

Hospital onset COVID-19 cases in Scotland

Week ending 01 March 2020
to week ending 01 May 2022

25 May
2022

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Introduction

Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) Scotland, part of National Services Scotland, works closely with Public Health Scotland to deliver the COVID-19 response. This release provides data for COVID-19 hospital onset cases in Scotland from week ending 01 March 2020 to week ending 01 May 2022.

A system for monitoring COVID-19 is critical to tracking hospital transmission and will inform infection prevention and control measures. The published data can be used to improve care of patients. The transmission of COVID-19 is thought to occur mainly through respiratory droplets generated by coughing and through contact with contaminated surfaces. As sustained community transmission has occurred as the pandemic has progressed, it has become more challenging to identify true cases of hospital transmission. [Further information on the epidemiology of COVID-19 in healthcare settings can be found on the Public Health Scotland website.](#)

This report includes all hospital onset cases of COVID-19 regardless of variant, such as Delta and Omicron. Further information on COVID-19 variants in Scotland can be found here: <https://publichealthscotland.scot/publications/covid-19-statistical-report/>.

The report also includes cases of reinfection with COVID-19.

ARHAI Scotland is working with NHS boards to validate COVID-19 hospital onset cases to ensure the data are robust.

Data are provided for the 14 NHS boards and one NHS special health board.

Due to the cessation of almost all population testing for SARS-CoV-2 at the end of April, the format and content of this report is currently under review.

Results and Commentary

Breakdown of COVID-19 cases by hospital onset status – cumulative data

The total number of COVID-19 cases reported to ARHAI Scotland, with specimen dates up to 01 May 2022, was 1,922,365. Of these:

- 1,887,759 (98.2%) were reported as community onset (first positive specimen of COVID-19 episode taken in the community).
- 19,218 (1.0%) were reported as non-hospital onset (first positive specimen of COVID-19 episode on day 1 or 2 of inpatient admission to NHS board).
- 3,291 (0.2%) were reported as indeterminate hospital onset (first positive specimen of COVID-19 episode on days 3 to 7 of admission to NHS board).
- 3,507 (0.2%) were reported as probable hospital onset (first positive specimen of COVID-19 episode on days 8 to 14 of admission to NHS board).
- 8,590 (0.4%) were reported as definite hospital onset (first positive specimen of COVID-19 episode 15 or more days after admission to NHS board).

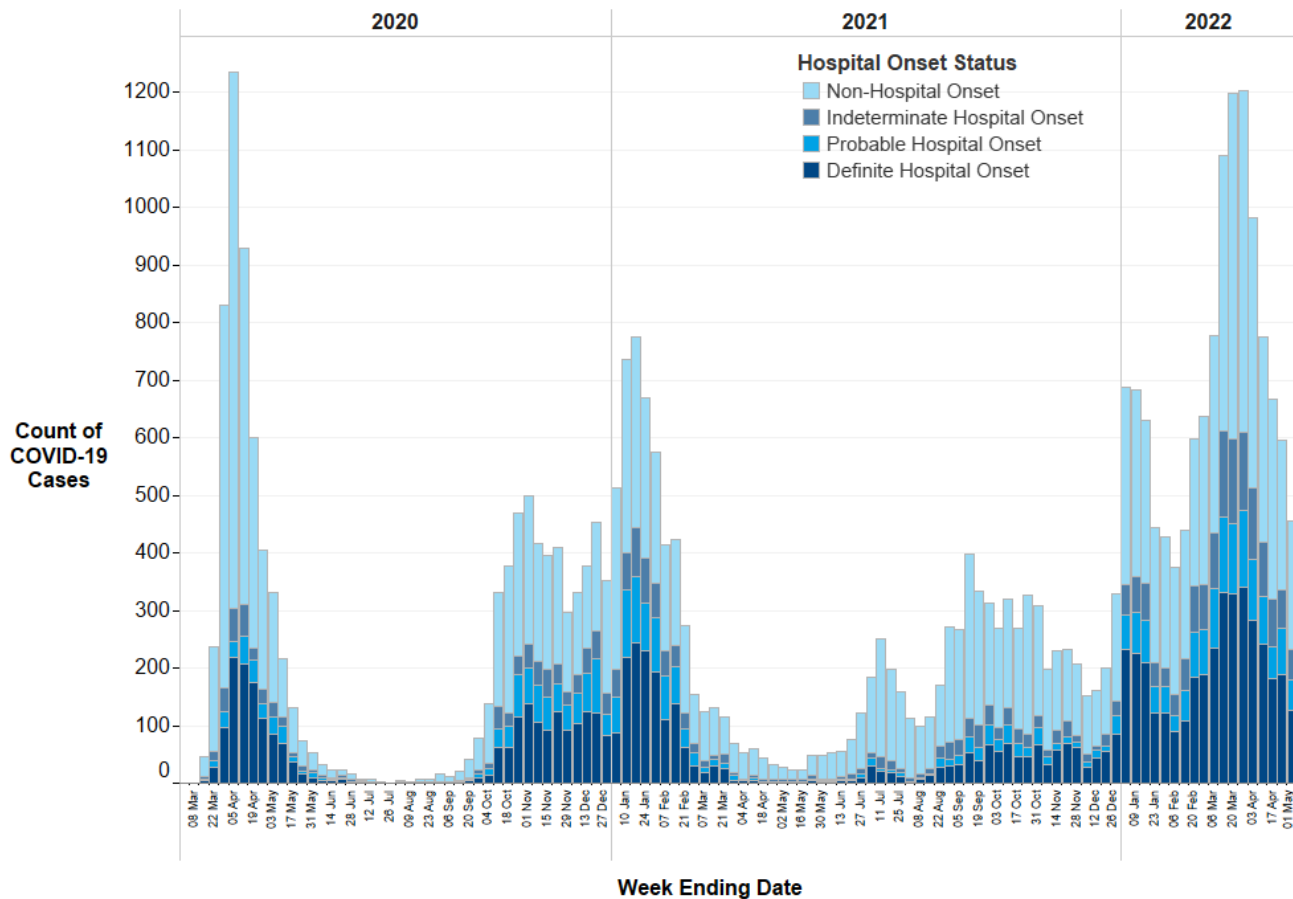
Breakdown of COVID-19 cases by hospital onset status – weekly data

