

Discharges from NHSScotland Hospitals to Care Homes between 1 March and 31 May 2020

Publication date: 28 October 2020

Revised 21 April 2021





A Management Information release for Scotland

INQ000101020_0001

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Revisions

This report is a revised version of the previous "Hospital Discharges into Care Homes in Scotland" published on 28 October 2020.

The following revisions have taken place:

- Further quality assurance of the data used in this report, which has resulted in 6 discharges (3 individuals) being removed from the analysis. This is because these discharges were later identified as not being to a care home. All analyses have been updated to account for the changed data This means there are now 5,198 discharges in the underlying data-set, rather than 5,204 previously. This does not impact on the main conclusions from the original report.
- The reporting of the statistical modelling part of section 2 (which analyses the risk of care home outbreaks associated with hospital discharge) has been updated following feedback from users and the Office for Statistics Regulation. Additional visuals and commentary have been included to provide greater clarity on our findings.
- Section 3 has been added. Since the publication of the original report in October 2020, further analysis has been performed to explore specific aspects in detail including:
 - classification of discharges based on pre-hospital residency (where people lived before they were admitted to hospital);
 - analysis of the outcomes within 30 days of hospital discharge (all-cause mortality, COVID-19 mortality and COVID-19 infection) of all those who were discharged;
 - and analysis of those individuals whose last positive test before discharge was positive (including relationship with care home outbreaks).
 - Collaboration with the Public Health Microbiology Team within Public Health Scotland enabling the clinical data on people whose last positive test before discharge was positive to be combined with viral genomic sequencing data (where available). The genomic data has allowed analysis of the specific samples of those discharged from hospital and the samples from the care home they were discharged-to, to be compared to understand more about patterns of infection transmission and relationships between hospital discharge and care home outbreaks.

Introduction

On 18 August 2020 the Cabinet Secretary for Health and Sport, commissioned Public Health Scotland (PHS) to carry out work to identify and report on discharges from NHS Hospitals to care homes during the first wave of the COVID-19 Pandemic. Both the University of Edinburgh and the University of Glasgow were partners in the production of this report.

This publication by PHS presents management information statistics on people aged 18 and over who were discharged from an NHSScotland hospital to a care home between 1 March and 31 May 2020. Section one of the report explains the methodology in defining the cohort of patients who were discharged, and describes their demographics and COVID-19 testing status. Section two defines and describes care home outbreaks of COVID-19 with an analysis of the factors associated with those outbreaks, specifically including hospital discharges. Section three provides further analysis on: classification of discharges based on residency prior to their admission to hospital; analysis of the outcomes of all those who were discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home and analysis of those discharged from hospital to a care home whose last test was positive (including viral genomic sequencing).

To protect confidentiality, the information presented in this report will not identify either individual people or individual care homes.

Clinical care context

Our understanding of COVID-19 infection was rapidly changing in the period between 1 March and 31 May. This evolving understanding is reflected in updated guidance over the period. To place in context with the guidance, the statistics in this report are presented, where appropriate, in time periods which reflect the key guidance and policy changes over the period.

Key changes in policy and National Guidance are highlighted in figure 1 below, and more detail is provided in <u>Appendix 1</u>.

Figure 1: Clinical Practice and Testing



Section 1 – Discharges from NHSScotland Hospitals to care homes

This section explains the methodology in defining the cohort of patients who were discharged, and describes their demographics and COVID-19 testing status.

Main Points (for Section 1)

Between 1 March and 31 May 2020, there were 5,198 discharges from NHS hospitals to care homes (4,804 individuals), this accounted for 5.3% of all hospital discharges during the same period. Of these discharges to care homes, 49.1% were discharged in the month of March, with a further 26.8% discharged in April, and 24.1% in May.

Demographics of the patient cohort

- The average (mean) age of people discharged from hospital to a care home was 81 years old. Females accounted for 58.5% of discharges.
- Discharges in March and April had slightly longer stays in hospital, on average, compared to those discharged in May.
- Three out of four discharges (75.3%) to care homes after a hospital length of stay of four or more weeks (1,654) were from three specialities: Geriatric Medicine, GP (non-obstetrics) and Psychiatry of Old Age

Testing

- There were 3,595 discharges from hospital to a care home between 1 March and 21 April. The majority (82%) in this earlier period were not tested for COVID-19, in-keeping with clinical guidance which restricted testing to those with symptoms of infection. Of the 646 who were tested, 75 received a positive result while in hospital.
- There were 1,603 discharges from hospital to a care home between 22 April and 31 May. The majority (1,491, 93%) in this later period were tested for COVID-19, in line with the changes in clinical guidance. Of these, 1,213 tested negative and 278 tested positive. Of those who tested positive, 233 had a later negative test result before discharge.

It is important to note that there are valid clinical reasons for individuals **not** to be tested before discharge, relating to their capacity to consent to testing and appropriateness of testing, e.g. in end of life care situations.

Discharge planning should involve the person themselves, their families and care homes as partners in care. COVID-19 test results and reasons for not testing before discharge should be clearly documented in clinical case records and discharge communication.

Methodology – creating a register of discharges from hospitals to care homes

This work relied upon the development of a comprehensive register of discharges of people aged 18 and over who were discharged to a care home and were;

- admitted to hospital prior to 1 March 2020 and discharged by 31 May 2020 or
- admitted and discharged from hospital during 1 March and 31 May 2020.

There is no one source of data which reliably identifies discharges from hospitals to care homes. It is not currently possible to identify all discharges from hospital to care homes from hospital records alone. Identifying the cohort of patients was therefore not straight-forward and required linking together data from a variety of sources to create as accurate a register of discharges from hospital to care homes as possible. The reasons for the challenges in using hospital data alone, and the other data sets we have used to define the full cohort of patients, are described below.

Challenges of using hospital data alone

When a person is either admitted or discharged from hospital, information is recorded on who they are, the date they were admitted and discharged, clinical data about the cause of admission and any procedures done, and their address on admission. Much of the data is recorded using standardised codes which are entered by administrative and clinical staff.

Hospital data is collected through 4 main data sets:

- SMR01 general inpatient and daycase record (the definitive record of general hospital admission and discharge but not finalised for some weeks after discharge)
- RAPID daily rapid and preliminary inpatients and daycases (an immediately available but not finalised version of SMR01, and can be used as a source of information if the SMR01 record is not available)
- SMR01E geriatric long stay records
- SMR04 inpatient psychiatry records (the definitive record of psychiatric hospital admission and discharge but not finalised for some weeks after discharge).

The RAPID data set was used to try and ensure the full extent of acute discharges were adequately captured, as issues with the level of SMR01 completeness (i.e delays in submission of validated data) for some boards meant that some discharge data for the time period under examination were not yet available via SMR01.

One of the data items collected is "Discharge/Transfer To". This describes the type of residence a patient is discharged or transferred to and can be used to identify those patients who are discharged to a care home. However, there are recognised data quality issues with the recording of 'Discharge/Transfer to' on hospital discharge records. For example, someone discharged to a care home may be incorrectly recorded as being discharged to a private residence; or someone discharged to sheltered housing may be recorded as being

discharged to a care home. Identifying discharges to care homes using this data item alone would have led to an undercount of patients (and some patients who were not discharged to care homes would have been wrongly assigned as a care home discharge), so it was important that other data sets were used to identify further patients discharged to a care home. Of the 5,198 discharges in our final register of discharges to care homes, only 3,639 (70%) were correctly identified using the "discharge/transfer to" data item. The other 1,559 (30%) were identified through linking of other data, which identifies further potential discharges to care homes in the hospital data. A further 139 discharges identified using "discharge/transfer to" were removed because they had been incorrectly recorded as discharges to care homes.

Linking other data to the hospital data to identify additional patients

To enhance the hospital data, and produce as complete a register of discharges to care homes as possible, further datasets were used to identify additional patients who were discharged to care homes who could not be identified using the "discharge/transfer to" data recorded on the main hospital data described above. These additional data sets were also used to validate those patients already identified on the hospital discharge records, and remove a small number of patients who had been incorrectly recorded in "discharge/transfer to" as having been discharged to a care home.

Some of these data were also used to explicitly identify the care home the patient was discharged to (for use in the more contextualised analysis described in section 2 of this report). This was done by comparing recorded addresses with addresses of care home registered with the **Care Inspectorate**.

The additional data considered were:

- **Delayed discharges** hospital inpatients who are clinically ready for discharge from inpatient hospital care and who continue to occupy a hospital bed beyond the ready for discharge date.
- **Community Health Index** (CHI) demographic data for all patients in Scotland, including the GP recorded address and an institution flag which identifies patients who reside in a care home
- Scottish Ambulance Service Patient Transport Service (PTS) people who have been taken to a care home address
- **Temporary Placements** Health and Social Care Partnerships were asked to supply data on people who moved into care homes from hospital on a temporary basis during this period, as these cases were thought to be less reliably identified using other methods.
- **Deaths data** National Records Scotland data on registered deaths, where place of death was a care home.
- Discharges identified through local review in NHS Boards

These additional data sources enabled the identification of a further 1,559 discharges to care homes, and allowed PHS to verify the 3,639 discharges to care homes identified directly from

the hospital data (because the majority of the patients also appeared in these other data sets, enabling confirmation that they had been transferred to a care home).

Of the 1,559 additional discharges to care homes identified, the vast majority (1,517, 97.3%) had a corresponding hospital discharge record (on the main hospital data sets described on the previous page) but were not originally explicitly identified as discharges to care home because the "discharge/transfer to" data item had not been accurately recorded. There were 42 discharges identified through the delayed discharges data, that did not yet have a corresponding hospital discharge record in the main hospital data sets (which are subject to delay in some cases). These 42 discharges were included in our register for completeness.

Additional validation

To validate the enhanced cohort of discharges to care homes identified through the use of the hospital data and the other data sets, NHS Boards were asked to review the information for their discharges, encompassing intelligence from their own clinical audits and local reviews. PHS then reviewed their feedback and incorporated changes where appropriate.

Detailed information on the creation of the PHS register is described in our <u>methodology</u> <u>paper</u>, which also provides information on the numbers of patients being identified through each of the different data sources.

Actions to address the recording issues on hospital discharge data

As a result of the data issues identified in this report, work is underway to improve recording on hospital discharge records to identify when a person is either admitted from or discharged to a care home.

PHS are working with NHS Boards and IT System suppliers to enable the name of the care home to be recorded on admission and discharge, removing the need to rely solely on the incomplete "Discharge/Transfer to" code. This will then be submitted to PHS as part of the routine datasets.

Alongside this, PHS are planning training materials and reminders about why it is vital and important for all staff to record this information accurately.

Linking our register of patients to testing data

Once all discharges to care homes were identified, these records were then matched to their COVID-19 testing results, identified through the ECOSS system (which collates COVID-19 laboratory test results from NHS laboratories in Scotland and UK laboratories).

Results and Commentary: NHS Discharges to Care Homes

The analysis within this section is based on discharges from hospital between 1 March and 31 May 2020. It includes all inpatients in NHSScotland hospitals (including psychiatry) who stayed overnight, and who were aged 18 years or over at the time of discharge. Discharges to care homes were identified as described in the previous section.

Hospital discharges

This section details the number of discharges to care homes between 1 March and 31 May 2020, and contextualises this in terms of all discharges within the same period.

- There were a total of 97,628 hospital discharges between 1 March and 31 May 2020
- Of these, 5,198 (5.3%) were discharges to a care home
- These 5,198 discharges were for 4,804 patients (i.e. some patients had multiple stays in hospital over the period and were discharged more than once). The majority (92.7%) of patients had a single discharge, 7.3% had more than one discharge in this period
- Nearly half (49.1%) of discharges to care homes occurred in March 2020, with a further 26.8% discharged in April, and the remaining 24.1% in May.
- The majority (94%) of discharges to care homes in the period were admitted into hospital as an emergency, compared to 80.9% of all discharges in the same period
- The highest number of discharges across the three-month period were in March, with fewer discharges in April and May. Capacity was created across the NHS by stopping non urgent elective activity to ensure that urgent and emergency care took priority. Therefore, there was a drop in hospital inpatient activity during the course of the period under review.

