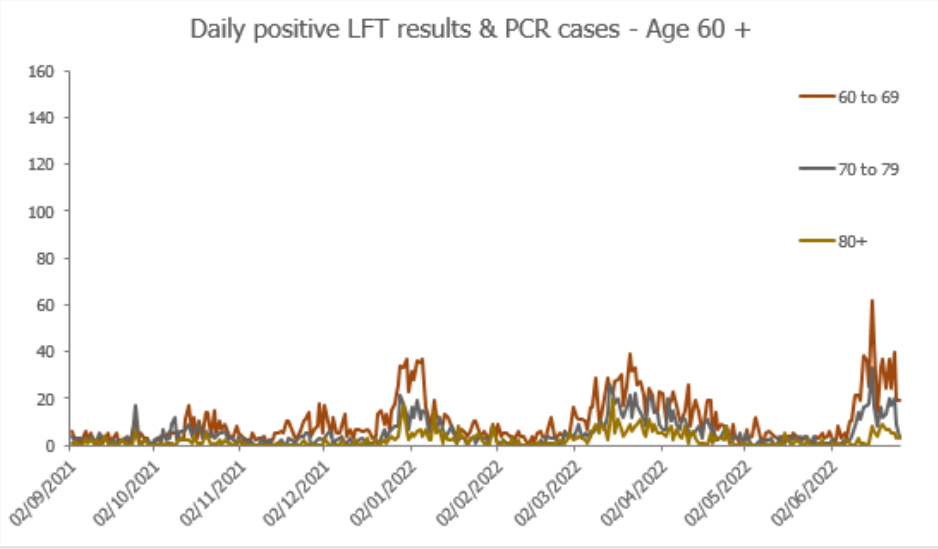


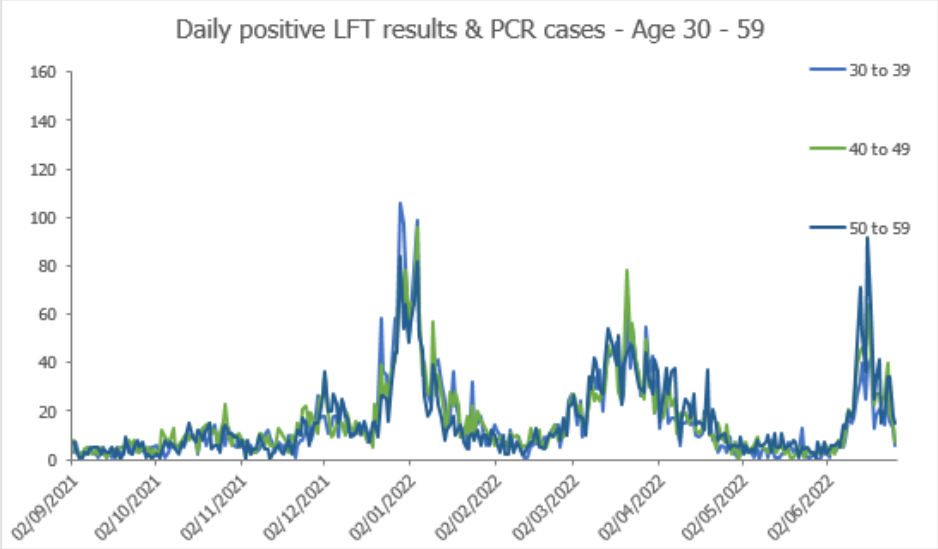
# Daily Positive Results – Latest 3-months