The total number of COVID-19 cases reported to ARHAI Scotland this week (week ending 01 May 2022) was 14,210. Of these:

- 13,754 (96.8% of all COVID-19 cases) were reported as community onset (first positive specimen of COVID-19 episode taken in the community), of which 1,829 (13.3% of community onset cases) were reinfections. In the previous week (week ending 24 April 2022) there were 21,206 (97.3% of all COVID-19 cases) of which 2,696 (12.7% of community onset cases) were reinfections.
- 224 (1.6% of all COVID-19 cases) were reported as non-hospital onset (first positive specimen of COVID-19 episode on day 1 or 2 of admission to NHS board), of which 17 (7.6% of non-hospital onset cases) were reinfections. In the previous week (week ending 24 April 2022) there were 259 (1.2% of all COVID-19 cases), of which 23 (8.9% of non-hospital onset cases) were reinfections.

- 52 (0.4% of all COVID-19 cases) were reported as indeterminate hospital onset (first positive specimen of COVID-19 episode on days 3 to 7 of admission to NHS board), of which 3 (5.8% of indeterminate hospital onset cases) were reinfections. In the previous week (week ending 24 April 2022) there were 67 (0.3% of all COVID-19 cases), of which 1 (1.5% of indeterminate hospital onset cases) was a reinfection.
- 53 (0.4% of all COVID-19 cases) were reported as probable hospital onset (first positive specimen of COVID-19 episode on days 8 to 14 of admission to NHS board), of which 2 (3.8% of probable hospital onset cases) were reinfections. In the previous week (week ending 24 April 2022) there were 81 (0.4% of all COVID-19 cases), of which 4 (4.9% of probable hospital onset cases) were reinfections.
- 127 (0.9% of all COVID-19 cases) were reported as definite hospital onset (first positive specimen of COVID-19 episode 15 or more days after admission to NHS board), of which 8 (6.3% of definite hospital onset cases) were reinfections. In the previous week (week ending 24 April 2022) there were 188 (0.9% of all COVID-19 cases), of which 11 (5.9% of definite hospital onset cases) were reinfections.