Table 1 below details the number of discharges by month to a care home by NHS Board of Treatment, and the percentage of all discharges in the 3 months which were care home discharges. Of the mainland NHS Boards, NHS Dumfries and Galloway and NHS Borders had a slightly higher percentage of discharges to care homes compared with other NHS Boards; this is likely to be due to these areas having a higher proportion of older adults resident there.

Board of Treatment	Mar-20	Apr-20	May-20	Total	% All
					discharges
National Boards	1	0	0	1	0.1%
NHS Ayrshire & Arran	212	134	110	456	5.9%
NHS Borders	50	39	48	137	7.8%
NHS Dumfries & Galloway	97	64	60	221	8.1%
NHS Fife	188	93	72	353	6.3%
NHS Forth Valley	119	60	41	220	5.4%
NHS Grampian	241	174	116	531	6.3%
NHS Greater Glasgow & Clyde	663	317	350	1,330	5.4%
NHS Highland	120	82	70	272	6.4%
NHS Lanarkshire	268	107	102	477	4.4%
NHS Lothian	379	211	181	771	4.6%
NHS Orkney	7	8	7	22	8.6%
NHS Shetland	19	3	8	30	11.4%
NHS Tayside	168	88	81	337	4.0%
NHS Western Isles	21	12	7	40	9.4%
Scotland	2,553	1,392	1,253	5,198	5.3%

Table 1: Discharges to care homes by board of treatment and month of discharge; Scotland; Discharges between 1 March to 31 May 2020

Source: Validated register of hospital discharges to care homes

Figures 2a and 2b show the daily number discharges to care homes (figure 2a) and any location (figure 2b). The pattern is similar in both charts, with larger numbers of discharges during March compared to April and May. For discharges to care homes, the larger number of discharges continued into early April. This likely reflects the different profile of patients who are being discharged to care homes (compared to the larger population of hospital discharges). Discharges to care homes will generally be older patients who tend to have more complex physical and mental health needs and dependency than the general population so will require appropriate support to be in place before they are discharged.





Source: Validated register of hospital discharges to care homes





Source: SMR, RAPID & Delayed Discharges

Characteristics of the population discharged to care homes

This section describes the characteristics of patients discharged from hospital into a care home.

Age

The age of those identified as being discharged from hospital to care home between 1 March and 31 May 2020, ranged from 19 to 105 years old, with an average (mean) age of 81 years. In comparison, the average age for all discharges was 61 years. Females accounted for 58.5% of discharges, which is similar to the proportion observed for all discharges during the same time period (54.4%).





Source: Validated register of hospital discharges to care homes

Length of stay

Figure 4 shows the length of stay, in days, for discharges from hospitals to care homes over the three month period, 1 March to 31 May 2020. Although the pattern over the three months is similar, patients discharged in March and April had slightly longer stays in hospital, on average, compared to those discharged in May. In March and April, 49% of patients were discharged within 3 weeks (within 20 days) of admission: in May 49% of patients were discharged within 2 weeks (a week shorter, on average).





Source: Validated register of hospital discharges to care homes

Older adults living with frailty and complex multimorbidity tend to have longer inpatient stays than younger people, who more often have a specific acute diagnosis. The specialty providing care reflects this complexity.

Three specialties accounted for three quarters (75.3%) of all discharges to care homes with a length of stay of four or more weeks (1,654); Geriatric Medicine, GP Non-obstetrics (generally community hospitals) and Psychiatry of Old Age.

Discharge diagnosis

Table 2 shows the most common main diagnoses for patients discharged from hospital to care homes. The most common diagnoses were grouped under infections (excluding COVID) (20.3%) and falls and fractures (18.5%). In 5.2% of discharges, dementia was recorded as the main diagnosis.

Table 2: Most common main diagnostic groupings – discharges to care homes; Scotland; Discharges between 1 March to 31 May 2020

ICD10 ¹ Diagnosis	Number of discharges	Percent
Infection (excluding COVID-19)	1,053	20.3%
Falls & fractures	963	18.5%
Dementia	272	5.2%
COVID-19 ²	242	4.7%
Stroke and TIA ³	231	4.4%
Delirium	144	2.8%
Cardiovascular	99	1.9%

Source: Validated register of hospital discharges to care homes

Notes:

1. Diagnosis is recorded using the International Classification of Diseases Volume 10 (ICD10). Figures presented in this table refer to the main diagnosis recorded on the discharge record.

- 2. This includes both patients with an ICD10 code of U071 (COVID-19 virus identifed on laboratory test) and ICD10 code of U072 (Clinical COVID-19 diagnosed on other clinical features).
- 3. Transient Ischaemic Attack

Table 2 shows that COVID-19 was recorded as the main diagnosis in 242 discharges. A further 93 discharges had COVID-19 recorded as a secondary diagnosis. In total, 335 (6.4%) of all discharges to care homes had COVID-19 as a diagnosis recorded on the discharge record.

The prevalence of COVID-19 recorded on the hospital records of patients discharged to care homes increased over the period from less than 5 (<1%) discharges in March, to 135 (9.7%) in April and 197 (15.7%) in May.

Note these figures are based on the recording of COVID-19 on the case notes for the patient and do not reflect confirmed laboratory tests for COVID-19. They may therefore include suspected cases of COVID-19, or omit some positive cases if they were not recorded on the case notes. An analysis of discharges to care homes based on confirmed test results for patients is shown in the next section. The figures based on confirmed test results are similar and show 3 positive cases recorded in March, 125 in April and 225 in May.

COVID-19 Testing

Testing guidance for COVID-19 evolved during the period of interest (1 March to 31 May 2020), and availability of testing increased within hospital settings and in the community. [See appendix 1]. The Cabinet Secretary announced: "Covid-19 patients discharged from hospital to a care home should have given two negative tests before discharge. I now expect other new admissions to care homes to be tested and isolated for 14 days in addition to the clear social distancing measures the guidance sets out." on 21 April. Thus the data have been split at 22 April. HPS guidance was revised and published on 26 April, see Appendix 1.

Table 3 below gives a summary of the testing status of patients discharged from hospital to care homes. Data are reported by month of discharge, with figures for April split to reflect the changes in testing policy [See appendix 1]. It shows:

- There were 3,595 discharges to a care home between 1 March and 21 April. The majority (82%) were not tested for COVID-19, in-keeping with clinical guidance which restricted testing to those with symptoms of infection. Of the 646 discharges tested, 75 had a positive result while in hospital.
- There were 1,603 discharges to a care home between 22 April and 31 May. The majority (1,491, 93%) were tested for COVID-19, in line with the changes in clinical guidance. Of these, 1,213 tested negative and 278 tested positive. Of those who tested positive, 233 had a negative test result prior to discharge.

It is important to note that there are valid clinical reasons for individuals not to be tested prior to discharge, relating to their capacity to consent to testing and appropriateness of testing, e.g. in end of life care situations.

PHS sought clarification from Boards for individuals discharged from 22 April onwards who had tested positive and had either no negative tests or only one. There is recognition that changes in policy and guidance require time for implementation in clinical practice and this was reflected in the feedback from NHS Boards. Feedback received provided several reasons for not being able to complete negative testing prior to discharge, including: unable to swab (clinically inappropriate due to end of life care or distress to person), clinical decision based on symptoms and duration since first swab, and that the individual was returning to a care home with a known outbreak.

Table 3: COVID-19 testing status¹ of those discharged from hospitals to care homes, Scotland; Discharges between 1 March and 31 May 2020

	1-31 March	1-21 April	22-30 April	1-31 May
Number of discharges to care homes	2,553	1,042	350	1,253
Number not tested during admission	2,309	640	73	39
Number tested during admission	244	402	277	1,214
Always negative	241	330	224	989
Positive test then negative before discharge				
One negative test before discharge	-	4	7	5
At least two negative tests before discharge	-	6	24	197
Positive test without negative test before discharge				
First positive test >14 days before discharge	-	11	4	8
First positive test 8-14 days before discharge	1	23	7	6
First positive test 0-7 days before discharge	2	28	11	9

Source: Validated register of hospital discharges to care homes: ECOSS COVID-19 testing data

Notes:

- 1 Where an individual had more than one test in a single day, any positive test result was retained over the negative, to retain the more important result
- 2 Number of discharges tested or not tested for COVID-19 prior to discharge from hospital to a care home. This includes positive tests up to 14 days prior to admission in addition to positive tests during admission
- 3 Number of discharges with one or more negative tests for COVID-19 prior to discharge and no positive test recorded within 14 days before hospital admission or during admission
- 4 Number of discharges with one or more positive tests for COVID-19 followed by a negative test prior to discharge from hospital
- 5 Number of discharges with one or more positive tests for COVID-19 and no subsequent negative test prior to discharge, by duration since first positive test

Delayed discharges

This section of the report is based on the number of delayed discharges from hospital to care homes between 1 March and 31 May 2020. These figures are a subset (30.0%) of the discharges from hospital to care homes (shown in the previous section) and only include discharges for those people who experienced a period of delay between being medically fit for discharge and actual discharge (eg because waiting for suitable accommodation to be available).

Routinely published information on delayed discharges is available on the Public Health Scotland website at: <u>https://beta.isdscotland.org/find-publications-and-data/health-and-social-care/delayed-discharges/delayed-discharges-in-nhsscotland-monthly/</u>.

These routine data provide information on those discharged home or to a placement. The placement category includes discharges to care homes. Figures in this section differ from published figures of delayed discharges to a placement because the published figures include discharges to other placements including Intermediate Care which can take place in other settings (e.g. housing with care, or community hospitals). Delays in hospital where the person died before discharge are not included.

Over the period 1 March to 31 May 2020, there were 1,560 delayed discharges identified as discharged from hospital to a care home following a period of delay, which represents 92.4% of the total number of delayed discharges to a placement (1,688) over the same period.

Table 4 gives a summary of the testing status of patients who were delayed discharges and discharged from hospital to care homes. Data are reported by month of discharge, with figures for April split to reflect the changes in testing policy [See appendix 1]. It shows:

- There were 1,242 delayed discharges to a care home between 1 March and 21 April. The majority (88.7%) of which were not tested for COVID-19, in-keeping with clinical guidance which restricted testing to those with symptoms of infection. Of the 140 delayed discharges which were tested, 11 received a positive result while in hospital.
- There were 318 delayed discharges to a care home between 22 April and 31 May. The majority (293, 92.1%) of which were tested for COVID-19, in line with the changes in clinical guidance. Of these, 237 tested negative and 56 tested positive. Of those who tested positive, all 56 had a negative test result prior to discharge.

 Table 4: COVID-19 testing status¹ of delayed discharges from hospital to a care home;

 Scotland; Discharges between 1 March and 31 May 2020

	1-31 March	1-21 April	22-30 April	1-31 May
Number of delayed discharges to care homes ²	855	387	83	235
Number not tested prior to discharge ³	825	277	23	2
Number tested prior to discharge ³	30	110	60	233
All tests done were negative ⁴	30	99	47	190
Positive test then negative test before discharge⁵				
One negative test before discharge	-	1	2	-
At least two negative tests before discharge	-	1	11	43
Positive test without negative test before				
discharge		1		
First positive test >14 days before discharge	-	4	-	-
First positive test 8-14 days before discharge		5	-	-
First positive test 0-7 days before discharge	-	-	-	-

Source: Validated register of hospital discharges to care homes: ECOSS COVID-19 testing data Notes:

1 Where an individual had more than one test in a single day, any positive test result was retained over the negative, to retain the more important result

- 2 Number recorded as delayed prior to discharge from hospital to a care home identified in the validated register of hospital discharges to care homes
- 3 Number of delayed discharges tested or not tested for COVID-19 prior to discharge from hospital to a care home. This includes positive tests up to 14 days prior to admission in addition to positive tests during admission
- 4 Number of delayed discharges with one or more negative tests for COVID-19 prior to discharge and no positive test recorded within 14 days before hospital admission or during admission
- 5 Number of delayed discharges with one or more positive tests for COVID-19 followed by a negative test prior to discharge from hospital
- 6 Number of delayed discharges with one or more positive tests for COVID-19 and no subsequent negative test prior to discharge, by duration since first positive test

Health and Social Care Partnerships: Temporary Placements to care homes

Data was requested from Health and Social Care Partnerships (HSCPs) on individuals who had moved from inpatient hospital settings into care homes on a temporary basis.