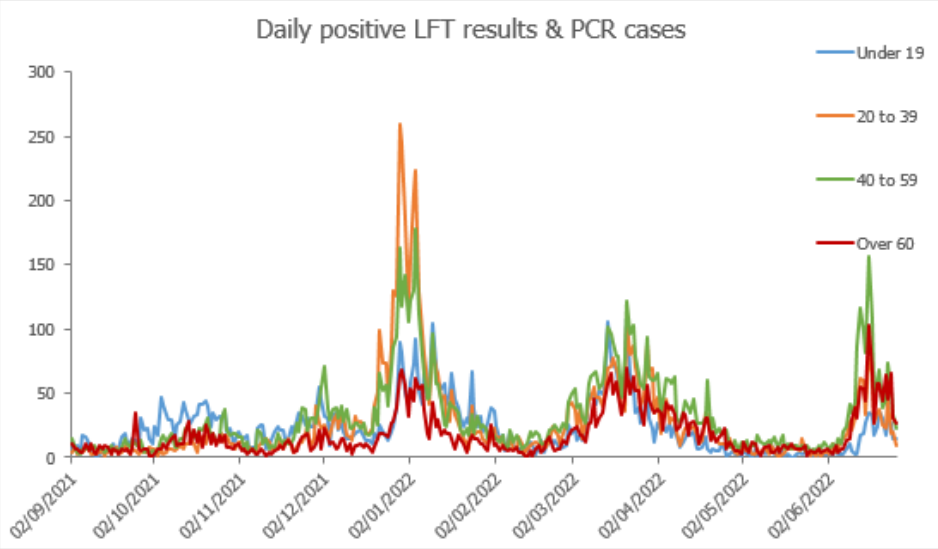


# Age Group Analysis

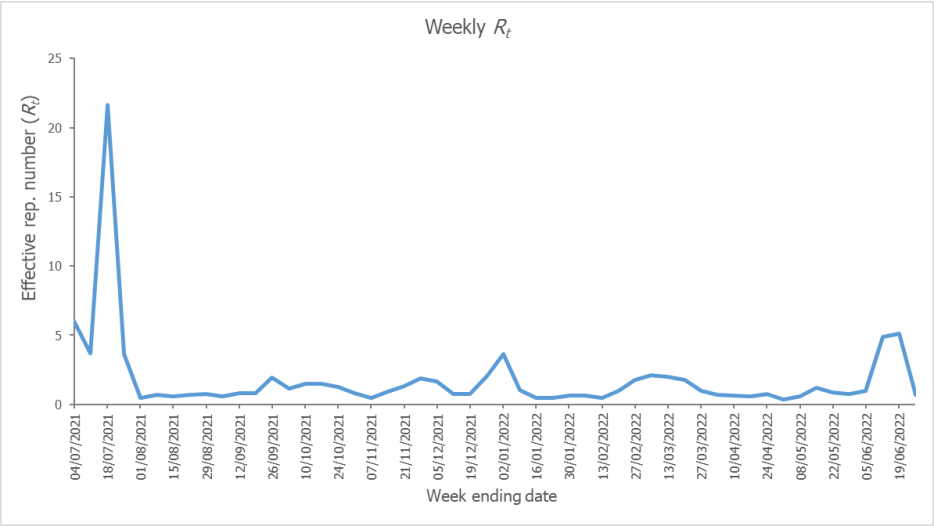


# Effective Reproduction Number ($R_t$)



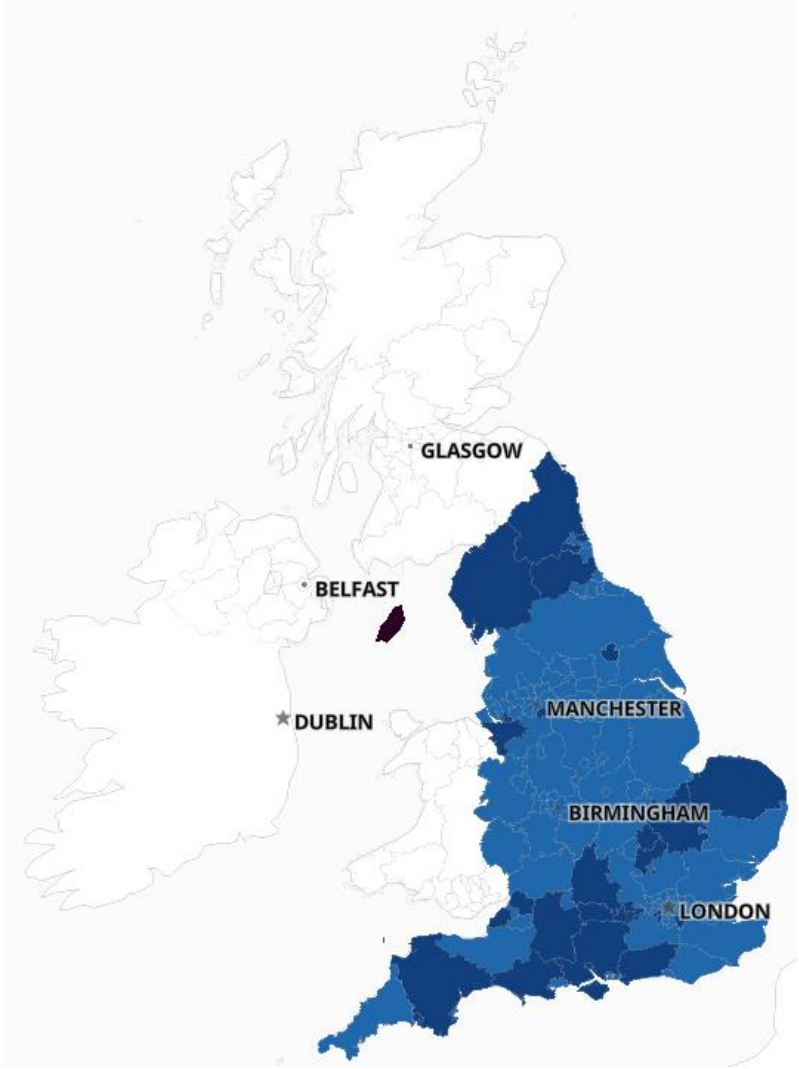

Latest 7 day
$R_t = 0.7$

- The Effective Reproduction Number ($R_t$) represents the number of secondary infections generated by each case over time 't' (over a week as presented here) and can be dramatically modified by applying effective interventions.
- When $R_t > 1$ there are more new infections than recoveries, thus the number of infected individuals in the population is increasing, while for $R_t < 1$ the number of infected individuals must be decreasing for the opposite reason.
- The calculation of $R_t$ is as follows[2]:

$$R_t\,(t_i) = \frac{\text{New Infections}}{\text{New Recoveries} + \text{New Deaths}}$$

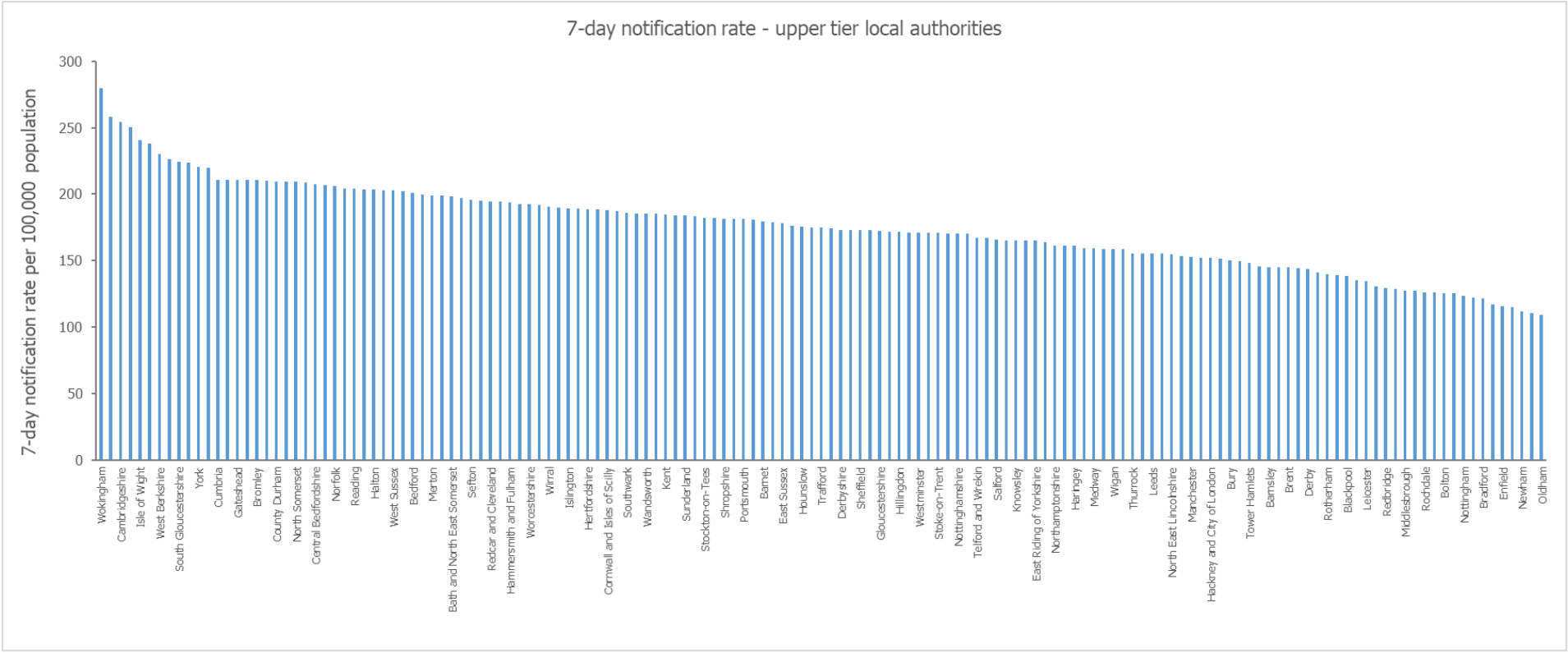
- The UK uses a more complex method of estimating $R_t$ which we are not able to replicate here. The use of this simplified methodology limits the robustness of comparing our $R_t$ value with UK estimates, however it provides a useful comparison between different time periods on Island. New Recoveries is calculated using the presumed 10 day recovery period from positive test result.
- A full table of daily $R_t$ values for the current wave is available in Appendix 1.
- It is worth noting that $R_t$ values, as seen in the daily $R_t$ table (Appendix 1), are sensitive to large fluctuations when daily case numbers are small. Therefore, consideration should be taken of other epidemiological data to gain a true understanding of patterns of spread.

