

Hospital onset COVID-19 cases in Scotland

Week ending 1 March 2020
to week ending 19 December 2021

12 January
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 1 March 2020 to week ending 19 December 2021.

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/>.

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.

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 19 December 2021, was 814,126. Of these:

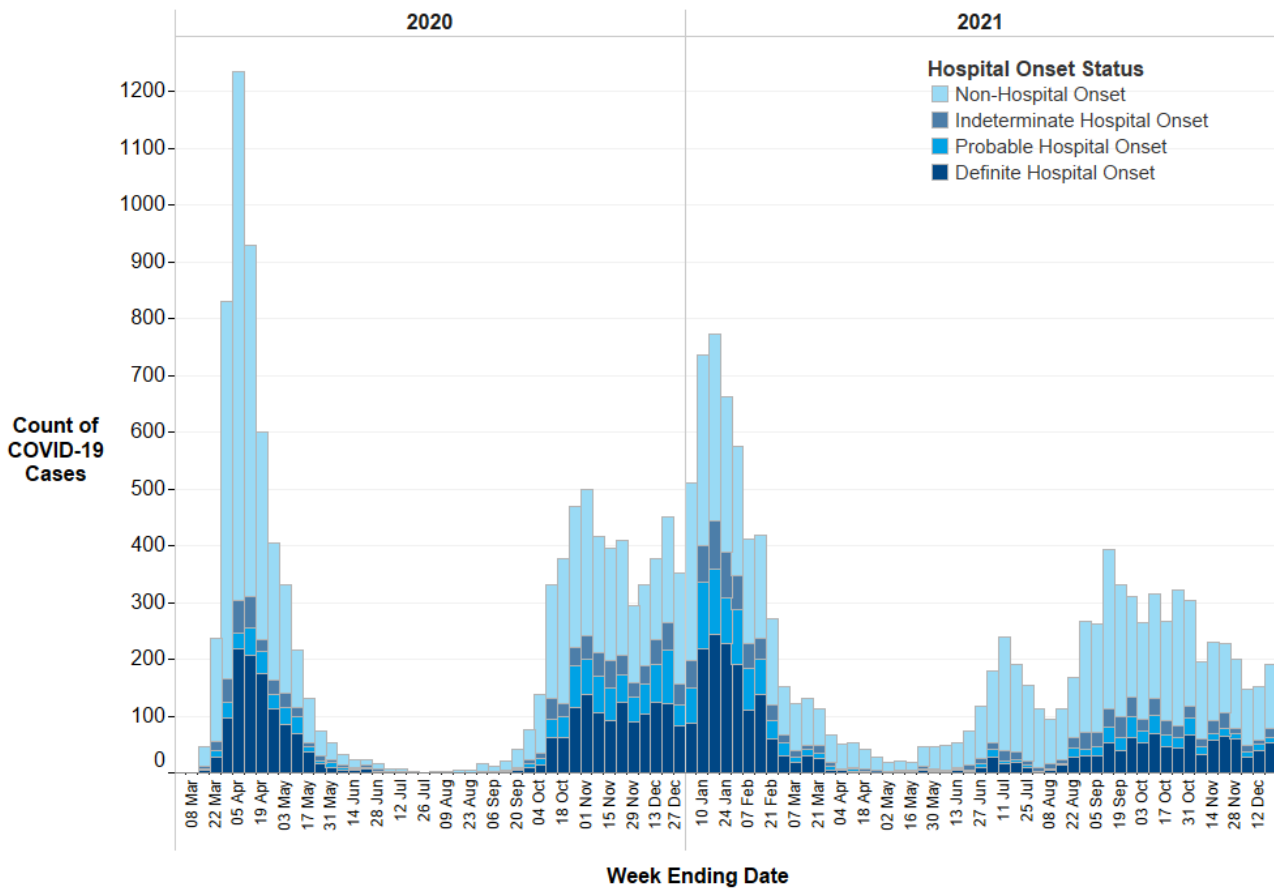
- 792,732 (97.4%) were reported as community onset (first positive specimen taken in the community).
- 12,851 (1.6%) were reported as non-hospital onset (first positive specimen on day 1 or 2 of inpatient admission to NHS board).
- 1,783 (0.2%) were reported as indeterminate hospital onset (first positive specimen on days 3 to 7 of admission to NHS board).
- 2,053 (0.3%) were reported as probable hospital onset (first positive specimen on days 8 to 14 of admission to NHS board).
- 4,707 (0.6%) were reported as definite hospital onset (first positive specimen date was 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 19 December 2021) was 40,771. Of these:

- 40,579 (99.5%) were reported as community onset (first positive specimen taken in the community). In the previous week (week ending 12 December 2021) there were 25,719 (99.4%).
- 113 (0.3%) were reported as non-hospital onset (first positive specimen on day 1 or 2 of admission to NHS board). In the previous week (week ending 12 December 2021) there were 93 (0.4%).
- 18 (0.04%) were reported as indeterminate hospital onset (first positive specimen on days 3 to 7 of admission to NHS board). In the previous week (week ending 12 December 2021) there were 7 (0.03%).
- 9 (0.02%) were reported as probable hospital onset (first positive specimen on days 8 to 14 of admission to NHS board). In the previous week (week ending 12 December 2021) there were 13 (0.1%).
- 52 (0.1%) were reported as definite hospital onset (first positive specimen date was 15 or more days after admission to NHS board). In the previous week (week ending 12 December 2021) there were 38 (0.1%).

Figure 1: Epidemic curve of COVID-19 cases with first positive specimen taken during an inpatient stay, by onset status: week-ending 1 March 2020 to week-ending 19 December 2021 (n=21,394).^{1,2}



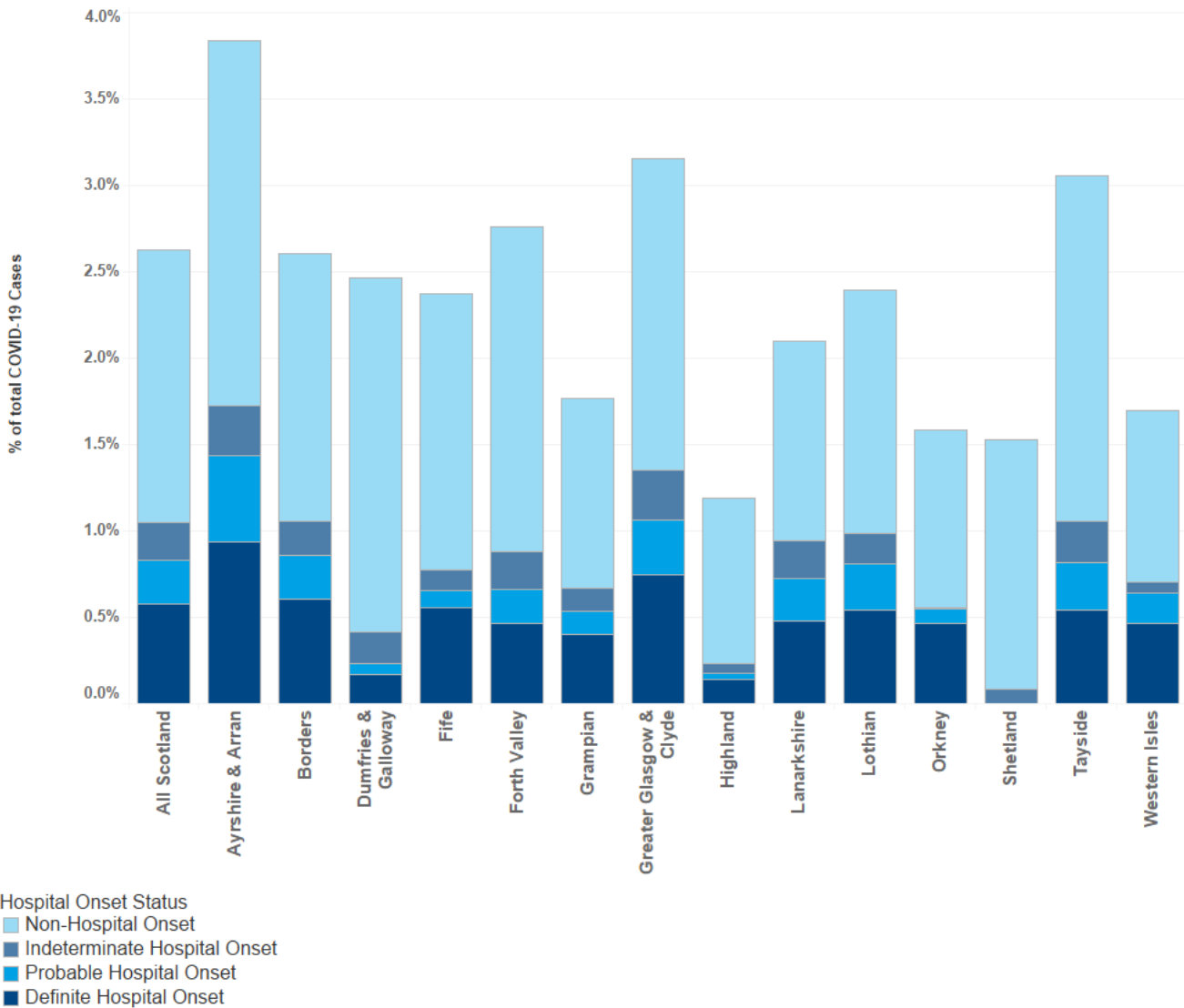
1. Source of data are Corporate Data Warehouse (CDW) that contains test results from Electronic Communication of Surveillance in Scotland (ECOSS) and Rapid Admission Preliminary Inpatient Data (RAPID) or local admission data.
2. The community cases are not represented in this chart as first sample was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