Data were received from 28 of the 31 HSCPs (90% return). All data received were reviewed and checked, removing those who were not in hospital settings at the time of placement to a care home, those who were placed in a care home on a permanent basis and duplicate records. This resulted in information on 832 discharges into temporary placements in a care home, 730 of these individuals could be linked to a valid SMR record and are included in the main analysis already presented.

The data is summarised below by discharges by month (Table 5), the number of care homes receiving temporary admissions and the reasons for temporary placement (Table 6).

Table 5 Discharges^{1.2.3} by month and Health and Social Care Partnership; between 1March to 31 May 2020

HSCP Name	March	April	May	Total
Aberdeen City	20	22	15	57
Aberdeenshire	*	*	*	5
Angus	14	6	8	28
Argyll & Bute	9	*	*	17
Borders	21	19	22	62
Clackmannanshire & Stirling	*	*	*	7
Dumfries & Galloway	7	*	*	14
Dundee	*	5	*	8
East Ayrshire	*	*	*	*
East Dunbartonshire	*	*	*	*
East Lothian	*	6	*	12
East Renfrewshire	*	*	5	9
Edinburgh	25	58	19	102
Falkirk	17	*	*	19
Glasgow City	108	48	48	204
Highland	13	*	*	17
Inverclyde	*	9	*	24
Midlothian	13	*	*	19
Moray	*	11	*	21
North Ayrshire	9	*	*	18
North Lanarkshire	-	-	-	0
Orkney	*	5	*	9
Perth & Kinross	11	*	*	12
Renfrewshire	*	*	*	9
Shetland	7	*	*	12
South Lanarkshire	84	34	10	128
West Dunbartonshire	*	*	6	13
West Lothian	*	*	*	*
Total	398	264	169	831 ¹

Source: HSCP submissions

Notes:

- 1. Missing date of care home admission in one case
- 2. No data were submitted by Fife, Na h-Eileanan Siar or South Ayrshire
- 3. * Indicates values that have been suppressed due to the potential risk of disclosure and therefore to maintain patient confidentiality

Care home name was provided to identify which care home individuals were discharged to. In total, 191 care homes received 832 discharges from hospital for temporary residence.

Table 6 Reasons^{1,2,} for temporary placement by month of discharge; between 1 Marchto 31 May 2020

Reason for placement	March	April	May	Total
Assessment	88	40	25	153
Awaiting package of care	66	28	9	103
Interim placement awaiting placement of choice including rehousing	43	28	23	95
Intermediate care	102	44	41	187
Palliative care	4	1	0	5
Rehabilitation	11	18	14	43
Respite	18	14	12	44
Step-down	10	4	3	17
Other reason provided ²	4	2	5	11
Temporary (no details given)	52	85	37	174
Total	398	264	169	831 ¹

Source: HSCP submissions

Notes:

1. Missing date of care home admission in one case

2. Includes house cleaning, repairs, symptom control

Section 2 – Impact on care homes

Introduction

The first section of this report described the methods used to identify the 5,198 discharges of 4,804 adults to care homes from NHS Scotland hospitals between 1 March to 31 May 2020 and described their characteristics and COVID-19 testing status during their hospital admission.

This section of the report focuses on the care homes that individuals were discharged to. It describes laboratory-confirmed care home outbreaks of COVID-19 across Scotland where the first positive test occurred between 1 March and 21 June. It then examines associations between care home characteristics and COVID-19 outbreaks, including examining any association between hospital discharge to care homes and outbreaks.

To protect confidentiality, the information presented in this report does not identify either individual people or individual care homes.

Main Points (for section 2)

Discharges to Care home

• There were 843 of the 1,084 care homes in Scotland that received 5,185 hospital discharges between 1 March and 31 May (13 of the discharges identified in Section 1 were to English care homes or the care home could not be identified)

Care homes received between 1 and 46 discharges, with an average of 6 discharges per care home

Care home outbreaks of COVID-19

- Using laboratory confirmed cases, 348 (32.1%) care homes in Scotland experienced an outbreak of COVID-19 in the home between 1 March and 21 June
- The percentage of care homes with an outbreak increased progressively with care home size, from 3.7% of care homes with less than 20 registered places to 90.2% of care homes with 90 or more registered places
- Almost all outbreaks (336/348) occurred in care homes for older people. There were 1,915 COVID-related deaths (i.e. with any mention of COVID-19 on the death certificate) in this period, occurring in 321 care homes.
- COVID-19 associated mortality was concentrated in its impact, more than half of COVID-19 deaths were in 64 homes and a quarter of all COVID-19 deaths were in just 25 homes.

- There were 13.5% of care homes with no discharges from hospital that had an outbreak, compared to 38% of care homes with one or more discharges. However, larger care homes were both more likely to have discharges *and* to have an outbreak, so a simple comparison is likely to be misleading
- In the statistical modelling analysis (see tables 10 & 11 for detailed commentary):
 - Hospital discharge is associated with an increased risk of an outbreak when considered on its own. However, after accounting for care home size and other care home characteristics, the estimated risk of an outbreak due to hospital discharge reduces.
 - Considering the results from the modelling explained in this section, we do not find any statistically significant association between hospital discharge and the occurrence of a care home outbreak. However, due to the uncertainty observed, we cannot rule out a small effect, particularly for those patients who were discharged untested or discharged positive.
 - Care home size is much more strongly associated with the risk of an outbreak than other care home characteristics, including the different types (negative test, untested, positive test) of hospital discharge.

Data sources

The analysis in this section used the same dataset as in section one. This file enabled individuals to be identified by using their Community Health Index (CHI) number, with multiple admissions for an individual identified using date of admission and CHI. Testing data for those discharged was defined as described in section one, classifying individuals at the time of discharge as follows:

- Untested during admission
- Last test negative before discharge (either all tests done were negative, or any positive test was followed by a negative test before discharge)
- Last test positive, with no negative tests before discharge
 - o 0-7 days since first positive test
 - o 8-14 days since first positive test
 - >14 days since first positive test

Allocation of care home of discharge

Discharge location, including care home name, is not recorded in hospital data. The actual care home that people were discharged to was assigned using address information obtained from linking multiple data sources (Figure 5). Where a care home location could not be identified (<5%) from these datasets, PHS contacted NHS Boards for more information

Figure 5: Data sources used to allocate a specific care home location individuals were discharged to



Footnote: HSCP – Health and Social Care Partnership; PTS – Patient Transport Service; CHI – Community Health Index; NRS – National Records of Scotland; SMR – Scottish Morbidity Record

Following the above process, a Scottish care home location was identified for 5,185 discharges (99.7% of all discharges identified) of 4,793 individuals.

The remaining 13 discharges were excluded. Seven were confirmed by Boards as care home discharges, but no location could be provided, and six were discharged to care homes in England so could not be linked to testing data.

Care home service data

The Care Inspectorate Datastore was used to obtain a list of active care home services during the period of interest. Care homes are identified using a CSNumber, which is based on their service registration.

Other descriptive variables about the care home including: **number of registered places** (the maximum number of residents allowed); **care home subtype** (older people; learning disability; mental health problems; physical and sensory impairment; other services including alcohol & drug misuse, blood borne viruses, respite & short breaks); **sector** (private, voluntary/not for profit, local authority/health board) and **Risk Assessment Document score (RAD score)** were extracted. The RAD score is used by Care Inspectorate inspectors and managers to inform inspection regimen; homes are categorised into low risk, medium risk and high risk, based on inspections, complaints, enforcement cases and updates around service quality. The **Integration Authority** in which the care home is located was also extracted (Integration Authorities are joint NHS-local authority bodies responsible for integrated care). The Care Inspectorate supplied an additional variable for use in this work defining whether a service provides registered **nursing care** to service users.

Testing data – care homes

Guidance about testing care home residents, and laboratory capacity to test residents changed over time, which affects the detection of cases. Testing practice also varied across NHS Boards. Initially, testing in the community was limited, and when done in care homes, only the first few residents with COVID-19 symptoms in each home were tested. If the first few residents were positive, then other residents with symptoms were assumed to have COVID-19 without testing (this is common practice for other infectious disease outbreaks). This means that the early numbers of positive tests will be less than the true number of cases. From 13 April, all residents with COVID-19 symptoms were tested. However, many older people may have atypical symptoms rather than a cough or fever, so the number of positive tests is still likely to be less than the true number of cases. After 1 May all residents and staff in homes with outbreaks, irrespective of symptoms were tested.

In hospitals, testing was initially restricted to people admitted with possible symptoms of COVID-19. Testing of people admitted to hospital with other symptoms was therefore very limited. Routine testing before discharge to care homes was introduced from 22 April (with allowed exceptions relating to the patient's ability to consent and to avoid patient distress), and screening of people aged 70 years admitted to hospital was introduced on 28 April.

All positive tests for COVID-19 obtained in NHS Scotland before 30 June were extracted from the Electronic Communication of Surveillance in Scotland (ECOSS) database. This includes tests taken by the NHS and those analysed in the UK Government Lighthouse Laboratories.

Care home resident tests were identified by linking ECOSS data to the CHI register. From the linked dataset, tests conducted in the care home were allocated to individual services based on specimen address, CHI address, test location, specimen type and clinical details.

Tests were eligible for inclusion in the analysis if they were performed between 1 March and 21 June (i.e to include test results 21 days after the last hospital discharge in the period 1 March to 31 May) and were obtained on a resident while in the care home (tests obtained while a resident was in hospital were excluded).

Care home outbreaks

There were 3,278 care home residents with one or more positive tests recorded where the test had been done in a care home (some residents were tested more than once). These 3,278 residents lived in 348 of the 1,084 (32.1%) care homes in Scotland, which were therefore defined as having a laboratory confirmed outbreak. The date of the first positive test in the care home was used to define the start date of each of these 348 laboratory confirmed outbreaks.

During the time period covered by this report Health Protection teams considered an outbreak of COVID-19 to be over when 28 days have elapsed after a positive test and no other positive tests are identified. Based on this we defined where a care home had more than one outbreak if there was a gap of 28 days or more between positive cases. Of the 348 care homes that experienced an outbreak of COVID-19 between 1 March to 21 June only one home had two discrete outbreaks in the period.

Mortality data

Mortality data was obtained from National Records of Scotland (NRS) of all deaths from 2 March to 21 June 2020. Deaths of those discharged were identified by linking the NRS deaths file to the hospital discharges file using CHI. All deaths in care homes were identified using institution codes and these were then mapped to the CSNumber and UPRN of each care home.

COVID-19 mortality was defined by any mention on the death certificate of ICD-10 codes U071 (COVID-19 virus identified on laboratory test) or U072 (Clinical COVID-19 diagnosed on other clinical features; this may include people in whom COVID-19 has been confirmed in hospital by other tests such as CT scan of the lungs, and people in whom COVID-19 is suspected). Data are reported based on date of death, rather than date of death registration.