# 7-day Notification Rate Area Comparison



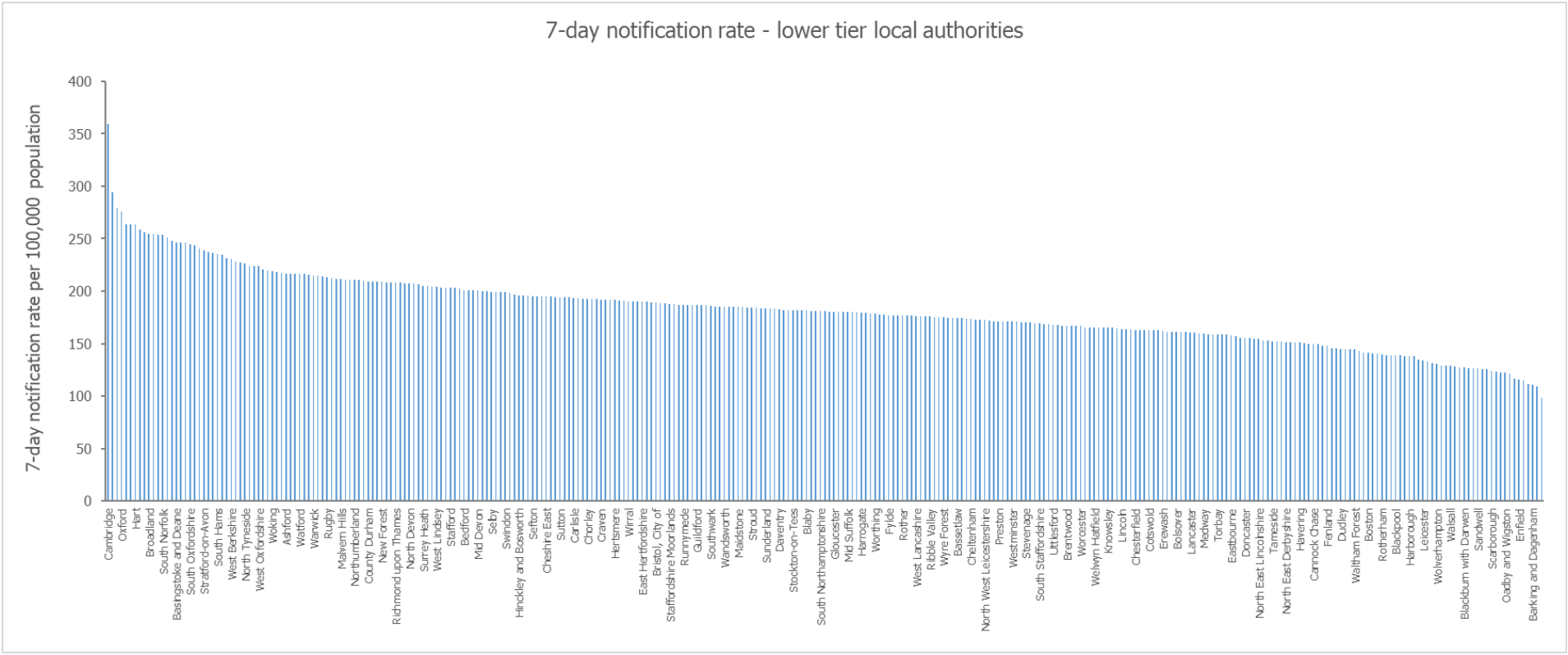

It should be noted that there are two reasons why data may not be shown. Firstly, data is not shown for areas with fewer than 3 cases at middle layer super output area (MSOA) level, to protect individuals' identity. Secondly, data may not be shown if the data is delayed or unavailable.

# 7-day Notification Rate – UK Upper Tier Local Authorities



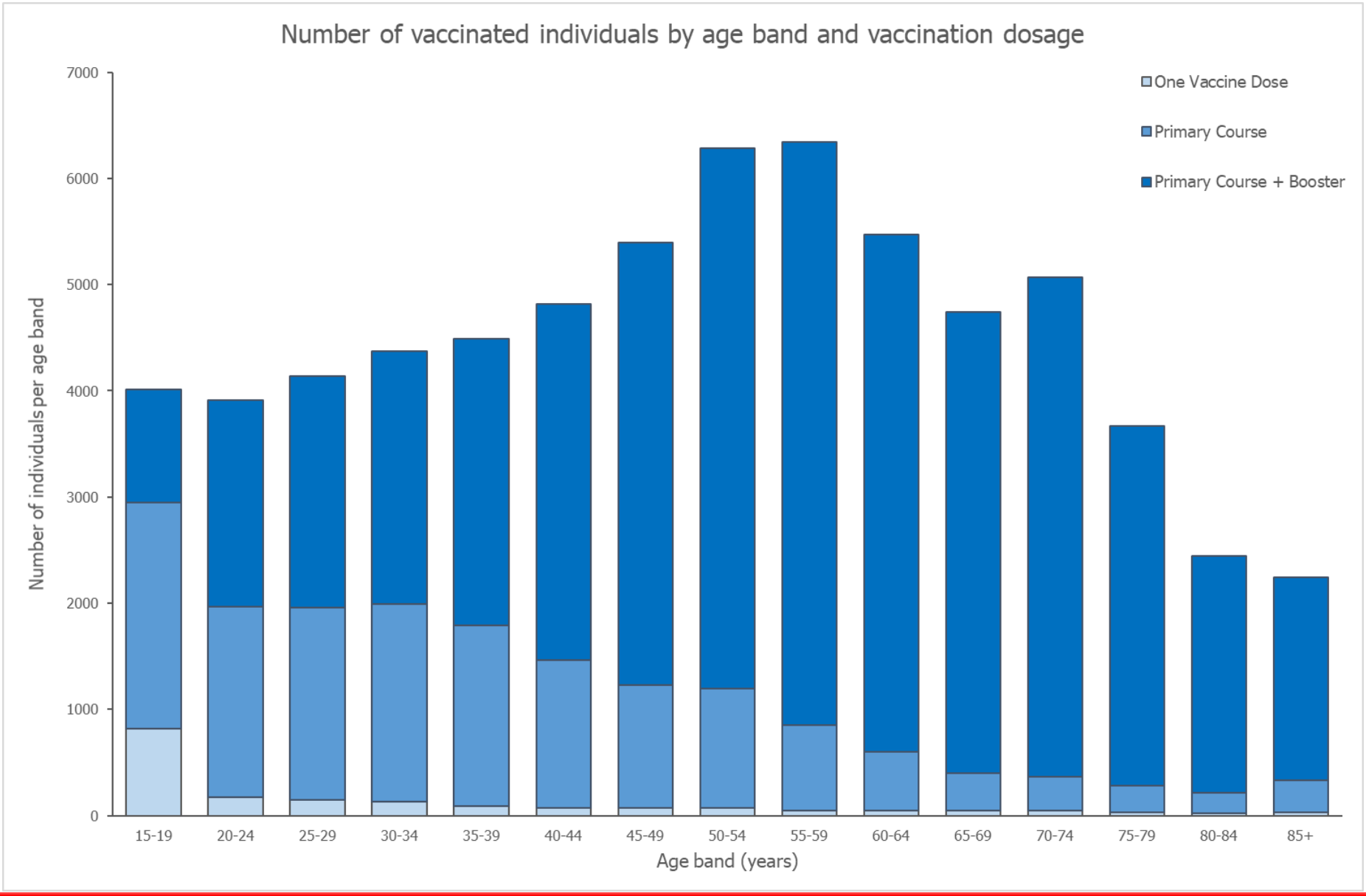

The data shown here is 7-day notification rate per 100,000 population for Upper Tier Local Authorities in the United Kingdom. It should be noted that Isle of Man data is not shown here due to the lack of comparability of data resulting from the differences in testing availability and strategy on the Isle of Man compared to the UK.