Figure 1: Epidemic curve of COVID-19 cases with first positive specimen of COVID-19 episode taken during an inpatient stay, by onset status: week-ending 01 March 2020 to week-ending 01 May 2022 (n=34,606).^{1,2,3}



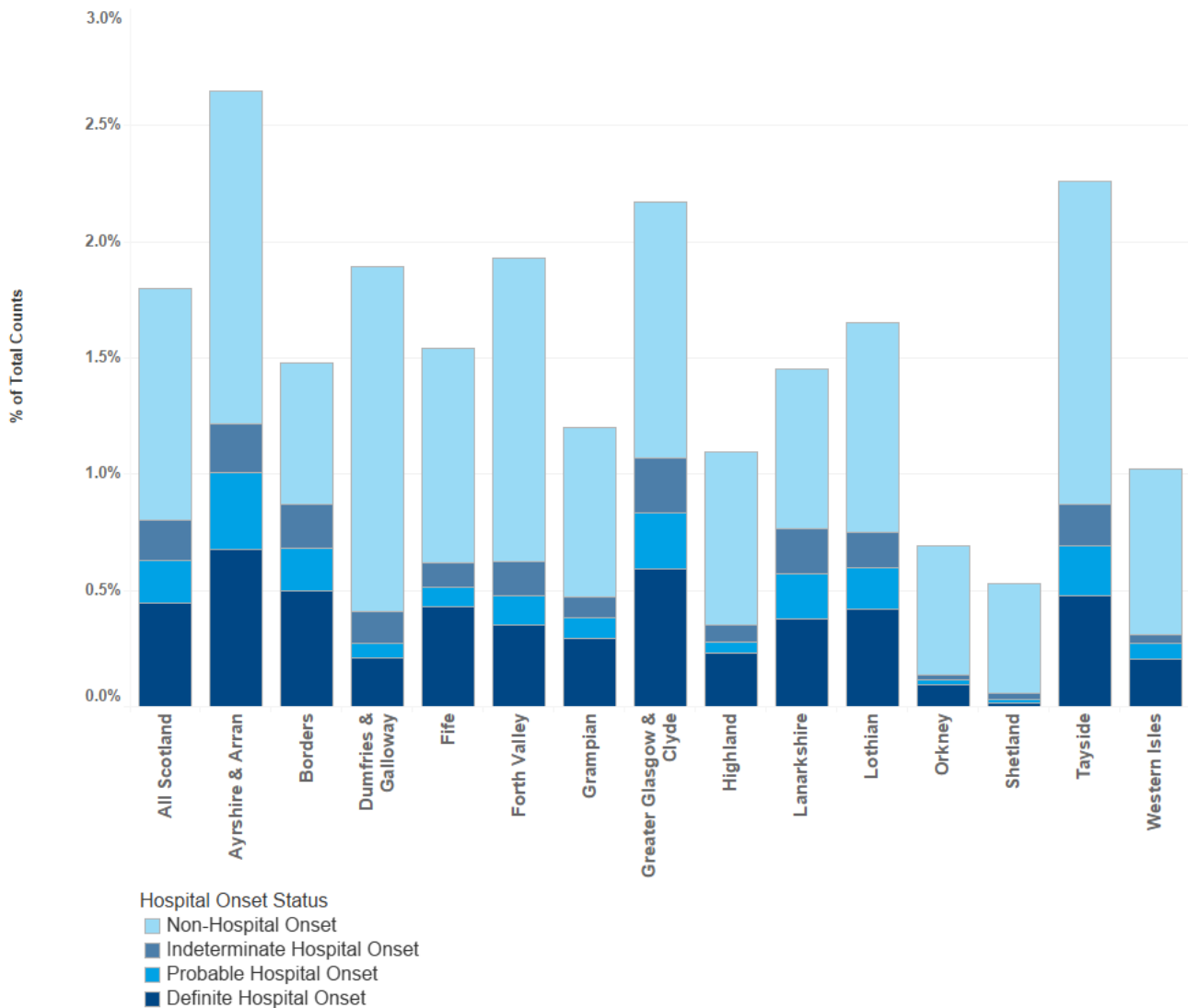
1. Source of data are Corporate Data Warehouse (CDW) that contains test results from Electronic Communication of Surveillance in Scotland (ECOSS) and Rapid Admission Preliminary Inpatient Data (RAPID) or local admission data.
2. The community cases are not represented in this chart as first sample was not taken in hospital setting.
3. Data include any reinfection episodes taken in hospital settings.