Care homes

Using information from the Care Inspectorate Datastore, Table 7 summarises the characteristics of the 1,084 care homes in Scotland included in the analysis

Table 1. Characteristics of all 1004 care notices included in analys	Table	7:	Characteristics	of all	1084	care homes	included	in	analy	sis
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Care home characteristic	Number of care homes	% of all care homes
Care home size (number of registered		
places)	208	27 5%
	290	27.5%
20-29	159	14.9%
40-49	159	14.7 %
40-49 50-59	77	7 1%
50-59 60 69	100	10, 194
70.79	27	2 406
80-89	37	3.4%
90 or more	51	3.0%
	51	4.770
	017	75 40/
Older people	017	75.4%
Other adult service	111	10.2%
Learning disabilities	156	14.4%
Sector		
Private	680	62.7%
Voluntary/not for profit	257	23.7%
Local authority/NHS	147	13.6%
Risk Assessment Document score ²		
Low risk	687	63.4%
Medium risk	223	20.6%
High risk	174	16.0%
Nursing care		
No nursing care	462	42.6%
Nursing care	609	56.2%
Missing	13	1.2%

1. Adult care homes for: Mental Health Problems; Physical and Sensory Impairment; Respite and Short Breaks; Alcohol and Drug Misuse; or Blood Borne Virus

2. Care Inspectorate assessment of service based on inspections, complaints, enforcement cases and updates around service quality

Table continues on next page

Care home characteristic	Number of	% of all
Integration outbority	care nomes	nomes
	50	5.00/
Aberdeen City	56	5.2%
Aberdeenshire	69	6.4%
Angus	30	2.8%
Argyll and Bute	18	1.7%
Clackmannanshire and Stirling	34	3.1%
Dumfries and Galloway	34	3.1%
Dundee City	30	2.8%
East Ayrshire	25	2.3%
East Dunbartonshire	19	1.8%
East Lothian	19	1.8%
East Renfrewshire	13	1.2%
Edinburgh	84	7.7%
Falkirk	32	3.0%
Fife	81	7.5%
Glasgow City	104	9.6%
Highland	68	6.3%
Inverclyde	22	2.0%
Midlothian	14	1.3%
Moray	16	1.5%
North Ayrshire	26	2.4%
North Lanarkshire	34	3.1%
Orkney Islands	8	0.7%
Perth and Kinross	43	4.0%
Renfrewshire	26	2.4%
Scottish Borders	26	2.4%
Shetland Islands	10	0.9%
South Ayrshire	31	2.9%
South Lanarkshire	59	5.4%
West Dunbartonshire	12	1.1%
West Lothian	31	2.9%
Western Isles	10	0.9%

Table 7 cont : Characteristics of all 1,084 care homes included in analysis

Source: Care Inspectorate Datastore

1. Adult care homes for: Mental Health Problems; Physical and Sensory Impairment; Respite and Short Breaks; Alcohol and Drug Misuse; or Blood Borne Virus

2. Care Inspectorate assessment of service based on inspections, complaints, enforcement cases and updates around service quality

Care home outbreaks of COVID-19

In total, 348 care homes had a **laboratory confirmed outbreak** of COVID-19 infection during the period 1 March to 21 June, defined as a care home where one or more residents had a positive test taken in the care home.

Figure 6 shows the evolution of care home outbreaks, based on date of first positive test. The number of care homes with a new outbreak rose rapidly from the week beginning 23 March, peaking at 70 new care home outbreaks in the week beginning 6 April before declining. From the week beginning 18 May, there were few new outbreaks.



Figure 6: Number of care homes with a new outbreak by week, 9 March to 21 June 2020

Week of test - week commencing

Source: CHI Register & ECOSS COVID-19 testing data

1. 4 of the 348 outbreaks were not visualised on the original graph - week 15 is 70 not 67, and week 17 is 36 not 35

Care home residents testing positive for COVID-19 in the care home

The first positive tests in care home residents were identified on 13 March. Figure 7 shows the 7-day rolling average of the number of positive tests for COVID-19 in care home residents. Figure 7 also notes the changes in terms of community testing practice where, at the beginning of the period only the first few symptomatic cases in each home were tested; changing to testing all symptomatic residents and finally all residents and staff in homes with an outbreak. The number of positive cases triples in the two weeks after testing is extended to all symptomatic residents, but this likely represents better ascertainment of cases rather than a true change in numbers. In addition, Figure 7 includes the 7-day rolling average of the number of COVID-19 deaths occurring in care homes. The first care home deaths from COVID-19 occurred on 17 March, rising to a peak in the third week of April before declining continuously.



Figure 7: Seven-day rolling average number of positive tests for COVID-19 in care home residents and COVID-19 deaths in care homes

Source: CHI Register, NRS deaths & ECOSS COVID-19 testing data

Care home mortality

Between 2 March and 21 June, there were 5,768 deaths in 774 care homes. Figure 8a shows the distribution of these deaths for all care homes, distinguishing between COVID-19 and Non-COVID-19 deaths. There were 1,915 COVID-related deaths (i.e. with any mention of COVID-19 on the death certificate) in this period, occurring in 321 care homes. Of all the COVID-related deaths 1,838 occurred in 276 care homes with a laboratory-confirmed outbreak, compared to 77 COVID-related deaths recorded in 45 care homes without a laboratory confirmed outbreak.

Figure 8a: Care home mortality – COVID-19 and non-COVID-19 deaths; distribution of resident deaths between homes with and without a laboratory confirmed outbreak



Source: CHI Register, NRS deaths & ECOSS COVID-19 testing data

Figures 8b and 8c show mortality in homes with and without a laboratory confirmed outbreak of COVID-19. This demonstrates the concentration of COVID-19 mortality in homes which had a laboratory confirmed outbreak. There is much less change in mortality in care homes without a laboratory confirmed outbreak. Because of variable testing early in the epidemic, relying on laboratory confirmed outbreaks may miss some outbreaks (notably, there are fewer laboratory confirmed outbreaks than 'suspected' outbreaks reported to the Care Inspectorate by care homes). However, since 96% of COVID-related deaths were in care homes with laboratory confirmed outbreaks, we are confident our method of identifying care home outbreaks does not miss any large outbreaks.





Source: CHI Register, NRS deaths & ECOSS COVID-19 testing data

COVID-19 associated mortality was further concentrated in its impact in care homes with an outbreak. More than half of COVID-19 deaths occurred in 64 of the 348 care homes with an outbreak, and a quarter of all COVID-19 deaths in 25 care homes.

Discharges to Care homes

There were 5,185 discharges of 4,793 people from hospital to 843 care homes in Scotland between 1 March and 31 May. Individual care homes received from 1 to 46 discharges, with an average of 6 discharges per care homes which received at least one discharge.

There were 730 (14.1%) discharges to 186 care homes which were identified by Health and Social Care Partnerships (HSCPs) as being for temporary placement (3 of the 31 HSCPs did not submit data and not all of those identified by HSCPs could be matched to the discharge file (See page 21, section one). Care homes received between 1 and 31 discharges for temporary placement, with an average of 4 discharges per care home receiving at least one temporary placement.

Table 8 shows the distribution of discharges based on the NHS Board the care home is located within. These differ slightly from the distribution of discharges reported in Section one, which were based on the NHS Board the hospital is located in. This is because people may live in a care home in one Board, but be discharged from a hospital in another Board.

NHS Board of Care Home	Number receiving discharges	% of all homes in area
Ayrshire & Arran	70	85.4%
Borders	20	76.9%
Dumfries & Galloway	29	85.3%
Fife	73	90.1%
Forth Valley	48	72.7%
Grampian	91	64.5%
Greater Glasgow & Clyde	155	79.1%
Highland	70	81.4%
Lanarkshire	73	78.5%
Lothian	110	74.3%
Orkney	*	-
Shetland	*	-
Tayside	83	80.6%
Western Isles	10	100.0%

Table 8: NHS Board location of care homes receiving discharges

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions

1. ** Indicates values that have been suppressed due to the potential risk of disclosure and therefore to maintain patient confidentiality

Of the 5,185 discharges to care homes, 2,344 (45.2%) were to one of the 736 care homes which did not experience an outbreak between 1 March and 21 June. Of the 2,841 (54.8%) discharges to the 348 care homes with an outbreak, 1,019 (19.7%) were after or on the day that the care home outbreak started (and so could not have caused the initial outbreak). The remaining 1,822 (35.1%) discharges were to one of the 348 care homes with an outbreak with the discharges being at various times before the outbreak had started. Of the 1,822 discharges to a care home before an outbreak, 1,505 had not been tested during the admission period, 301 had tested negative on their last test, and 16 had tested positive.

Figure 9: Proportion of hospital discharges to care homes by care home outbreak status and timing in relation to discharge



Characteristics of care homes with and without an outbreak

There were 348 (32%) care homes which experienced a laboratory confirmed COVID-19 outbreak between 1 March and 21 June 2020. The characteristics of these 348 care homes compared to the 736 care homes which did not experience an outbreak in this period, are shown in Table 9.

Care home size was very strongly related to outbreaks. Of the care homes with 90 or more registered places, 90.2% had an outbreak, compared to just 3.7% of homes with less than 20 registered places. Outbreaks were more common in older people's care homes (41.1%), private sector care homes (40.4%), care homes defined as high risk on the RAD score (47.1%), and care homes providing nursing care (45.2%). Of the care homes receiving no discharges from hospital 13.5% had an outbreak, compared to 38.0% of care homes with one or more discharges at time of outbreak.

However, all of the characteristics examined vary with care home size. Larger homes will receive more discharges, and are also more likely to be services for older people, provide nursing care and be privately owned. These relationships between different care home characteristics means that simple comparison by single characteristics may be misleading.
Care home characteristic	Care homes with an outbreak (N=348)		Care home an outbrea	es without ak (N=736)
	Number	%	Number	%
Care home size (number of regist	ered places)			
Less than 20	11	3.7%	287	96.3%
20-29	31	19.3%	130	80.7%
30-39	44	27.7%	115	72.3%
40-49	60	37.5%	100	62.5%
50-59	35	45.5%	42	54.5%
60-69	68	62.4%	41	37.6%
70-79	29	78.4%	8	21.6%
80-89	24	75.0%	8	25.0%
90 or more	46	90.2%	5	9.8%
Care home subtype				
Older people	336	41.1%	481	58.9%
Other adult service ¹	6	5.4%	105	94.6%
Learning disabilities	6	3.8%	150	96.2%
Sector				
Private	275	40.4%	405	59.6%
Voluntary/not for profit	32	12.5%	225	87.5%
Local authority/NHS	41	27.9%	106	72.1%
Risk Assessment Document Scor	e (RAD Score) ²			
Low risk	188	27.4%	499	72.6%
Medium risk	78	35.0%	145	65.0%
High risk	82	47.1%	92	52.9%
Nursing care				
No nursing care	68	14.7%	394	85.3%
Nursing care	275	45.2%	334	54.8%
Missing	5	38.5%	8	61.5%
Discharges from hospital 1 March	– 31 May			
No discharge	35	13.5%	225	86.5%
One or more discharges ³	313	38.0%	511	62.0%

Table 9: Characteristics of care homes with and without an outbreak of COVID-19

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register & ECOSS COVID-19 testing data

1. Adult care homes for: Mental Health Problems; Physical and Sensory Impairment; Respite and Short Breaks; Alcohol and Drug Misuse; or Blood Borne Virus

2. Care Inspectorate assessment of service based on inspections, complaints, enforcement cases and updates around service quality

3. At time of outbreak.

Analysis of risk of care home outbreaks associated with hospital discharge

The analysis of the risk of care home outbreaks being associated with hospital discharge was based upon existing <u>methods</u> used by Public Health Wales (PHW) to examine this question. The method used was a statistical technique called Cox proportional hazards regression modelling. This allows an evaluation of the risk of a care home outbreak in periods of time soon after a hospital discharge to a care home (the risk period), compared to periods of time where there had not been a hospital discharge. In this analysis, the risk period following a discharge from hospital was set to be the 7 to 21 days following a discharge, the same as used in the PHW analysis. PHW examined whether varying this time period changed the conclusions of the analysis, and found it did not.



Figure 10: Pictorial representation of example timeline for outbreak risk

The PHW statistical model was adapted to reflect differences in care home size (Wales has larger numbers of very small care homes with less than 10 beds) and different ways of classifying the care home subtype and other variables. Statistical models were fitted to:

- 1. Examine associations between any hospital discharge and outbreaks in all 1,084 care homes in Scotland.
- 2. Examine associations between different types of hospital discharge and outbreaks in all 1,084 care homes in Scotland. Types of hospital discharge were defined in terms of whether the person discharged had tested negative before discharge, was untested before discharge, or whose last test before discharge was positive.

The results shown in this section are for what are called univariate analysis and adjusted analysis.

- **Univariate analysis** examines associations between each care home characteristic on its own and whether the care home had an outbreak.
- **Adjusted analysis** means that the association takes account of all other variables. For example, larger care homes will on average have more discharges, but also more admissions from the community and more staff working in them. The risk of an

outbreak associated with a hospital discharge is therefore adjusted for care home size and other care home characteristics.

We report both univariate and adjusted analysis for completeness, but the adjusted analysis is more appropriate given the relationships between care home size and all other characteristics.

Associations are expressed as hazard ratios. For most care home characteristics, the hazard ratio is the relative risk of an outbreak compared to a reference category. A hazard ratio of more than one means that the risk is increased compared to the reference category. A hazard ratio of less than one means the risk is decreased.

For example, in table 10, the univariate hazard ratio for care homes that have nursing care compared to those without is 3.72. This means that over the whole period, care homes that provide nursing care are 3.72 times more likely to have a COVID-19 outbreak than those that do not. After adjustment for care home subtype, size and other characteristics, the hazard ratio reduces to 1.43 (this is because care homes providing nursing care are more likely to be care homes for older people and to be larger, both of which are also associated with outbreaks).