# 7-day Notification Rate – UK Lower Tier Local Authorities

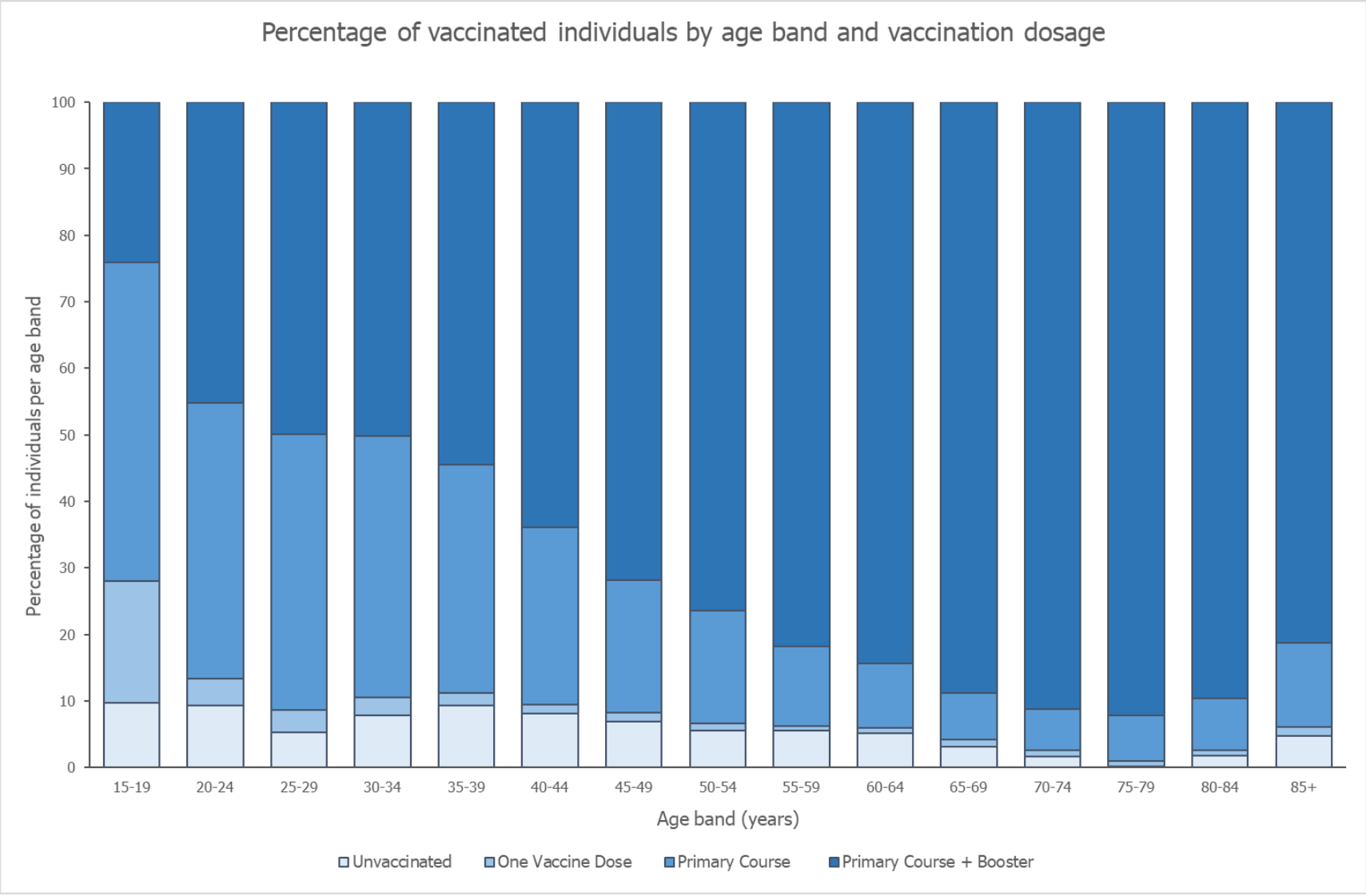



The data shown here is 7-day notification rate per 100,000 population for Lower Tier Local Authorities in the United Kingdom. It should be noted that Isle of Man data is not shown here due to the lack of comparability of data resulting from the differences in testing availability and strategy on the Isle of Man compared to the UK.

# Vaccine Uptake and Coverage



# Vaccine Uptake and Coverage




This data uses the 2021 Census populations as reference for eligible population[3].

# Hospitalised Patients

## SUMMARY

| | |
|---|---|
| **Total Patients** | **21** |

| **Vaccination Status of Hospital Admissions** | |
|---|---|
| **Primary Course + Booster(s)** | 67% |
| **Primary Course** | 10% |
| **One Vaccine Dose** | 0% |
| **Unvaccinated** | 24% |

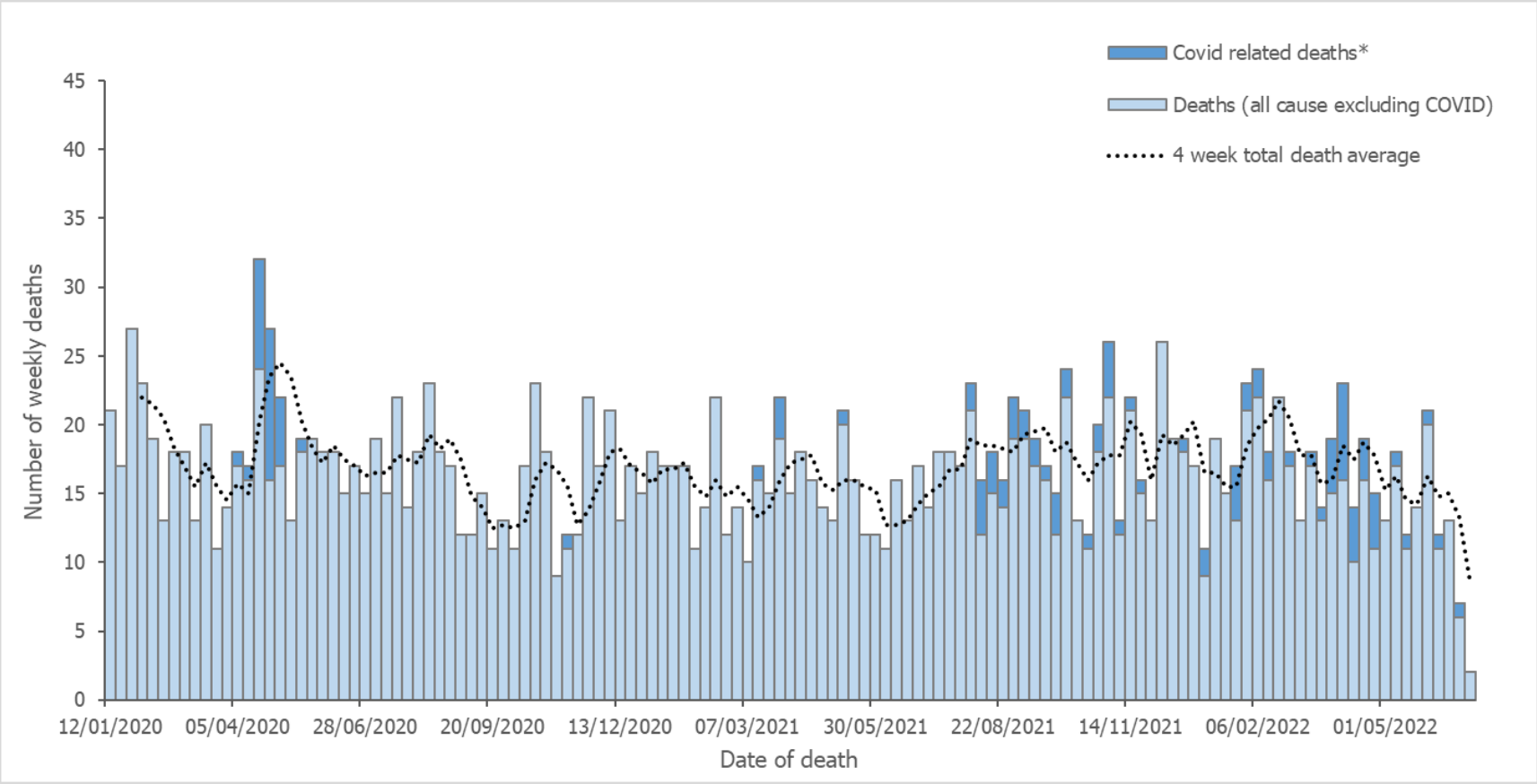
Snapshot – 28 June 2022

# Hospitalised Patients

The following information has been supplied by Manx Care:

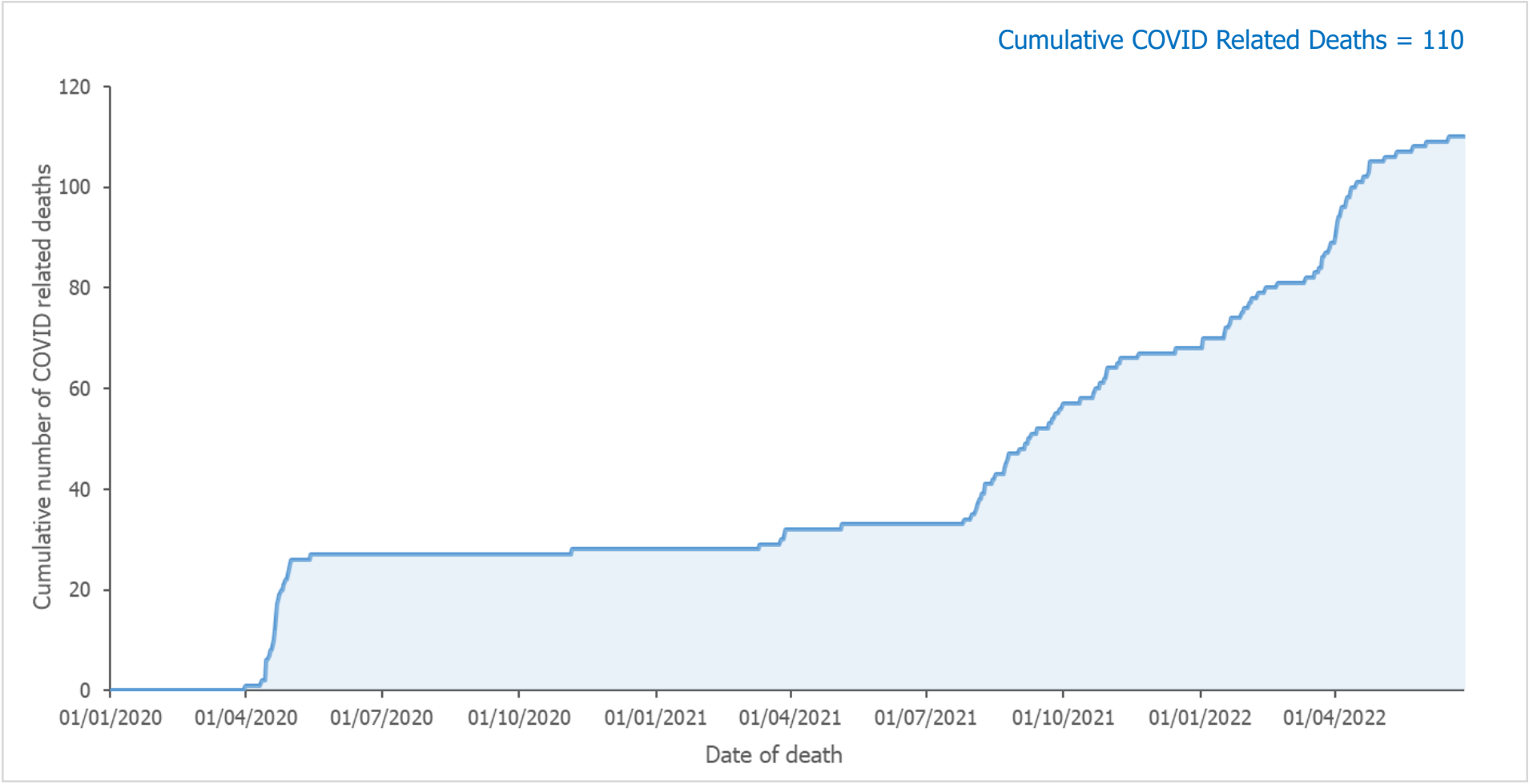
- At the time of information provision (10:00 28 June 2022), there are 21 patients currently in Nobles Hospital who have tested positive for COVID-19.
- 2 were admitted for treatment of their COVID-19 infection and 19 were admitted for other reasons.

# Weekly Deaths – Whole Pandemic

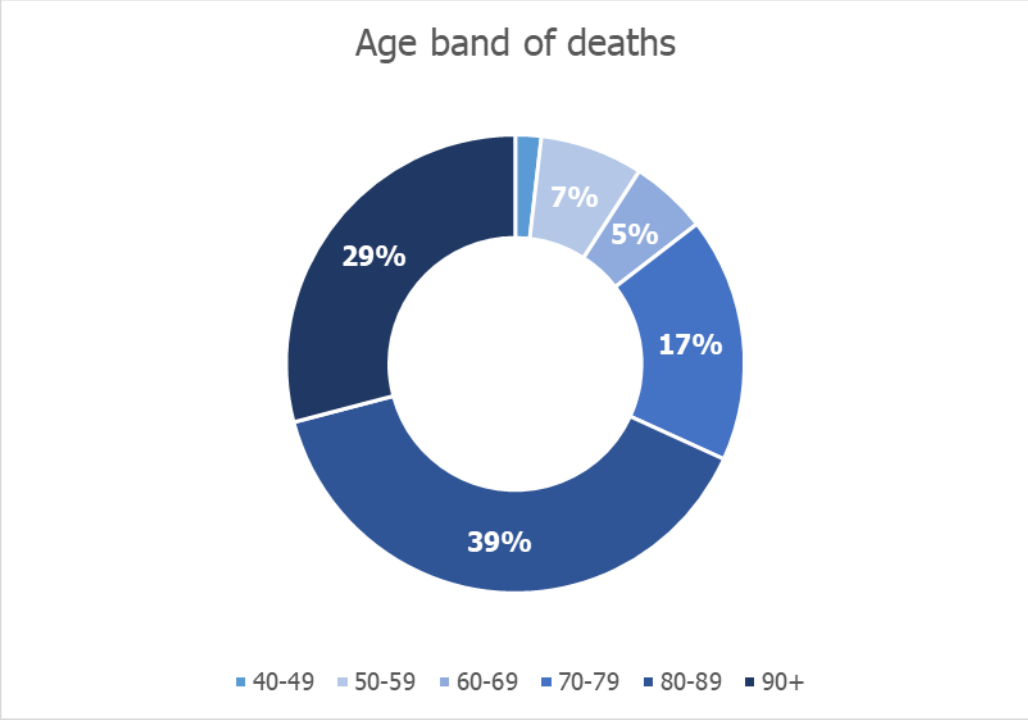



- *COVID related deaths are those where COVID-19 is mentioned anywhere on the death certificate.
- Death registrations are often delayed and therefore deaths occurring in a given week may not be input into the week of which death occurred until a later date, meaning figures are likely to change retrospectively as data is updated. This also means that the most recent numbers will be incomplete at the time of release, and will update in subsequent reports.
- Cumulative COVID-19 related deaths stands at 110.