Table 1: Number of COVID-19 cases, by onset status and NHS board: specimen dates up to 01 May 2022.^{1,2,3,4}

NHS board	Total COVID-19 cases (n)	Non-hospital onset (n)	Indeterminate hospital onset cases (n)	Probable hospital onset cases (n)	Definite hospital onset cases (n)	Non-hospital onset (%)	Indeterminate hospital onset cases (%)	Probable hospital onset cases (%)	Definite hospital onset cases (%)
Ayrshire & Arran	136,980	1,958	287	453	929	1.4%	0.2%	0.3%	0.7%
Borders	32,014	194	60	59	160	0.6%	0.2%	0.2%	0.5%
Dumfries & Galloway	44,203	656	61	27	93	1.5%	0.1%	0.1%	0.2%
Fife	126,535	1,169	130	103	547	0.9%	0.1%	0.1%	0.4%
Forth Valley	113,175	1,475	167	142	399	1.3%	0.1%	0.1%	0.4%
Golden Jubilee	71	40	17	6	8	-	-	-	-
Grampian	176,790	1,292	159	153	520	0.7%	0.1%	0.1%	0.3%
Greater Glasgow & Clyde	456,482	5,020	1,077	1,116	2,702	1.1%	0.2%	0.2%	0.6%
Highland	91,825	684	64	46	211	0.7%	0.1%	0.1%	0.2%
Lanarkshire	268,668	1,841	530	518	1,016	0.7%	0.2%	0.2%	0.4%
Lothian	320,399	2,889	488	584	1,337	0.9%	0.2%	0.2%	0.4%
Orkney	5,213	29	1	1	5	0.6%	0.0%	0.0%	0.1%
Shetland	6,635	31	2	1	1	0.5%	0.0%	0.0%	0.0%
Tayside	135,639	1,885	245	293	646	1.4%	0.2%	0.2%	0.5%
Western Isles	7,736	55	3	5	16	0.7%	0.0%	0.1%	0.2%
Scotland	1,922,365	19,218	3,291	3,507	8,590	1.0%	0.2%	0.2%	0.4%

1. Source of data are Corporate Data Warehouse (CDW) that contains test results from Electronic Communication of Surveillance in Scotland (ECOSS) and Rapid Admission Preliminary Inpatient Data (RAPID) or local admission data.
2. NHS Golden Jubilee has been excluded from the proportions data since data for this board will not be comparable with others due to no “community onset” cases assigned to that board.
3. The data used has not been adjusted for different patient groups and size of NHS board.
4. Data include any reinfection episodes taken in hospital settings.

Figure 2: Proportion of COVID-19 cases by onset status and NHS board: specimen dates up to 01 May 2022.^{1,2,3,4,5}



1. Source of data are Corporate Data Warehouse (CDW) that contains test results from Electronic Communication of Surveillance in Scotland (ECOSS) and Rapid Admission Preliminary Inpatient Data (RAPID) or local admission data.
2. NHS Golden Jubilee has been excluded since data for this board will not be comparable with others due to no “community onset” cases assigned to that board.
3. The data used has not been adjusted for different patient groups and size of NHS board.
4. Community onset cases are not shown but are included in the calculation of the proportions.
5. Data include any reinfection episodes taken in hospital settings.

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Further information

Further Information can be found on the [PHS website](#).

The next release of this publication will be 01 June 2022.

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Appendices

Appendix 1 – Revisions to the surveillance

Description of Revision	First report revision applied	Rationale for revision
Change from ECOSS to Corporate Data Warehouse (CDW) database	18/08/2021 (2021 Week 29 report)	<p>On the 28th July 2021, the COVID-19 reporting processes were updated by Public Health Scotland, which has resulted in some changes to the cumulative positive cases reported. From the report published on 18th August 2021, data have been generated using this new methodology, resulting in changes to the overall number of cases reported. Non-Scottish residents who first tested positive for COVID-19 within a Scottish hospital were excluded with this new methodology.</p> <p>Please see the Public Health Scotland website for more information.</p>
Re-inclusion of non-Scottish cases defined as a hospital onset case	06/10/2021 (2021 Week 36 report)	<p>After update in methodology to report cases by Public Health Scotland, non-Scottish residents were excluded from this report, for publication between 18th August 2021 and 29th September 2021.</p> <p>As of 6th October 2021, any COVID-19 cases from non-Scottish residents defined as a hospital onset case have been reinstated, and will continue to be reported. These cases are reported under the NHS board where the first COVID-19 sample was taken. ARHAI report these additional cases to accurately reflect the burden of infection and extent of nosocomial transmission of COVID-19 in Scottish hospitals.</p>
Inclusion of private laboratory data in Public Health Scotland COVID-19 dataset	15/12/2021 (2021 Week 46 report)	<p>The case inclusion methodology has been updated by Public Health Scotland. New data feeds from private labs are now included in the overall PHS COVID -19 dataset used for COVID-19 hospital onset reporting. This has resulted in the addition of 711 cases between week ending 3rd October 2021 and week ending 14th November 2021.</p>
Change in case definition to include Lateral Flow Device (LFD) positive results	02/02/2022 (2022 Week 1 report)	<p>Public Health Scotland has updated the Scottish COVID-19 national case definition to reflect the revised testing strategy from 5th January 2022. The new definition is valid for cases from 5th January 2022 onwards, whereby either a person's first LFD or PCR positive test is accepted. LFD positive</p>