For the discharge variable, the hazard ratio is the relative risk of an outbreak in the period soon after a hospital discharge (the 'risk period') compared to a period when there hasn't been a hospital discharge.

The hazard ratios presented in this report should be considered as only an estimate of the true or underlying value. In statistical modelling there is always a degree of uncertainty around a point estimate like a hazard ratio (e.g. because the analysis may be based on a small number of cases). To compensate for this, we calculate what are called "confidence intervals" to quantify the uncertainty around the hazard ratios presented. The wider the confidence interval, the greater the uncertainty in the hazard ratio estimate. Confidence intervals are given with a stated probability level. In this report this is 95%, and so there is a 95% probability (i.e. a 19 in 20 chance) that the confidence interval includes the 'true' value of the hazard ratio. The use of 95% is arbitrary, but is conventional practice in medical and public health statistics.

In this report, the 95% confidence interval for each hazard ratio is used to compare that factor against the reference value, which has a hazard ratio of 1. The reference value is treated as an exact reference value, allowing the confidence interval for an indicator value to be used to test whether the hazard ratio was statistically significantly different to the baseline value. If the interval does not include the 1, the area is assessed as being statistically significantly different from the reference value (if the confidence interval is entirely lower than 1, this shows the hazard ratio is statistically significantly lower; if it is entirely higher than 1, this shows the hazard ratio is statistically significantly higher). If the confidence interval includes 1, the hazard ratio is assessed as being similar to the reference value.

Figure 11 below gives an example of this in a hazard ratio chart. The coloured squares represent the hazard ratio for each group, with the colour representing the significance compared to the reference group. The grey vertical lines represent the upper and lower

confidence intervals - or limits - for each hazard ratio, and the horizontal grey line represents the range of the confidence interval wherein which we are reasonably (or 95%) confident the 'true value' of the hazard ratio lies.





The reference group - the blue square - sits at the value of 1.

The next group, "Group 1", has both the upper and lower confidence interval above the value of 1, so the range does not include 1. Therefore we can conclude that "Group 1" has a statistically significantly different risk compared to the reference group, and the hazard ratio value is represented as a red square to signify higher risk, as values lie above 1. However, note that the confidence intervals are quite wide. This indicates considerable uncertainty in the results, although even with this uncertainty we conclude the hazard ratio is higher.

For group 2, the upper and lower CI range does not span 1, and is wholly below 1, so the estimated hazard ratio is represented as an orange square, signifying a statistically significantly lower risk than the reference group.

The confidence intervals for "Group 3" span 1, and we can therefore conclude that the risk is not significantly different to the reference group, and the hazard ratio is shown as a black square. The confidence interval is narrow, giving us more confidence in the accuracy of the estimate.

The confidence interval for "Group 4" also spans 1, and we can therefore conclude that the risk is not significantly different to the reference group. However, the confidence interval us much wider than "Group 3" which means there is greater uncertainty in the accuracy of the estimate.

The commentary which accompanies the analysis of the statistical modelling in tables 10 and 11 considers the estimated hazard ratio and the accompanying confidence interval (to give an indication of any uncertainty surrounding the results).

Associations between any hospital discharge and outbreaks

The results from the modelling analysis are shown in table 10 and figure 12 below.

Table 10 shows both the univariate and the adjusted analysis, along with a commentary based on the adjusted analysis only (because the adjusted analysis is more appropriate given the relationships between care home size and all other characteristics).

The results from the adjusted analysis are also shown in graphical form in Figure 12.

An overall summary of the conclusions reached from Table 10 and Figure 12 is given under Figure 12.

Care home characteristic	Number (%) of homes with outbreaks	Univariate Hazard Ratio (95% Confidence Interval)	Adjusted ² Hazard Ratio (95% Confidence Interval)	Commentary (on the Adjusted Hazard Ratio)
Care home size				There is a very strong, statistically significant
Less than 20	11 (3.7)	1.0 (Reference)	1.0 (Reference)	association between care home size and the
20-29	31 (19.3)	5.75 (2.89 to 11.44)	3.59 (1.61 to 8.02)	
30-39	44 (27.7)	8.81 (4.55 to 17.05)	4.54 (2.06 to 9.97)	Compared to care homes with less than 20 beds,
40-49	60 (37.5)	12.03 (6.32 to 22.88)	6.48 (2.94 to 14.27)	the risk of an outbreak progressively increased as
50-59	35 (45.5)	15.90 (8.07 to 31.31)	7.70 (3.32 to 17.83)	
60-69	68 (62.4)	26.01 (13.75 to 49.21)	10.01 (4.49 to 22.29)	
70-79	29 (78.4)	40.41 (20.17 to 80.99)	14.51 (6.17 to 34.15)	
80-89	24 (75.0)	37.99 (18.59 to 77.65)	16.39 (6.77 to 39.68)	
90 or more	46 (90.2)	60.36 (31.16 to 116.93)	17.4 (7.51 to 40.33)	
Subtype				Compared to care homes for older people, the risk
Older people	336 (41.1)	1.0 (Reference)	1.0 (Reference)	of an outbreak was much lower in care homes
Other adult service ¹	6 (5.4)	0.10 (0.05 to 0.23)	0.28 (0.12 to 0.67)	providing other addit services.
Learning disabilities	6 (3.8)	0.07 (0.03 to 0.17)	0.46 (0.17 to 1.21)	
Sector				Compared to private sector care homes,
Private	275 (45.2)	1.0 (Reference)	1.0 (Reference)	voluntary/not for profit care homes had a similar
Voluntary/not for profit	32 (12.5)	0.26 (0.18 to 0.37)	1.00 (0.66 to 1.53)	higher risk of an outbreak.
Local authority/NHS	41 (27.9)	0.65 (0.47 to 0.91)	1.71 (1.13 to 2.59)	
RAD score				Compared to care homes with a low RAD (quality)
Low risk	188 (27.4)	1.0 (Reference)	1.0 (Reference)	score, homes with a medium RAD score and
Medium risk	78 (35.0)	1.36 (1.04 to 1.77)	0.95 (0.72 to 1.25)	an outbreak.
High risk	82 (47.1)	2.01 (1.55 to 2.60)	1.03 (0.78 to 1.37)	

Table 10: Care home characteristics (including hospital discharges) associated with care home outbreaks of COVID-19

Care home characteristic	Number (%) of homes with outbreaks	Univariate Hazard Ratio (95% Confidence Interval)	Adjusted ² Hazard Ratio (95% Confidence Interval)	Commentary (on the Adjusted Hazard Ratio)
Nursing care No nursing care Nursing care Missing	68 (14.7) 275 (45.2) 5 (38.5)	1.0 (Reference) 3.72 (2.86 to 4.86) 2.79 (1.12 to 6.91)	1.0 (Reference) 1.43 (1.00 to 2.05) 1.26 (0.48 to 3.33)	Compared to care homes which did not provide nursing care, care homes which provided nursing care had a higher risk of an outbreak.
Discharges No discharge Discharge	35 (13.5) 313 (38.0)	1.0 (Reference) 2.85 (2.28 to 3.56)	1.0 (Reference) 1.18 (0.92 to 1.52)	Compared to periods without a hospital discharge, there was an increased risk (adjusted HR 1.18) of an outbreak observed in period immediately after hospital discharge. The confidence interval includes 1.0 (the reference point, i.e. the risk of an outbreak with no discharge), which means the risk in periods with a discharge is not statistically significant from periods without a discharge. However, the confidence interval is relatively wide, which means there is uncertainty about the true risk - ranging from 8% lower risk of a care home outbreak in the period soon after a hospital discharge to 52% higher risk. We therefore cannot rule out a small risk from hospital discharge (see commentary under figure 12).

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register & ECOSS COVID-19 testing data 1. Adult care homes for: Mental Health Problems; Physical and Sensory Impairment; Respite and Short Breaks; Alcohol and Drug Misuse; or Blood Borne Virus

2. Model additionally adjusted for Integration Authority (hazard ratios not shown)

Statistically significant hazard ratios (ie the confidence interval does not include 1) are shown in **bold**



Figure 12: Adjusted hazard ratios and associated confidence intervals for care home characteristics associated with care home outbreaks of COVID-19

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register & ECOSS COVID-19 testing data

Considering hospital discharges, the analysis finds no statistically significant association between recent hospital discharge and the occurrence of a care home outbreak. However, the estimate of the hazard ratio for hospital discharge is slightly greater than 1, and the confidence interval in the adjusted analysis is relatively wide. We therefore cannot statistically exclude the presence of a small risk from hospital discharge. By comparison though, the risk of an outbreak associated with care home size is much larger than any plausible risk from a hospital discharge.

This finding is very similar to the Public Health Wales (PHW) analysis using similar methodology. In adjusted analysis, they observed a 15% higher risk in periods soon after a hospital discharge compared to periods without a hospital discharge, compared to our 18% increased risk. The 95% confidence interval for the PHW estimate of the risk soon after a hospital discharge ranged from 11% lower to 47% higher (also not statistically significantly different from periods without a hospital discharge). The PHW analysis also found the same strong association between care home size and risk of an outbreak.

In conclusion, considering the results from the adjusted model, we do not find any statistically significant association between hospital discharge and the occurrence of a care home outbreak, but cannot rule out a small effect. Care home size is much more strongly associated with the risk of an outbreak than all other care home characteristics, including hospital discharge.

Associations between different types of hospital discharge and outbreaks

The analysis presented in Table 10 and Figure 12 does not differentiate between different types of hospital discharge. Table 11 and Figure 13 adjusts the analysis further.

This analysis (shown in Table 11 and Figure 13) is identical to that shown in Table 10 and Figure 12, but distinguishes different types of hospital discharge in terms of whether the person discharged was known to have a negative COVID-19 test before discharge, was untested before discharge, or whose last test before discharge was positive.

Table 11 shows both the univariate and the adjusted analysis, along with a commentary based on the adjusted analysis only (because the adjusted analysis is more appropriate given the relationships between care home size and all other characteristics).

The results from the adjusted analysis are also shown in graphical form in Figure 13.

An overall summary of the conclusions reached from Table 11 and Figure 13 is given under Figure 13.

Table 11: Care home characteristics (including different types of hospital discharge) associated with care home outbreaks of COVID-19

Care home characteristic	Number (%) of homes with outbreaks	Univariate Hazard Ratio (95% Confidence Interval)	Adjusted ² Hazard Ratio (95% Confidence Interval)	Commentary (on the Adjusted Hazard Ratio)
Care home size				There is a very strong, statistically significant
Less than 20	11 (3.7)	1.0 (Reference)	1.0 (Reference)	association between care home size and the
20-29	31 (19.3)	5.75 (2.89 to 11.44)	3.60 (1.61 to 8.03)	occurrence of an oubleak.
30-39	44 (27.7)	8.81 (4.55 to 17.05)	4.57 (2.08 to 10.05)	Compared to care homes with less than 20 beds,
40-49	60 (37.5)	12.03 (6.32 to 22.88)	6.53 (2.96 to 14.38)	the risk of an outbreak progressively increased as
50-59	35 (45.5)	15.90 (8.07 to 31.31)	7.76 (3.35 to 17.97)	care nomes got bigger.
60-69	68 (62.4)	26.01 (13.75 to 49.21)	10.16 (4.56 to 22.63)	
70-79	29 (78.4)	40.41 (20.17 to 80.99)	14.53 (6.18 to 34.17)	
80-89	24 (75.0)	37.99 (18.59 to 77.65)	16.47 (6.80 to 39.91)	
90 or more	46 (90.2)	60.36 (31.16 to 116.93)	17.60 (7.58 to 40.86)	
Care home subtype				Compared to care homes for older people, the risk
Older people	336 (41.1)	1.0 (Reference)	1.0 (Reference)	of an outbreak was much lower in care homes
Other adult service*	6 (5.4)	0.10 (0.05 to 0.23)	0.29 (0.12 to 0.68)	providing other addit services.
Learning disabilities	6 (3.8)	0.07 (0.03 to 0.17)	0.46 (0.17 to 1.22)	
Sector				Compared to private sector care homes,
Private	275 (45.2)	1.0 (Reference)	1.0 (Reference)	voluntary/not for profit care homes had a similar
Voluntary/not for profit	32 (12.5)	0.26 (0.18 to 0.37)	1.0 (0.66 to 1.53)	higher risk of an outbreak.
Local authority/NHS	41 (27.9)	0.65 (0.47 to 0.91)	1.70 (1.12 to 2.58)	Ŭ
RAD score				Compared to care homes with a low RAD score,
Low risk	188 (27.4)	1.0 (Reference)	1.0 (Reference)	homes with a medium RAD score and homes with
Medium risk	78 (35.0)	1.36 (1.04 to 1.77)	0.94 (0.72 to 1.25)	a mgn had score had similar risks of all outbreak.
High risk	82 (47.1)	2.01 (1.55 to 2.60)	1.03 (0.77 to 1.37)	