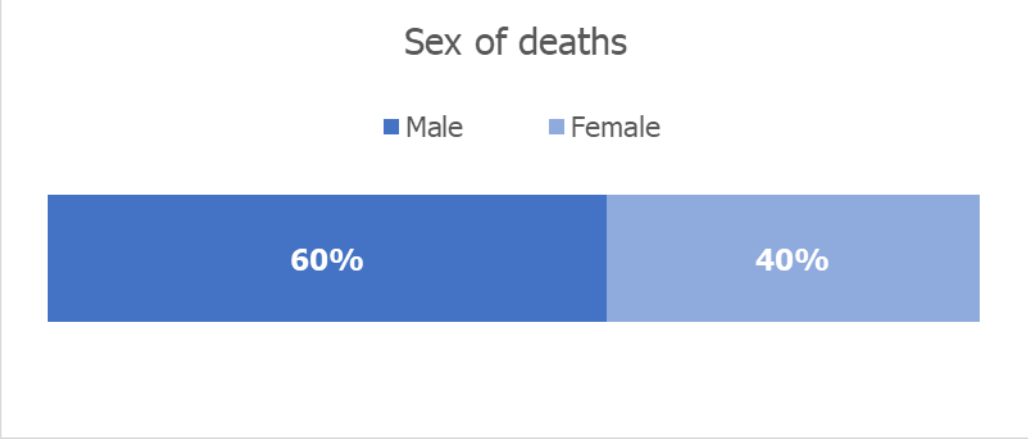
# Cumulative COVID-Related Deaths



# COVID-Related Deaths Overview




| Age band of deaths | No. of deaths | % of total deaths |
|---|---|---|
| 40-49 | 2 | 1.8% |
| 50-59 | 8 | 7.3% |
| 60-69 | 6 | 5.5% |
| 70-79 | 19 | 17.3% |
| 80-89 | 43 | 39.1% |
| 90+ | 32 | 29.1% |




| Place of death | No. of deaths |
|---|---|
| Hospital | 52 |
| Hospice | 4 |
| Nursing/Residential Home | 42 |
| Domestic Property | 12 |

# Definitions

**Vaccination Status**

- One dose = those who have received only one dose
- Primary Course = those who have received a full course (two or three dose). Third dose, those with immunosuppression only.
- Primary Course + Booster = a full course plus a booster