Table 1: Number of COVID-19 cases, by onset status and NHS board: specimen dates up to 19 December 2021.^{1,2,3}

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	58,014	1,223	170	289	544	2.1%	0.3%	0.5%	0.9%
Borders	12,112	188	24	31	73	1.6%	0.2%	0.3%	0.6%
Dumfries & Galloway	17,510	359	32	11	30	2.1%	0.2%	0.1%	0.2%
Fife	53,119	849	61	53	296	1.6%	0.1%	0.1%	0.6%
Forth Valley	47,859	903	103	93	224	1.9%	0.2%	0.2%	0.5%
Golden Jubilee	36	20	8	3	5	-	-	-	-
Grampian	63,564	697	87	83	257	1.1%	0.1%	0.1%	0.4%
Greater Glasgow & Clyde	212,044	3,821	623	660	1,588	1.8%	0.3%	0.3%	0.7%
Highland	30,651	293	19	9	44	1.0%	0.1%	0.0%	0.1%
Lanarkshire	123,924	1,425	271	306	595	1.1%	0.2%	0.2%	0.5%
Lothian	134,706	1,895	245	357	731	1.4%	0.2%	0.3%	0.5%
Orkney	1,074	11	0	1	5	1.0%	0.0%	0.1%	0.5%
Shetland	1,176	17	1	0	0	1.4%	0.1%	0.0%	0.0%
Tayside	56,626	1,133	138	154	307	2.0%	0.2%	0.3%	0.5%
Western Isles	1,711	17	1	3	8	1.0%	0.1%	0.2%	0.5%
Scotland	814,126	12,851	1,783	2,053	4,707	1.6%	0.2%	0.3%	0.6%

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.

Figure 2: Proportion of COVID-19 cases by onset status and NHS board: specimen dates up to 19 December 2021.^{1,2,3,4}



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 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.