Care home characteristic	Number (%) of homes with outbreaks	Univariate Hazard Ratio (95% Confidence Interval)	Adjusted ² Hazard Ratio (95% Confidence Interval)	Commentary (on the Adjusted Hazard Ratio)
Nursing care				Compared to care homes which did not provide nursing care, care homes which provided nursing
No nursing care	68 (14.7)	1.0 (Reference)	1.0 (Reference)	care had a higher risk of an outbreak.
Nursing care	275 (45.2)	3.72 (2.86 to 4.86)	1.42 (0.99 to 2.04)	5
Missing	5 (38.5)	2.79 (1.12 to 6.91)	1.26 (0.48 to 3.32)	
Discharges				Compared with periods where there were no
No discharge	35	1.0 (Reference)	1.0 (Reference)	discharges, the risk of an outbreak is:
Discharge Negative	#	2.13 (1.43 to 3.16)	0.95 (0.63 to 1.43)	patients who had tested negative.
Discharged Untested	#	3.06 (2.41 to 3.89)	1.27 (0.97 to 1.66)	• is higher in periods where there were discharges
Discharged Positive	#	4.65 (1.71 to 12.66)	1.17 (0.41 to 3.31)	for patients who were untested or had tested positive.
				In all three comparisons, the confidence intervals of the hazard ratios include 1.0 (the reference point, i.e. the risk of an outbreak with no discharge), which means that the risks in these periods are not statistically significantly different from the risk in periods without a discharge. However, the width of the confidence interval means our level of certainty about the three types of hospital discharge varies (see commentary under figure 13).

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register & ECOSS COVID-19 testing data

 Adult care homes for: Mental Health Problems; Physical and Sensory Impairment; Respite and Short Breaks; Alcohol and Drug Misuse; or Blood Borne Virus
 Model additionally adjusted for Integration Authority (hazard ratios not shown)
 # it is not possible to report the number of homes in each category as the analysis is based on defining periods of risk, for all discharges between 1 March and 31 May. Each care home will have varying proportions of time with no discharge, or with a recent discharge of each of the three types.

Statistically significant hazard ratios (ie the confidence interval does not include 1) are shown in **bold**

Figure 13: Adjusted hazard ratios and associated confidence intervals for care home characteristics (including different types of hospital discharge) associated with care home outbreaks of COVID-19



Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register & ECOSS COVID-19 testing data

Considering the three different types of hospital discharge:

- there is good evidence that there was no risk associated with discharges where the
 person had tested negative before discharge, compared to periods where there was no
 discharge. The best estimate of the risk was a 5% reduction. The 95% confidence interval
 for this estimate ranges from 37% lower to 43% higher.
- In contrast, although the estimated risk for periods soon after discharges where the
 person was untested was not statistically significantly different from periods where there
 was no discharge, the confidence interval is wide and the association is only just not
 statistically significant. The best estimate of this risk is a 27% increase in risk the period
 soon after an untested discharge compared to a period without a discharge. The 95%
 confidence interval for the estimate ranges from 3% lower to 66% higher. We therefore
 cannot rule out the possibility of an increased risk of an outbreak from a care home
 receiving a discharge where the person was untested (although any plausible effect is
 small compared to the risk associated with care home size).
- Similarly, the estimated risk for periods soon after discharges where the person's last test was positive was not statistically significantly different from periods where there was no discharge. However, there were a very low number of discharges in this category which

means there is greater uncertainty (and hence a wider confidence interval which reflects this). The best estimate of this risk is a 17% increase. The 95% confidence interval for the estimate ranges from 59% lower to 331% higher. We therefore cannot rule out the possibility of an increased risk of an outbreak in a care home receiving a discharge where the person last tested positive, but the small numbers in this category make drawing any firm conclusion difficult (although any plausible effect is small compared to the risk associated with care home size). The impact of positive discharges into care homes is explored further in section 3.

Considering the results from the adjusted model, we do not find any statistically significant association between hospital discharge of any type and the occurrence of a care home outbreak, but cannot rule out a small effect. Care home size is much more strongly associated with the risk of an outbreak than other care home characteristics, including different types of hospital discharge.

Section 3 – Additional analysis including Genomic Sequencing

Since the publication of the original report in October 2020, further analysis has been performed to explore specific aspects in detail including:

- classification of discharges based on pre-hospital residency (where people lived before they were admitted to hospital);
- analysis of the outcomes within 30 days of hospital discharge (all-cause mortality, COVID-19 mortality and COVID-19 infection) of all those who were discharged;
- and analysis of those people whose last positive test before discharge was positive (including relationship with care home outbreaks). Collaboration with the Public Health Microbiology Team within Public Health Scotland enabled the clinical data on people whose last positive test before discharge was positive to be combined with viral genomic sequencing data (where available). The genomic data has allowed analysis of the specific samples of those discharged from hospital and the samples from the care home they were discharged-to, to be compared to understand more about patterns of infection transmission and relationships between hospital discharge and care home outbreaks.

To protect confidentiality, the information presented in this report does not identify either individual people or individual care homes.

Main Points (for Section 3)

Classification of discharges based on pre-hospital residency

- Nearly half (45.9%) of the people were discharged back to their usual care home of residence.
- Almost a third (31.6%) moved into a new long-term care home placement on discharge from hospital.
- One in seven (14.5%) had a temporary placement in a care home
- For the remaining 7.8% of those discharged from hospital to care home, their previous residency before admission was unclear.

Outcomes at 30-days after discharge

- Mortality is high among people discharged to care homes, with 675 people dying within 30 days of discharge (14.1% of all of those discharged).
 - A large majority of deaths (83.3%) within 30 days of hospital discharge were in the care home
 - COVID-19 was associated with 21.6% of deaths within 30 days of hospital discharge
- In the 30 days after their hospital discharge to a care home, 154 people tested positive for COVID-19. This represents 3.5% of all people discharged who had not previously tested positive for COVID-19.
 - Of these 154 people testing positive within 30 days of discharge, 26 were discharged to a care home with an existing outbreak of COVID-19 and 127 were discharged to a care home before any outbreak had started. One person

tested positive during a hospital readmission and the care home they were discharged to did not experience an outbreak.

 In total, 54 of the 154 (35.1%) people testing positive died within 30 days of their hospital discharge. All of these deaths were recorded as COVID-19 associated on the death certificate.

Discharges where last test was positive

- There were 106 people (who had a total of 110 discharges) where the last test for COVID-19 before hospital discharge to care home was positive
- Within this group, 79.2% of infections had a definite community onset, as people tested positive before admission to hospital or within the first 1-2 days of admission, without having been an inpatient in hospital recently.
- For these 106 people:
 - There were 80 people discharged to care homes with an existing outbreak of COVID-19, where the discharge could therefore not have caused the care home outbreak
 - There were 7 people discharged 15 or more days after their first positive test for COVID-19, who would not be considered at risk of onward transmission of infection
 - There were 9 people discharged to care homes which did not experience an outbreak of COVID-19
 - There were 10 people discharged where the hospital discharge and care home outbreak showed an association in the timing of the hospital discharge and care home outbreak which required further review using viral genomic sequencing

Viral genomic sequencing analysis

- Analysis focused on care home outbreaks where we identified a possible or unclear epidemiological association between the hospital discharge and care home outbreak
- Analysis is limited by the lack of sequencing data available from the first three months of the pandemic in Scotland
- There was only sufficient sequencing data in 2 care homes to examine whether a person discharged from hospital before the start of a care home outbreak could have been responsible for starting the care home outbreak. The findings are not consistent with hospital introduction of infection in these care homes.
- There was only sufficient sequencing data in 5 care homes to examine whether a person discharged from hospital after a care home outbreak had started, could have been responsible for a further introduction of infection to the care home. In all cases examined the viral lineages of the positive residents discharged from hospital were already present in the care homes before the person was discharged from hospital
- Reducing community prevalence of infection is critical to protect those living in care homes from COVID-19 infection

Classification of discharges based on pre-hospital residency

Hospital discharges to care homes include those returning to their previous care home after in-hospital care, those moving into a new permanent home, and those moving in to a care home on a temporary basis (for example, for rehabilitation or while waiting for additional care to be provided in their own home). People are therefore not just "discharged to" care homes. There is a flow of people in both directions to and from care homes and hospitals.

Of the 5,198 discharges from hospital for 4,804 people, we were able to identify the specific Scottish care home each person was discharged to in all but 13 discharges (11 people), and were therefore able to classify each of these discharges to care homes. These are presented in Table 12.

Type of hospital discharge	Number of	Number of	Percentage
	discharges	people ²	of people
			discharged
Returned to previous care home	2,412	2,207	45.9%
New care home placement	1,633	1,517	31.6%
Temporary placement	730	696	14.5%
Unclear type of discharge ¹	410	373	7.8%
Care home of discharge not known ³	13	11	0.2%
Total	5,198	4,804	

Table 12: Summary of discharges and people based on type of hospital discharge

Source: Validated register of hospital discharges to care homes, CHI Register, HSCP submissions.

Notes:

- 1. Unclear are those identified as discharged to care homes, but whose registered address in CHI is not the same as the care home they were discharged from hospital to. This will include people who died before their registered address in CHI was updated or who were discharged to a care home on a temporary basis, as their registered address would not change. Of note a quarter of those in the unclear group died (before 30 June) and it is likely they were new care home admissions whose CHI address was not updated before death.
- 2. Where a person has multiple hospital admissions, this classification is based on their most recent discharge

3. Six cases of discharges where NHS Boards could confirm discharge was to care home, but no location could be provided or derived by linkage and seven where person was discharge to a care home in England

Further information in the Methodology Document

Outcomes for people discharged to care homes

This section reports on the outcomes in the 30 days of discharge for all people discharged. Outcomes examined are:

- All-cause mortality
 - COVID-19 associated mortality
 - Non-COVID-19 associated mortality
- COVID-19 infection.

The reporting in this section is descriptive i.e. looking at the pattern of these events in people discharged from hospital to a care home. That an outcome occurred does not mean that it was caused by the discharge.

All-cause mortality within 30 days discharge

Of the 4,804 people discharged to a care home between 1 March and 31 May 2020, there were 675 who died within 30 days of discharge from hospital (14.1% mortality). Where an person had more than one discharge in the time period, mortality was calculated based on the time from their last hospital discharge.

Most of these deaths, 562 out of the 675 (83.3%), occurred in the care home with the remaining 113 (16.7%) occurring elsewhere, most often on a readmission to hospital.

Of the 675 people who died within 30 days of discharge from hospital to a care home there were:

- 327 people discharged in March (13.3% of all the people discharged in March), of whom 59 people (2.4% of those discharged in March) had COVID-19 recorded on the death certificate
- 216 people discharged in April (15.8% of all the people discharged in April), of whom 69 people (5.0% of those discharged in April) had COVID-19 recorded on the death certificate
- 132 people discharged in May (10.8% of all the people discharged in May), of whom 18 people (1.5% of those discharged in May) had COVID-19 recorded on the death certificate

Following discharge to a care home, 146 people who died within 30 days of discharge had COVID-19 recorded on the death certificate (21.6% of those dying within 30 days of discharge). Nearly two-thirds of these (96/146, 64.4%) had ICD-10 code U071 (laboratory confirmed COVID-19) recorded on their death certificate, with the remaining 50 (34.2%) coded as U072 (clinical or epidemiological diagnosis (suspected or probable) of COVID-19 infection).

Table 13 summarises the most common underlying causes of death for those people who died within 30 days of their hospital discharge.