# Appendix 1

| Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ | Date | Daily $R_t$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01-Jul | 6.00 | 20-Jul | 11.67 | 08-Aug | 0.67 | 27-Aug | 0.54 | 15-Sep | 1.63 | 04-Oct | 1.76 | 23-Oct | 0.99 | 11-Nov | 0.61 | 30-Nov | 2.74 | 19-Dec | 0.60 | 07-Jan | 0.86 | 26-Jan | 0.67 | 14-Feb | 0.92 | 05-Mar | 1.20 | 24-Mar | 0.71 | 12-Apr | 0.90 | 01-May | 0.28 | 20-May | 0.79 | 08-Jun | 2.76 |
| 02-Jul | 2.67 | 21-Jul | 13.14 | 09-Aug | 0.73 | 28-Aug | 0.79 | 16-Sep | 0.59 | 05-Oct | 1.14 | 24-Oct | 0.67 | 12-Nov | 0.67 | 01-Dec | 3.12 | 20-Dec | 1.43 | 08-Jan | 0.30 | 27-Jan | 0.46 | 15-Feb | 1.34 | 06-Mar | 1.57 | 25-Mar | 0.70 | 13-Apr | 0.79 | 02-May | 0.63 | 21-May | 0.90 | 09-Jun | 6.85 |
| 03-Jul | 6.00 | 22-Jul | 9.55 | 10-Aug | 0.64 | 29-Aug | 0.34 | 17-Sep | 0.70 | 06-Oct | 2.24 | 25-Oct | 1.09 | 13-Nov | 0.77 | 02-Dec | 2.19 | 21-Dec | 1.69 | 09-Jan | 0.31 | 28-Jan | 0.56 | 16-Feb | 1.37 | 07-Mar | 3.96 | 26-Mar | 0.56 | 14-Apr | 0.69 | 03-May | 0.50 | 22-May | 0.60 | 10-Jun | 3.83 |
| 04-Jul | 5.00 | 23-Jul | 1.13 | 11-Aug | 0.76 | 30-Aug | 0.51 | 18-Sep | 0.86 | 07-Oct | 1.13 | 26-Oct | 1.13 | 14-Nov | 1.05 | 03-Dec | 1.38 | 22-Dec | 3.85 | 10-Jan | 0.77 | 29-Jan | 0.53 | 17-Feb | 0.70 | 08-Mar | 2.77 | 27-Mar | 0.57 | 15-Apr | 0.49 | 04-May | 0.38 | 23-May | 1.22 | 11-Jun | 4.95 |
| 05-Jul | 7.00 | 24-Jul | 1.56 | 12-Aug | 0.63 | 31-Aug | 0.78 | 19-Sep | 0.64 | 08-Oct | 1.89 | 27-Oct | 1.59 | 15-Nov | 2.59 | 04-Dec | 0.65 | 23-Dec | 1.88 | 11-Jan | 0.76 | 30-Jan | 0.63 | 18-Feb | 1.16 | 09-Mar | 3.18 | 28-Mar | 1.17 | 16-Apr | 0.37 | 05-May | 0.44 | 24-May | 1.21 | 12-Jun | 10.00 |
| 06-Jul | 0.67 | 25-Jul | 1.35 | 13-Aug | 0.48 | 01-Sep | 0.68 | 20-Sep | 2.00 | 09-Oct | 1.15 | 28-Oct | 0.71 | 16-Nov | 2.15 | 05-Dec | 1.11 | 24-Dec | 2.00 | 12-Jan | 0.55 | 31-Jan | 1.48 | 19-Feb | 0.87 | 10-Mar | 1.44 | 29-Mar | 1.20 | 17-Apr | 0.45 | 06-May | 0.73 | 25-May | 0.65 | 13-Jun | 9.62 |
| 07-Jul | 7.00 | 26-Jul | 0.47 | 14-Aug | 0.40 | 02-Sep | 0.66 | 21-Sep | 3.62 | 10-Oct | 1.85 | 29-Oct | 0.66 | 17-Nov | 2.10 | 06-Dec | 1.20 | 25-Dec | 1.43 | 13-Jan | 0.35 | 01-Feb | 1.22 | 20-Feb | 1.03 | 11-Mar | 1.41 | 30-Mar | 0.83 | 18-Apr | 1.25 | 07-May | 0.78 | 26-May | 0.35 | 14-Jun | 9.20 |
| 08-Jul | 6.00 | 27-Jul | 0.52 | 15-Aug | 0.65 | 03-Sep | 0.77 | 22-Sep | 1.52 | 11-Oct | 2.74 | 30-Oct | 0.44 | 18-Nov | 0.87 | 07-Dec | 1.24 | 26-Dec | 2.62 | 14-Jan | 0.27 | 02-Feb | 1.03 | 21-Feb | 2.37 | 12-Mar | 1.35 | 31-Mar | 0.34 | 19-Apr | 1.90 | 08-May | 0.63 | 27-May | 0.95 | 15-Jun | 6.61 |
| 09-Jul | 7.00 | 28-Jul | 0.86 | 16-Aug | 0.63 | 04-Sep | 0.44 | 23-Sep | 1.09 | 12-Oct | 1.97 | 31-Oct | 0.43 | 19-Nov | 0.88 | 08-Dec | 1.48 | 27-Dec | 4.38 | 15-Jan | 0.33 | 03-Feb | 0.31 | 22-Feb | 3.05 | 13-Mar | 2.15 | 01-Apr | 0.75 | 20-Apr | 0.59 | 09-May | 1.32 | 28-May | 0.35 | 16-Jun | 11.21 |
| 10-Jul | 2.57 | 29-Jul | 0.48 | 17-Aug | 0.81 | 05-Sep | 0.33 | 24-Sep | 2.33 | 13-Oct | 3.03 | 01-Nov | 0.94 | 20-Nov | 1.00 | 09-Dec | 0.86 | 28-Dec | 5.16 | 16-Jan | 0.50 | 04-Feb | 0.57 | 23-Feb | 3.05 | 14-Mar | 2.90 | 02-Apr | 0.35 | 21-Apr | 0.66 | 10-May | 2.07 | 29-May | 0.88 | 17-Jun | 6.20 |
| 11-Jul | 3.50 | 30-Jul | 0.45 | 18-Aug | 0.56 | 06-Sep | 1.07 | 25-Sep | 2.33 | 14-Oct | 1.23 | 02-Nov | 0.53 | 21-Nov | 1.14 | 10-Dec | 0.51 | 29-Dec | 10.12 | 17-Jan | 0.71 | 05-Feb | 0.32 | 24-Feb | 1.17 | 15-Mar | 3.99 | 03-Apr | 0.54 | 22-Apr | 0.51 | 11-May | 1.38 | 30-May | 0.57 | 18-Jun | 1.93 |
| 12-Jul | 2.75 | 31-Jul | 0.31 | 19-Aug | 0.92 | 07-Sep | 1.05 | 26-Sep | 1.32 | 15-Oct | 0.96 | 03-Nov | 0.64 | 22-Nov | 2.16 | 11-Dec | 0.48 | 30-Dec | 4.82 | 18-Jan | 0.73 | 06-Feb | 0.36 | 25-Feb | 1.15 | 16-Mar | 3.41 | 04-Apr | 0.79 | 23-Apr | 0.53 | 12-May | 1.13 | 31-May | 0.88 | 19-Jun | 1.86 |
| 13-Jul | 13.33 | 01-Aug | 0.45 | 20-Aug | 0.80 | 08-Sep | 1.32 | 27-Sep | 1.89 | 16-Oct | 1.43 | 04-Nov | 0.50 | 23-Nov | 2.53 | 12-Dec | 0.36 | 31-Dec | 4.15 | 19-Jan | 0.76 | 07-Feb | 0.91 | 26-Feb | 1.61 | 17-Mar | 1.55 | 05-Apr | 0.93 | 24-Apr | 0.47 | 13-May | 0.96 | 01-Jun | 1.00 | 20-Jun | 2.23 |
| 14-Jul | 19.60 | 02-Aug | 1.22 | 21-Aug | 0.64 | 09-Sep | 1.17 | 28-Sep | 1.42 | 17-Oct | 1.07 | 05-Nov | 0.24 | 24-Nov | 2.45 | 13-Dec | 0.82 | 01-Jan | 1.41 | 20-Jan | 0.28 | 08-Feb | 0.48 | 27-Feb | 1.49 | 18-Mar | 1.37 | 06-Apr | 0.92 | 25-Apr | 0.75 | 14-May | 0.90 | 02-Jun | 0.48 | 21-Jun | 1.24 |
| 15-Jul | 17.86 | 03-Aug | 0.80 | 22-Aug | 0.66 | 10-Sep | 0.47 | 29-Sep | 2.17 | 18-Oct | 1.36 | 06-Nov | 0.26 | 25-Nov | 1.74 | 14-Dec | 1.27 | 02-Jan | 2.38 | 21-Jan | 0.30 | 09-Feb | 0.66 | 28-Feb | 3.44 | 19-Mar | 0.81 | 07-Apr | 0.51 | 26-Apr | 0.69 | 15-May | 0.96 | 03-Jun | 1.13 | 22-Jun | 0.91 |
| 16-Jul | 150.50 | 04-Aug | 0.51 | 23-Aug | 0.93 | 11-Sep | 0.38 | 30-Sep | 0.74 | 19-Oct | 1.91 | 07-Nov | 0.31 | 26-Nov | 1.60 | 15-Dec | 0.74 | 03-Jan | 2.80 | 22-Jan | 0.32 | 10-Feb | 0.41 | 01-Mar | 3.82 | 20-Mar | 1.25 | 08-Apr | 0.43 | 27-Apr | 0.55 | 16-May | 1.15 | 04-Jun | 1.67 | 23-Jun | 0.77 |
| 17-Jul | 25.57 | 05-Aug | 0.68 | 24-Aug | 1.08 | 12-Sep | 0.62 | 01-Oct | 0.49 | 20-Oct | 2.21 | 08-Nov | 0.95 | 27-Nov | 1.52 | 16-Dec | 0.68 | 04-Jan | 4.74 | 23-Jan | 0.38 | 11-Feb | 0.32 | 02-Mar | 3.27 | 21-Mar | 2.22 | 09Apr | 0.37 | 28-Apr | 0.25 | 17-May | 0.69 | 05-Jun | 2.55 | 24-Jun | 0.71 |
| 18-Jul | 17.67 | 06-Aug | 0.99 | 25-Aug | 0.78 | 13-Sep | 0.71 | 02-Oct | 1.06 | 21-Oct | 1.73 | 09-Nov | 1.28 | 28-Nov | 1.60 | 17-Dec | 0.73 | 05-Jan | 1.74 | 24-Jan | 1.05 | 12-Feb | 0.33 | 03-Mar | 1.55 | 22-Mar | 1.60 | 10-Apr | 0.73 | 29-Apr | 0.19 | 18-May | 1.53 | 06-Jun | 1.68 | 25-Jun | 0.53 |
| 19-Jul | 18.57 | 07-Aug | 0.38 | 26-Aug | 0.80 | 14-Sep | 0.82 | 03-Oct | 1.20 | 22-Oct | 0.86 | 10-Nov | 1.13 | 29-Nov | 2.09 | 18-Dec | 0.50 | 06-Jan | 1.03 | 25-Jan | 0.77 | 13-Feb | 0.44 | 04-Mar | 1.80 | 23-Mar | 1.44 | 11-Apr | 0.52 | 30-Apr | 0.23 | 19-May | 0.73 | 07-Jun | 4.33 | 26-Jun | 0.19 |

# Appendix 2 - Environmental surveillance

Environmental surveillance – or wastewater-based epidemiology (WBE) – has been a widely used tool as part of a range of surveillance systems during the COVID-19 pandemic.

Studies of some of the first COVID-19 cases found the presence of SARS-CoV-2 RNA in the faeces of patients, and studies have found SARS-CoV-2 in the faeces of both symptomatic and asymptomatic individuals.

WBE has the potential to detect changes in the circulation of a pathogen in a population before syndromic-based surveillance systems identify cases.

The use of WBE in surveillance of viral pathogens is an emerging science, and in this pilot study between the Government of The Isle of Man and the London School of Hygiene and Tropical Medicine (LSHTM), we are exploring how WBE could be used to monitor levels of viruses which can have significant public health impact, in a proof-of-principle study.

# Appendix 2 - WBE for viral pathogens pilot study

Wastewater samples are collected four days per week at a collection site on Isle of Man and transported to LSHTM for testing.