		<p>cases followed by a negative PCR result within 48 hours are excluded. This change in definitions primarily affects the number of cases reported as community onset, and will have a minimal impact on hospital onset COVID-19.</p> <p>Please see the Public Health Scotland website for more information.</p>
<p>Inclusion of reinfections data</p>	<p>10/04/2022 (2022 Week 14 report)</p>	<p>On 1 March 2022, Public Health Scotland updated the Scottish COVID-19 national case definition to include reinfections of COVID-19.</p> <p>Previously COVID-19 cases were based on an individual's first positive test result only. The new definition includes both first infections and possible reinfections. Possible reinfections are defined as individuals who test positive, by PCR (polymerase chain reaction) or LFD (lateral flow device), 90 days or more after their last positive test. Note that as per the change in definitions to include LFD tests as above, positive tests after 90 days from an LFD before the 5th January 2022 are not included as a reinfection.</p> <p>All reinfection data from the beginning of the pandemic are now included in the report. From week 7 report (week ending 16/03/2022) to week 13 report (week ending 03/04/2022) only reinfections from 29th November 2021 were validated and included in the report, with reinfections prior to these classified as community onset. From week 14 (10/04/2022) the remaining reinfections from the beginning of the pandemic until 28th November were validated.</p> <p>Please see the Public Health Scotland website for more information.</p>

Appendix 2 – Publication metadata

Publication title

Hospital onset COVID-19 cases in Scotland

Description

This release provides information on hospital onset COVID-19 cases, there is a need for consistent reporting using standardised case definitions.

Theme

Infections in Scotland

Topic

COVID-19

Format

Word document

Data source(s)

COVID-19 Cases:

- Case data source: Source of data are Corporate Data Warehouse (CDW) that contains test results from Electronic Communication of Surveillance in Scotland (ECOSS).
- Admissions Data Source: Rapid Admission Preliminary Inpatient Data (RAPID) or Local Patient Admissions Systems.

Date that data are acquired

10 May 2022

Release date

25 May 2022

Frequency

Weekly

Timeframe of data and timeliness

Timeframe of this publication was decided by first positive sample in Scotland (i.e. March 2020)

The latest iteration of data is 01 May 2022; therefore, the data are 3 or 4 weeks in arrears.

Continuity of data

Weekly updates

Revisions statement

These data are not subject to planned major revisions. However, ARHAI Scotland aims to continually improve the interpretation of the data and therefore analysis methods are regularly reviewed and may be updated in the future.

Revisions relevant to this publication

Data are continually validated by both NHS boards and within the ECOSSE laboratory database and within CDW. The databases are live and data may change due to possible changes in specimen dates, personal demographics or amendments to COVID-19 test results, retrospective counts for Community onset cases may vary slightly from week to week. Any changes to cases taken within hospital settings, which are validated by NHS boards, are tracked by ARHAI Scotland. Changes to retrospective data are outlined in the table below if applicable.

Revisions relevant to this publication for COVID-19 cases up to 24 April 2022 include:

NHS Board	Hospital Onset Category	Change	Reason for Change
Scotland	Community onset	+1	Data changes in CDW
NHS LO	Non-Hospital Onset	+1	Retrospective change to case in week ending 17/04/2022

Concepts and definitions

A COVID-19 case is defined as an individual who has tested positive for COVID-19 by SARS-CoV-2 RT-PCR (PCR), or, from 5th January 2022 onwards by PCR, Lateral Flow Device (LFD) or other point of care rapid test. LFD positive cases that are followed by a negative PCR result within 48 hours are excluded.