 Table 13: The most common underlying causes of death of those who died within 30 days of their last hospital discharge between 1 March to 31 May 2020

Cause of Death	Number of deaths	Percentage of deaths	Percentage of people discharged
COVID-19 (with any mention of COVID-19 on the death certificate)	146	21.6%	3.0%
Other underlying causes:			
Dementia and other neurodegenerative disease	109	16.1%	2.3%
Stroke and complications associated with cerebrovascular disease	43	6.4%	0.9%
Falls	38	5.6%	0.8%
Myocardial infarction	21	3.1%	0.4%
Lung cancer	18	2.7%	0.4%
Pneumonia	18	2.7%	0.4%
Chronic Obstructive Pulmonary Disease	17	2.5%	0.4%
All other causes	265	39.3%	5.5%
Total deaths within 30 days of discharge	675	100.0%	14.1%

Source: Validated register of hospital discharges to care homes, NRS Deaths

There is no existing comprehensive national data on the usual outcomes experienced by those discharged to care homes, but care home residents are a group known to have high mortality in normal circumstances. Care home residents are typically frail and have complex physical and mental health problems. Care homes provide a home for those whose needs cannot be accommodated in other settings and have an essential role in supporting those approaching the end of life, providing care in a homely setting.

COVID-19 Infection

In total, 4,804 people were discharged from hospital to a care home between 1 March and 31 May 2020. Of these, 349 (7.3%) had tested positive for COVID-19 before their hospital discharge (243 of whom had a subsequent negative test before discharge).

Of the remaining 4,455 people who had not previously tested positive for COVID-19 (i.e. those who were untested or tested negative during their hospital admission), there were 154 (3.5%) people who tested positive for COVID-19 for the first time in the 30 days after their hospital discharge.

The analysis in this section will focus on these 154 indvididuals, Table 14 summarises their characteristics.

Table 14: Characteristics of the 154 people who tested positive for COVID-19 for the first time in the 30 days after their hospital discharge

		Percentage of people in this group
Age		
Average (mean age)	81 years	-
Sex		
Men	65 people	42.2
Women	89 people	57.8
Month of hospital discharge		
March	74 people	48.1
April	70 people	45.5
Мау	10 people	6.5
Discharge to care home		
Returned to previous care home	57 people	37.0
New placement	55 people	35.7
Temporary placement	33 people	21.4
Unclear	9 people	5.8
Length of hospital stay		
Average (mean length)	48 days	-
Average (middle/median length)	26 days	-
Outcome at 30 days after hospital discharge		
Alive	100 people	64.9
Died in care home	26 people	16.9
Died elsewhere (most often in hospital)	28 people	18.2

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register, ECOSS COVID-19 testing data;NRS Deaths

At 30 days after their hospital discharge 100 (64.9%) of these people were alive, 26 people (16.9%) had died in the care home and 28 people (18.2%) had died elsewhere, most commonly in hospital.

Further analysis will examine the timing of these infections in relation to the hospital discharge and the care home outbreak and classify the onset of infection.

Timing of hospital discharge and relationship to care home outbreaks for those who tested positive for COVID-19 in the 30 days after discharge

The 154 people who tested positive for COVID-19 in the 30 days after their hospital discharge were discharged to a total of 97 care homes (8.9% of all care homes in Scotland).

In total, 96 of these care homes had an outbreak of COVID-19 between 1 March and 21 June (defined as at least one resident testing positive for COVID-19 while the resident was in the care home). These 96 homes represent 27.6% of all homes in Scotland which had an outbreak of COVID-19 between 1 March and 21 June.

- For 127 people (82.5% of those testing positive for COVID-19 in the 30 days after their hospital discharge), their hospital discharge was **before** the start of the outbreak in the care home.
- For 26 people (16.9% of those testing positive for COVID-19 in the 30 days after their hospital discharge) their hospital discharge was **after** the start of the outbreak in the care home

In the 1 home of this group of 97 which did not experience an outbreak, the resident tested positive during a readmission to hospital and no other positive tests were identified within the care home by 21 June.

Discharged before an outbreak started in the care home

Focusing on the 127 people who tested positive for COVID-19 within 30 days of their hospital discharge and who were discharged to 75 care homes where an outbreak of COVID-19 had not started:

- Four people (3.1%) were discharged from hospital to 4 care homes on the same day that the care home outbreak started (defined as the first day a resident in the care home received a positive test for COVID-19). The four people tested positive for COVID-19 between 6 and 19 days after the care home outbreak started.
- For 7 people (5.5%) discharged to 7 care homes, they were the first and only positive case of COVID-19 identified in the care home before 21 June 2020
- For 38 people (30.0%) discharged to 35 care homes, they tested positive on the first day of the care home outbreak
- For 64 people (50.4%) discharged to 43 care homes, they tested positive for COVID-19 between 1 and 27 days after the start of the care home outbreak
- For 14 people (11.0%) they tested positive for COVID-19 before the care home outbreak started, as their positive test was during a readmission to hospital

Discharged after an outbreak started in the care home

Focusing on the 26 people who tested positive for COVID-19 within 30 days of their hospital discharge and who were discharged to 21 care homes where an outbreak of COVID-19 had already started:

- For 19 people there had been between 1 and 41 previous positive cases of COVID-19 in the care home before their hospital discharge, with an average of 7 previous positive cases detected in residents within the care home
- For 7 people there had been a single positive case of COVID-19 in another resident before the person's discharge from hospital

Most of these people (23 out of 26) were discharged within 14 days of the most recent positive tests in the care home, with the remaining 3 people discharged at least 15 days after the most recent positive test in the care home.

Classification of infection onset

Formal classification of the source of any infection relies on understanding where people have been in the period prior to developing the infection. Definitions are based on an adapted form of the European Centre for Disease Prevention and Control (<u>ECDC</u>) classification (the original ECDC classification is used to define COVID-19 infection in relation to hospital admission). The classification accounts for periods of time spent in hospital or not in hospital. Table 15 and Figure 14 summarise the criteria applied for classification of infection onset.

Number of days spent in location at time of positive test	Classification	Explanation
15 days or more	Definite hospital onset	First positive test on days 15 or more of hospital admission
	Definite community/care home onset	First positive test on days 15 or more after discharge to care home
8-14 days	Probable hospital onset	First positive test on days 8-14 of hospital admission
	Probable community/care home onset	First positive test on days 8-14 after discharge to care home
3-7 days	Indeterminate onset	First positive test on days 3-7 of hospital admission or after discharge to care home
1-2 days	Determined by the hospital and community/care home status that would have applied if they had not been admitted/ discharged.	

Table 15: Criteria for classification of infection onset, adapted from ECDC

The day a person is discharged from hospital to care home is counted as the first day in the care home. Some people have repeated admissions and discharges from hospital in fairly

quick succession, which makes it difficult to be certain where they were infected (their infection status is usually 'indeterminate').



Figure 14: Criteria for classification of infection onset, adapted from ECDC

Of the 154 people testing positive in the 30 days after their hospital discharge:

- None tested positive on the day of hospital discharge to care home or the next day (days 1-2)
- There were 19 people (12.3% of those testing positive in the 30 days after discharge) who tested positive within 3-7 days of discharge to the care home
- There were 30 people (19.5% of those testing positive in the 30 days after discharge) who tested positive within 8-14 days of discharge to care home
- There were 105 people (68.2% of those testing positive in the 30 days after discharge) who tested positive on days 15-30 of discharge to care home.

Applying NHS Scotland modified definitions adapted from ECDC and taking account of the length of hospital stay and time in care home, Table 16 presents a summary of the infection classification of these 154 people in terms of the onset of their infection.

Table 16: Classification of infection of those who received their first positive test for COVID-19 after hospital discharge to care home

Infection classification	Number of people	Percentage
Definite hospital onset	0	0%
Probable hospital onset	0	0%
Indeterminate onset	19	12.3%

Probable community onset	30	19.5%
Definite community onset	105	68.2%

Source: Validated register of hospital discharges to care homes, ECOSS COVID-19 testing data

Further analysis of people whose last test was positive at time of hospital discharge

From 1 March to 31 May 2020 there were 110 discharges from hospital to care homes of 106 people (4 had one readmission) where the last COVID-19 test performed before their hospital discharge was positive.

The analysis in this section will focus on these 106 indvididuals, Table 17 summarises their characteristics.

Table 17: Characteristics of the 106 people whose last test for COVID-19 before hospital discharge was positive

		Percentage of people in this
		910 dip
Age		
Average (mean age)	80 years	-
Sex		
Men	47 people	44.3
Women	59 people	55.7
Month of hospital discharge		
March	3 people	2.8
April	83 people	78.3
May	20 people	18.9
Discharge to care home		
Returned to previous care home	90 people	84.9
New placement	11 people	10.4
Temporary placement	3 people	2.8
Unclear	2 people	1.9
Length of hospital stay		
Average (mean length)	15 days	-
Average (middle/median length)	6.5 days	-
Outcome at 30 days after hospital discharge		
Alive	74 people	69.8
Died in care home	30 people	28.3
Died elsewhere (most often in hospital)	2 people	1.9

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register, ECOSS COVID-19 testing data;NRS Deaths

At 30 days after their hospital discharge 74 (69.8%) of these people were alive, 30 people (28.3%) had died in the care home and 2 people (1.9%) people had died elsewhere, most commonly in hospital.

Further analysis will examine the timing of COVID-19 infection in relation to hospital admission and discharge, classify the onset of infection and examine the relationship between these discharges and the onset of care home outbreaks.

Timing of COVID-19 test and hospital admission and discharge

To understand any impact of individual discharges on COVID-19 outbreaks in care homes, it is necessary to take account of the timing of infection and the duration of illness. Table 18 shows the timing of COVID-19 infection in relation to hospital admission and discharge for these 106 people discharged whose last test for COVID-19 was positive.

Timing of positive test	Days sin				
	0-2 days	3-7 days	8-14 days	15 days or more	TOTAL
Before admission	0	9	8	6	23
Day 1 – 2 of admission	23	15	19	8	65
Day 3 – 7 of admission	1	2	1	2	6
Day 8 – 14 of admission	0	0	1	0	1
Day ≥ 15 of admission	1	0	4	6	11
TOTAL	25	26	33	22	

Table 18: Timing of COVID-19 infection in relation to hospital admission and discharge

Source: Validated register of hospital discharges to care homes; ECOSS COVID-19 testing data

Of those 106 people whose last test for COVID-19 at the time of hospital discharge was positive, 23 people (21.7%) were diagnosed as being positive before they were admitted to hospital. A further 65 (61.3%) were diagnosed on the first or second day of their hospital admission.

Of the 83 people who tested positive after admission to hospital, 67 of them (80.7%) were discharged to care homes between 0-14 days after their first positive test.

Classification of infection onset

For each person whose last test for COVID-19 was positive at the time of their hospital discharge, their infection has been classified based on onset and is reported in Table 19. This is based on the same criteria adapted from ECDC as described in Table 15.

Table 19: Classification of COVID-19 infection onset among the 106 people whose last test at time of hospital discharge to care home was positive

Infection classification	Number of people	Percentage
Definite community onset	84	79.2%
Probable community onset	1	0.9%
Indeterminate onset	9	8.5%
Probable hospital onset	1	0.9%
Definite hospital onset	11	10.4%

Source: Validated register of hospital discharges to care homes; ECOSS COVID-19 testing data

Relationship between hospital discharges and care home outbreaks

This section looks at the relationship between each of these 106 discharges and the timing of care home outbreaks. A care home outbreak is defined as a positive test for COVID-19 on an person resident in the care home at the time of the test.

These 106 people were discharged to 75 care homes (6.9% of all care homes in Scotland).

- In total 67 of these 75 (89.3%) care homes had an outbreak of COVID-19 between 1 March and 21 June 2020 (19.3% of all care homes in Scotland which experienced an outbreak of COVID-19 in this period).
- The remaining 8 care homes did not experience an outbreak of COVID-19 during this time period.

Using the linked clinical data and knowledge of people's prior residence and hospital admissions it is possible to investigate associations between the hospital discharge of the person whose last test for COVID-19 was positive and the outbreak of COVID-19 infection in the care home they were discharged-to.

Based on the timing of infection onset, hospital discharge and care home outbreak, this allows categorisation of each discharge into the following four groups:

- 1. No epidemiological association
- 2. Possible epidemiological association
- 3. Unclear epidemiological association
- 4. No outbreak of COVID-19 infection

The definition used to allocate discharges into these categories is presented in Table 20.