Samples are concentrated by filtration and then assayed using reverse-transcription polymerase chain reaction (RT-PCR)-based methods for the presence of viral genomic material (RNA) of a panel of pathogens (SARS-CoV-2, enteroviruses, influenza virus and norovirus).

The amount of viral RNA for each pathogen in the sample tested is estimated by comparison with a quantitative standard, and from this virus genome copies per litre of wastewater is estimated mathematically.

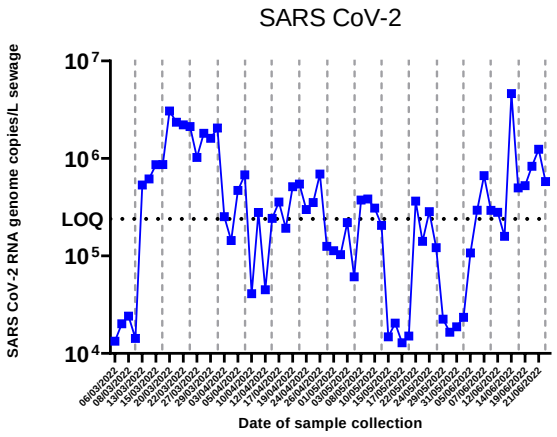
# Appendix 2 - Data update

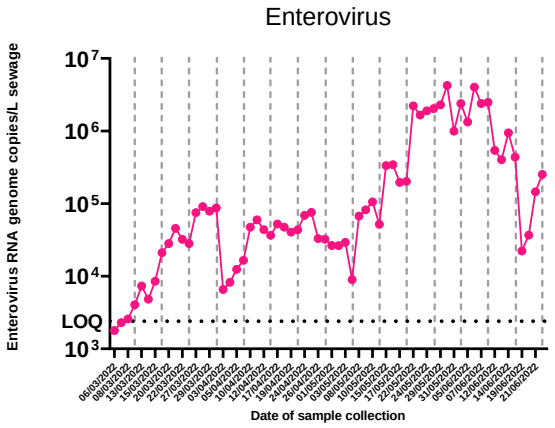
Data presented for samples collected over sixteen weeks, between 06/03/2022 – 22/06/2022.

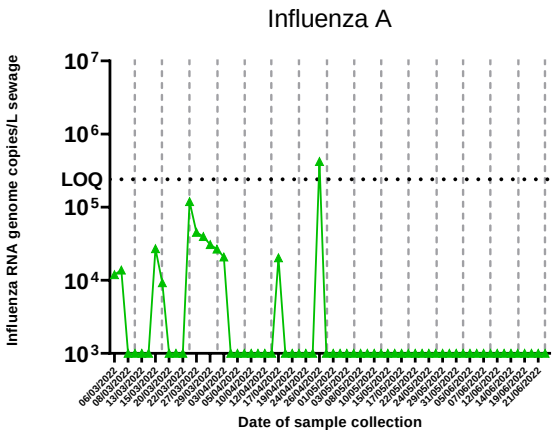
SARS-CoV-2 RNA remains detectable in Week 16 (w/c 19/06/2022) at levels above the limit of quantitation (LOQ) of the assay.

Enterovirus RNA remains detectable in Week 16 (w/c 19/06/2022) at levels above the LOQ of the assay.

Influenza virus RNA remains below the LOQ in Week 16 (w/c 19/06/2022).



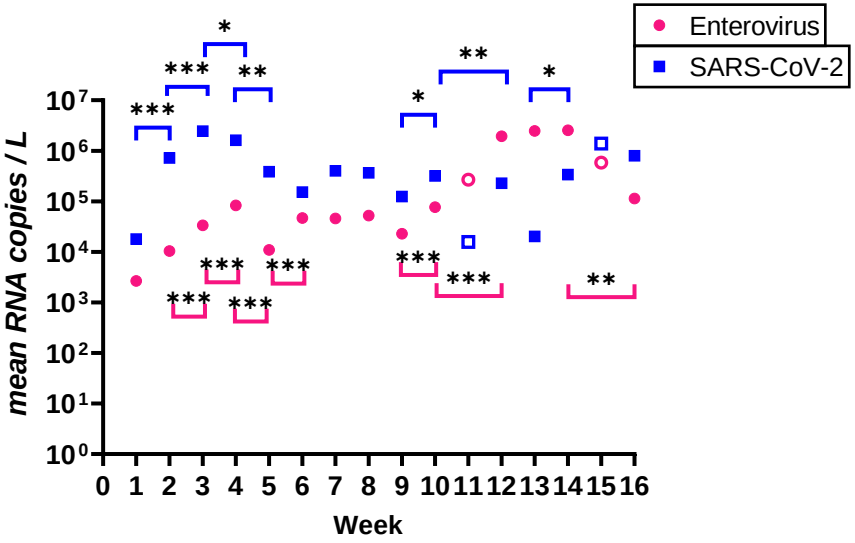



# Appendix 2 - Data update

Monitoring RNA levels in wastewater is inherently stochastic and dependent on multiple factors. To gauge the trend in the changes observed, the weekly mean levels have been compared.

There has been no statistically significant change in in SARS-CoV-2 RNA in Week 16 compared to Week 14.

There has been a statistically significant decrease ($p<0.01$) in enterovirus RNA in Week 16 compared to Week 14.



# Appendix 2 - WBE for viral pathogens pilot study

The data and analysis presented here is preliminary, and based on techniques that are in-development. This data has not been peer-reviewed. As such the final data may change following further analyses.

Through this pilot study, we aim to understand more about how WBE is used in monitoring viral pathogens, validating the methods used, and understand for which pathogens the technology is most valid.

Alongside continuing to monitor levels of viral RNA in wastewater samples and provide technical validation of these methods in an applied context, this study will determine the usefulness of sequencing-based methods to characterise virus types detected in the samples, and working with specialists in modelling, how this data can be used to infer relationships between cases and genome detection in wastewater.

# Appendix 2 - References


[1] M. Morvan, A. Lojacomo, C. Souque, M. Wade, T. Hoffmann, K. Pouwels, A. Singer, J. Bunce, A. Engeli, J. Grimsley, K. O'Reilly, L. Danon, Estimating SARS-CoV-2 prevalence from large-scale wastewater surveillance: insights from combined analysis of 44 sites in England. International Journal of Infectious Diseases, Volume 116, Supplement, 2022. doi.org/10.1016/j.ijid.2021.12.057.

[2] Fitzgerald SF, Rossi G, Low AS, et al. Site Specific Relationships between COVID-19 Cases and SARS-CoV-2 Viral Load in Wastewater Treatment Plant Influent. Environ Sci Technol. 2021;55(22):15276-15286. doi:10.1021/acs.est.1c05029

# References


[1] Coronavirus (COVID-19) Infection Survey, UK: 24 June 2022
https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronaviruscovid19infectionsurveypilot/24june2022

[2] Contreras, S., Villavicencio, H. A., Medina-Ortiz, D., Saavedra, C. P., & Olivera-Nappa, Á. (2020). Real-Time Estimation of $R_t$ for Supporting Public-Health Policies Against COVID-19. *Frontiers in public health*, *8*, 556689. https://doi.org/10.3389/fpubh.2020.556689

[3] https://www.gov.im/media/1375604/2021-01-27-census-report-part-i-final-2.pdf

# Data Disclaimer

While we have used reasonable efforts to ensure the accuracy of the data used within this report, data may be subject to change and historical amendment as new systems become established.

The quality of data provided to Public Health by other organisations is the responsibility of the originating organisation.

Produced on behalf of Professor Hugo van Woerden, Interim Director of Public Health.