First positive test and reinfections for each individual are counted. Episodes of infection are described as:

- First positive test recorded for case since March 2020
- Possible reinfections defined as individuals who test positive 90 days or more after their last positive test.

The transmission of COVID-19 is thought to occur mainly through respiratory droplets and through contact with contaminated surfaces. [Further information on the epidemiology of COVID-19 in healthcare settings can be found on the Public Health Scotland website](#). As sustained community transmission has occurred as the pandemic has progressed, it has become more challenging to identify true cases of hospital transmission.

A system for monitoring COVID-19 is critical to tracking nosocomial transmission in healthcare settings to inform infection prevention and control measures. In response to the Scottish Government's request to ascertain and validate the hospital-onset status of all COVID-19 cases in Scotland, ARHAI Scotland are working with NHS boards to establish a minimum viable dataset to fulfil this request.

The agreed nosocomial case definition for the UK is based on the number of days since admission to an NHS health board to the date of specimen sampling for a positive SARS-CoV-2 RT-PCR test. Time since admission to specimen sampling is categorised as:

- community onset (first positive specimen of new infection or reinfections (90 days or more after their last positive test) taken in the community)
- non-hospital onset (first positive specimen of new infection or reinfections (90 days or more after their last positive test) on day 1 or 2 of admission to NHS board)
- indeterminate (first positive specimen of new infection or reinfections (90 days or more after their last positive test) on days 3 to 7 of admission to NHS board)

- probable (first positive specimen of new infection or reinfections (90 days or more after their last positive test) on days 8 to 14 of admission to NHS board)
- definite hospital onset (first positive specimen date of new infection or reinfections (90 days or more after their last positive test) was 15 or more days after admission to NHS board)

These definitions are necessary due to the maximum incubation period of 14 days. See table below:

Day of sampling post admission	Nosocomial categorisation
Before admission	Community onset COVID-19
Day 1 of admission/on admission to NHS board	Non-hospital onset COVID-19
Day 2 of admission	Non-hospital onset COVID-19
Day 3 of admission	Indeterminate hospital onset COVID-19
Day 4 of admission	Indeterminate hospital onset COVID-19
Day 5 of admission	Indeterminate hospital onset COVID-19
Day 6 of admission	Indeterminate hospital onset COVID-19
Day 7 of admission	Indeterminate hospital onset COVID-19
Day 8 of admission	Probable hospital onset COVID-19
Day 9 of admission	Probable hospital onset COVID-19
Day 10 of admission	Probable hospital onset COVID-19
Day 11 of admission	Probable hospital onset COVID-19
Day 12 of admission	Probable hospital onset COVID-19
Day 13 of admission	Probable hospital onset COVID-19
Day 14 of admission	Probable hospital onset COVID-19
Day 15 of admission and onwards to discharge	Definite hospital onset COVID-19
Post discharge	Community onset COVID-19

The hospital onset cases in this report represent cases presenting in hospital and do not include COVID-19 associated with hospital care that present on readmission to hospital or post-discharge.

Admission to health board was agreed as the appropriate point to start counting the duration of hospital stay to first positive specimen date within a new infection or reinfection episode, rather than the date of admission to a single hospital, since patients can be

transferred between hospitals which would lead to restarting the clock to 'day 1' each time and therefore underestimating the number of nosocomial infections.

Any discharges and re-admissions within the same health board which occur within the same calendar day will be classed as a continuous stay; the clock will not be restarted in these instances, only when a readmission occurs on the second day or more after any discharge.

For definite, probable, indeterminate and non-hospital onset (day 1 or 2 of inpatient stay), the NHS board reported is where the first positive sample within a new infection or reinfection episode was taken, established either using Rapid Admission Preliminary Inpatient Data (RAPID) data and validated by the boards, or using individual NHS board's internal admissions systems. Since the definition of hospital-onset COVID-19 was determined using date of admission to NHS board, the board assigned may not represent the board of attribution of hospital-onset COVID-19 infection (Table above).

For community onset (no admission), the NHS board of residence will be used, according to the Electronic Communications of Surveillance in Scotland (ECOSS) lab surveillance database. Non-Scottish residents who tested positive for COVID-19 in the community in Scotland are excluded from reporting.