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Further information

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

The next release of this publication will be 19 January 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 (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 (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 (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>

Appendix 2 – Publication metadata

Metadata indicator	Description								
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)	<p>COVID-19 Cases:</p> <p>Case data source: Source of data are Corporate Data Warehouse (CDW) that contains test results from Electronic Communication of Surveillance in Scotland (ECOSS).</p> <p>Admissions Data Source: Rapid Admission Preliminary Inpatient Data (RAPID) or Local Patient Admissions Systems.</p>								
Date that data are acquired	29 December 2021								
Release date	12 January 2022								
Frequency	Weekly								
Timeframe of data and timeliness	<p>Timeframe of this publication was decided by first positive sample in Scotland (i.e. March 2020)</p> <p>The latest iteration of data is 19 December 2021, therefore the data are 3 or 4 weeks in arrears.</p>								
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	<p>Data are continually validated by both NHS boards and within the ECOSS 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.</p> <p>Revisions relevant to this publication for COVID-19 cases up to 12 December 2021 include:</p> <table border="1"> <thead> <tr> <th>NHS Board</th> <th>Hospital Onset Category</th> <th>Change</th> <th>Reason for Change</th> </tr> </thead> <tbody> <tr> <td>NHS LO</td> <td>Community onset</td> <td>+1</td> <td>Additional record received in CDW for week ending 22/08/2021</td> </tr> </tbody> </table>	NHS Board	Hospital Onset Category	Change	Reason for Change	NHS LO	Community onset	+1	Additional record received in CDW for week ending 22/08/2021
NHS Board	Hospital Onset Category	Change	Reason for Change						
NHS LO	Community onset	+1	Additional record received in CDW for week ending 22/08/2021						

NHS BR	Community onset	+1	Data correction in CDW for week ending 21/11/2021
NHS AA	Community onset	+1	Additional record received in CDW for week ending 28/11/2021
NHS BR	Community onset	-1	Data correction in CDW for week ending 05/12/2021
NHS GGC	Community onset	+3	Additional record received in CDW for week ending 05/12/2021
NHS GR	Community onset	+3	Additional record received in CDW for week ending 05/12/2021
NHS GGC	Community onset	+1	Additional record received in CDW for week ending 12/12/2021

Concepts and definitions

A COVID-19 case is defined as an individual who has tested positive for COVID-19 by PCR. Only the first positive test for each individual is counted.

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 taken in the community)
- non-hospital onset (first positive specimen on day 1 or 2 of admission to NHS board)
- indeterminate (first positive specimen on days 3 to 7 of admission to NHS board)
- probable (first positive specimen on days 8 to 14 of admission to NHS board)
- definite hospital onset (first positive specimen date 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.

Start point of duration

Admission to health board was agreed as the appropriate point to start counting the duration of hospital stay to first positive specimen date, 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 sample 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
- Date of admission to health board when patient tested positive for COVID-19
- NHS board where first positive test undertaken

<p>Relevance and key uses of the statistics</p>	<p>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.</p>
<p>Accuracy</p>	<p>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.</p> <p>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.</p>
<p>Completeness</p>	<p>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%.</p> <p>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.</p>
<p>Comparability</p>	<p>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.</p> <p>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.</p> <p>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.</p> <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. 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.</p> <p>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.</p>

Accessibility	<p>It is the policy of ARHAI Scotland to make its web sites and products accessible according to published guidelines.</p> <p>Link to this reports open data platform can be found here: https://www.opendata.nhs.scot/dataset/hospital-onset-covid-19-cases-in-scotland</p>
Coherence and clarity	<p>Previous published reports can be found at: https://www.publichealthscotland.scot/publications/show-all-releases?id=20584</p>
Value type and unit of measurement	<p>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.</p> <p>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.</p> <p>Due to rounding the percentages do not always add up to 100%</p>
Disclosure	The PHS protocol on Statistical Disclosure Control Protocol is followed.
Official Statistics designation	Management Information
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