Minimum data required to be validated:

- CHI number (or for non-Scottish residents, patient forename, surname and date of birth)
- Date of positive SARS-CoV-2 RT-PCR test within new infection or reinfection episode.
- Date of admission to health board when patient tested positive for COVID-19
- NHS board where first positive test of new infections or reinfection episode undertaken

Relevance and key uses of the statistics

Surveillance data are essential for monitoring trends and assisting in outbreak investigations and to understand the extent of ongoing transmission within the hospital setting. ARHAI Scotland offers support to NHS boards across Scotland to aid their local COVID-19 prevention strategies.

Accuracy

It is acknowledged that patients can be transferred between NHS health boards and if transferred into a different health board during the same hospital stay, then the clock is restarted to 'day 1' which could lead to an underestimation of cases. However, the decision to restrict start date to admission to a single NHS health board represents the requirement to report at the health board-level. Any discharges and re-admissions which occur within the same calendar day and within the same NHS board will be overlooked - the clock will not be restarted in these instances, only when a readmission occurs on the second or more day after any discharge.

COVID-19 cases identified after discharge from hospital but within 14 days may be associated with the hospital. These cases, including those identified on readmission to hospital, are not included as hospital onset. This may result in under-reporting of COVID-19 cases associated with hospital care.

Completeness

Surveillance data are collected using the ARHAI Scotland system that allows data collectors in NHS boards to validate ECOSS records as well as identifying additional cases that may not be included in the ECOSS or CDW systems. This therefore means that completeness for hospital onset cases under current definitions is near to 100%.

NHS Golden Jubilee will be excluded from any views showing the proportion of hospital onset cases due to no non-hospital onset cases being assigned to that board – therefore data for this board will not be comparable with other NHS boards.

Comparability

The agreed nosocomial case definition for the UK has been adopted to allow comparison across the four nations. However, geographical differences for example NHS board versus NHS Trust have to be considered.

Prior to 15 June 2020, the total number of cases reported by Public Health Scotland and the Scottish Government did not include those identified in UK Government Laboratories. The number of cases reported in this report includes cases identified in this scheme so will therefore be higher than what was included in the daily reporting prior to 15 June 2020.

There may be some differences to NHS board level counts within this report and reports from Public Health Scotland. ARHAI report hospital onset cases against the NHS board where the sample was taken, with community onset reported against NHS board of residence; PHS primarily report all cases by NHS board of residence.

On the 28th July 2021, the COVID-19 reporting processes were updated by Public Health Scotland, which has resulted in some changes to the cumulative positive cases reported. Since 18th August 2021, data in this report have been generated using this new methodology, resulting in changes to the overall number of cases reported. Please see the Public Health Scotland website for [more information](#).

There may be some differences in the total number of cases within this report and reports from Public Health Scotland as this report includes non-Scottish residents who tested positive for COVID-19 whilst an inpatient in a Scottish hospital, whereas Public Health Scotland reports exclude these individuals.

Accessibility

It is the policy of ARHAI Scotland to make its web sites and products accessible according to [published guidelines](#).

Link to this report open data platform can be found here:

<https://www.opendata.nhs.scot/dataset/hospital-onset-covid-19-cases-in-scotland>

Coherence and clarity

Previous published reports can be found at:

<https://www.publichealthscotland.scot/publications/show-all-releases?id=20584>

Value type and unit of measurement

At National level, the number and proportion of COVID-19 cases which can be classed as definite hospital onset, probable hospital onset, indeterminate hospital onset, non-hospital onset and community onset, and broken down by week using the date of first positive COVID-19 sample of new infections or reinfections. The number and proportion of reinfections included in each category is also given.

NHS board level, the cumulative number and proportion of COVID-19 cases which can be classed as definite hospital onset, probable hospital onset, indeterminate hospital onset, non-hospital onset and community onset, using the date of first positive COVID-19 sample within new infections or reinfection episodes.

Due to rounding the percentages do not always add up to 100%.

Disclosure

The PHS protocol on [Statistical Disclosure Control Protocol](#) is followed.

Official Statistics designation

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UK Statistics Authority Assessment

Not assessed

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Appendix 3 – Early access details

Pre-Release Access

Under terms of the "Pre-Release Access to Official Statistics (Scotland) Order 2008", ARHAI Scotland is obliged to publish information on those receiving Pre-Release Access ("Pre-Release Access" refers to statistics in their final form prior to publication). The standard maximum Pre-Release Access is five working days. Shown below are details of those receiving standard Pre-Release Access.

Standard Pre-Release Access:

- Scottish Government Health Department
- NHS board Chief Executives
- NHS board Communication leads