Table 20: Epidemiological classification of relationship between hospital discharge of people whose last test for COVID-19 was positive and care home outbreaks

Classification	Definition
No epidemiological association	Person is discharged from hospital to a care home whose outbreak of COVID-19 started before the hospital discharge
	OR
	Person is discharged from hospital to a care home 15 or more days after their first positive test for COVID-19 ¹
Possible epidemiological association	A person was discharged from hospital within 14 days of their first positive test for COVID-19
	AND
	Another care home resident tests positive 3-14 days after the person is discharged into the care home (and that other care home resident is the first positive test in the care home)
Uncertain epidemiological association	A person was discharged from hospital within 14 days of their first positive test for COVID-19 (used as a proxy for duration of illness)
	AND
	Another care home resident tests positive on the same day or within two days of the hospital discharge ² OR another care resident tests positive 15 or more days after the hospital discharge (and that other care home resident is the first positive test in the care home)
No outbreak	Person is discharged from hospital to a care home which does not experience an outbreak of COVID-19
Notes	

Epidemiological association - examining and describing patterns of disease onset and relationship of hospital discharge and infection using information in linked clinical datasets

1. After 14 days from a positive test, Health Protection Scotland guidance indicates that barrier infection control precautions can be stepped-down if the person is well. From a practical perspective, these people are not considered to be at risk of onward transmission of infection. Hospital discharge guidance has recommended that people with known COVID-19 should isolate on their return to the care home setting after inpatient hospital discharge.

2. People arriving in the care home cannot cause an outbreak which occurs as they arrive, because if they infect others, then it takes several days for that person to develop symptoms and be tested.

These definitions were applied to the 106 discharges of people whose last test for COVID-19 was positive, using the discharge closest to their first positive test for COVID-19, the classification is presented in Table 21 and Figure 15.

 Table 21: Comparison of the timing of positive test in relation to hospital discharge

 and the timing of any care home outbreak after the discharge

	Timing of care home outbreak in relation to hospital discharge				No care	
Days since positive test at time of hospital discharge	Before hospital discharge	0-2 days after d/c	3-7 days after d/c	8-14 days after d/c	15 days or more after d/c	home outbreak
0-2 days	19	2	1	1	0	2
3-7 days	24	1	0	0	0	1
8-14 days	24	1	1	2	1	4
15 days or more	13	0	3	1	3	2

Source: Validated register of hospital discharges to care homes; Care Inspectorate Datastore; HSCP submissions CHI Register, ECOSS COVID-19 testing data;NRS Deaths

Notes:

Blue cells – no epidemiological association; Grey cells – uncertain epidemiological association; Orange cells – possible epidemiological association; Green cells – no care home outbreak. d/c – discharge

Figure 15: Comparison of the timing of positive test in relation to hospital discharge and the timing of any care home outbreak after the discharge

Timing of care home outbreak in relation to discharge	Number of discharges	Days <mark>s</mark> ince first positive test	Type of epidemiological association	
		0-2 days	None	19
Before hospital discharge	00	3-7 days	None	24
	00	8-14 days	None	24
		15 days or more	None	13
		0-2 days	Uncertain	2
0-2 days after hospital	4	3-7 days	Uncertain	1
discharge	4	8-14 days	Uncertain	1
		15 days or more	-	0
		0-2 days	Possible	1
3-7 days after hospital	5	3-7 days	-	0
discharge	5	8-14 days	Possible	1
		15 days or more	None	3
8-14 days after hospital discharge		0-2 days	Possible	1
	4	3-7 days	-	0
	4	8-14 days	Possible	2
		15 days or more	None	1
	4	0-2 days		0
15 days or more after		3-7 days	-	0
hospital discharge		8-14 days	Uncertain	1
		15 days or more	None	3
No care home outbreak	9	0-2 days	No Outbreak	2
		3-7 days	No Outbreak	1
		8-14 days	No Outbreak	4
		15 days or more	No Outbreak	2

Summary of further analysis of people discharged whose last test was positive at time of hospital discharge

There are five discharges to five care homes which are possibly epidemiologically associated (in terms of the timing of the discharge, timing of the outbreak and days since positive test). A further five discharges have an uncertain association with outbreaks. Finding these epidemiological associations (possible or uncertain) between a hospital discharge and a care home outbreak means that the discharge of the positive person occurs before the care home outbreak begins and at a time when the person being discharged would be considered infectious to others. An epidemiological association is not proof that a hospital discharge caused a care home outbreak. However, it identifies discharges and outbreaks where further analysis using available viral genomic sequencing would be helpful in trying to identify the cause of the care home outbreak (presented on page 67).

There were 80 discharges of COVID-19 positive people to care homes which already had an outbreak before the hospital discharge occurred. The hospital discharge is therefore not epidemiologically associated with a first outbreak of infection. However, there is the possibility that some of these discharges caused further introduction of infection in a care home which already had an active outbreak. A further 7 discharges occur after the person had been positive for COVID-19 for 15 days or longer. Again, further analysis was undertaken using available viral genomic sequencing data to explore these care home outbreaks (presented on page 71).

There were 9 discharges of COVID-19 positive people to eight care homes which did not experience an outbreak of COVID-19 at any point between 1 March and 21 June 2020.

Genomic sequencing analysis

When a nose/throat swab is performed to identify the presence of the SARS-CoV-2 virus that causes COVID-19 infection, the genetic material of the virus can undergo further laboratory analysis to decode the genetic material of the virus. This analysis is known as whole genome sequencing and is used to genetically characterize the virus.

During the COVID-19 pandemic, genomic sequencing analysis undertaken globally has identified multiple strains or variants of the SARS-CoV-2 virus. Finding multiple strains is normal, because viruses evolve and mutate (change slightly) over time as they replicate. Although most mutations make no real difference to how the virus acts (e.g. how easy it is to catch), these changes mean it can be possible to say whether viruses which infected multiple residents in a care home appear to be different strains of the virus or not. Identified strains and mutations have been recorded in a national UK database and used by scientists to understand patterns of disease transmission across the country and wider world. Genomic sequencing analysis can also have a role in investigating outbreaks of COVID-19, but there are key requirements and limitations to understand about the use and interpretation of these data:

- Sequencing can only be undertaken on positive PCR (polymerase chain reaction) swabs
- Sequencing can only be undertaken where the swab has captured enough viral genetic material
- If sequencing was not done at the time, then it is often difficult or impossible to do it now because many swabs taken in spring and early summer 2020 have not been stored
- Drawing conclusions from genomic sequencing analysis relies on having enough resident swabs from each care home
- An understanding of which strains are common in the local community or local hospitals is necessary to help establish the relationship of disease within a care home and its wider community

Working with the Public Health Microbiology Team within Public Health Scotland, the clinical data on the pathways of people into and out of hospital and care homes was brought together with the available genomic sequencing data to examine viral transmission patterns.

As discussed on pages 5, 26, 31 and Appendix 1, the period between March and mid-June 2020 was one in which policy and access to testing for COVID-19 changed, with limited testing outside of inpatient hospital settings initially. There are also some regional differences in the availability of both testing and sequencing in this early period of the pandemic in Scotland. Therefore, we have limited genomic sequencing data for care home outbreaks between March and mid-June. The availability of genomic sequencing data is biased towards large and prolonged care home outbreaks, where local Health Protection Teams are likely to have undertaken more testing and requested genetic sequencing analysis.

We identified two groups where genomic sequencing analysis (if available) would add to the clinical data analysis and will present the findings below:

- 1. Positive discharges with epidemiological association between hospital discharge and the start of a care home outbreak: people who were discharged from hospital into a care home, whose last test before discharge was positive, where the timing of discharge and the start of an outbreak in the care home supported a possible or uncertain epidemiological association between the hospital discharge and the care home outbreak
- 2. Positive discharges without epidemiological association between hospital discharge and the start of a care home outbreak: people who were discharged from hospital into a care home, whose last test before discharge was positive, but where the timing of discharge and the start of an outbreak did NOT support an epidemiological association between the hospital discharge and the care home outbreak, but where we are looking for evidence of a new introduction (i.e. a new strain of the virus), even though there is an ongoing outbreak

In keeping with the analysis presented throughout the report, the focus is on the initial outbreak of infection within each care home. To protect the confidentiality of individual residents,we have aggregated the data using time periods to match the earlier tables and figures of the report:

Length of hospital admission: 0-6 days; 7-13 days; 14-20 days; 21-27 days; 28-34 days; 35-41 days; 42-48 days; 49-55 days; 56-62 days; 63-69 days; 70-76 days; 77-83 days; 84-90 days and 91 days and over

less than 1 week; 1-2 weeks; 2-3 weeks; 3-4 weeks; 4-5 weeks; 5-6 weeks; 6-7 weeks; 7-8 weeks; 8-9 weeks; 9-10 weeks; 10-11 weeks; 11-12 weeks; 12-13 weeks and 13 or more weeks

Timing of COVID-19 diagnosis in relation to hospital admission: diagnosed before admission; diagnosed on days 1-2 of admission; diagnosed on days 3-7 of admission; diagnosed on days 8-14 of admission, and diagnosed on or after day 15 of admission

Days since first positive test at time of hospital discharge: first positive test 0-2 days before discharge; 3-7 days before discharge; 8-14 days before discharge; 15 or more days before discharge

Timing of the start of the care home outbreak in relation to hospital discharge: outbreak starts before hospital discharge; 0-2 days after discharge; 3-7 days after discharge; 8-14 days after discharge; 15 or more days after discharge

Genomic sequencing analysis

Following genome sequencing, SARS-CoV-2 viruses can be characterized by representing how genetically related different viruses are (genotyping) visualised on a family 'tree' (phylogenetics). This provides different levels of resolution that can help distinguish straines of the viruses.

The first level of genotyping is the identification of UK 'lineages'. This groups together viruses that are predicted to originate from a single introduction into the UK - each UK lineage represents a separate introduction into the UK. For the lineages that have most successfully spread, there can be many representatives belonging to the same UK lineage circulating in Scotland and causing disease. Where different lineages are observed in a care home outbreak, this is indicative of multiple introductions of infection to the care home (rather than a single person introducing infection). Where a single lineage is present in a care home this can be indicative of a single introduction of infection, but if that lineage is widespread in the community, multiple introductions of infection can not be ruled out.

UK lineages can be further sub-divided into 'phylotypes', which are subgroups with the UK lineage. Where two sequences share the same phylotype, they are share mutations with one another, which allows the inference of relatedness between them and evidence to help rule-in transmission in an outbreak. However, pairs of viral sequences sharing a phylotype does not prove that one person infected another, rather that the two viral sequences are ultimately sourced from the same subset of circulating viral lineages. Thus phylotype sharing alone is not indicative of direct transmission, but can provide supportive evidence of transmission for infections which are epidemiologically believed to be part of a single outbreak or event.

Where a number of different phylotypes are observed in a care home outbreak that also widespread in the community, this can be indicative of multiple introductions of that virus belonging to that lineage to the care home. Alternatively, during a large outbreak multiple related phylotypes can be found where the virus mutates over time. In this case if those phylotypes are rarely or not at all found in the community, this can be indicative a single introduction of infection.

Findings from Genomic Sequencing Analysis

Positive discharges with an epidemiological association between hospital discharge and care home outbreak

As detailed on page 62, there were 10 cases of people who were discharged from hospital into a care home whose last test was positive, where the clinical data supported either a possible or uncertain epidemiological association between the hospital discharge and care home outbreak in the timing of the person's infection and the care home outbreak. In five cases there was a possible association and in five cases the association was uncertain.

Genomic sequencing analysis to understand links between discharge and care home outbreaks is only possible where the virus infecting the person being discharged was sequenced. Genomic sequencing data exists for 2 of the people discharged where there is a possible association, and 1 person discharged where there is an uncertain association.

Test samples for the remaining 7 people did not undergo sequencing analysis at the time, and are not available in the national data to sequence now.

The 3 care home outbreaks with genomic sequencing data are summarised below in terms of the clinical analysis and genomic sequencing analysis.

Outbreak 1

Resident 1 was admitted to hospital A from their own home, and discharged from hospital A to care home 1 after a 14-20 day inpatient stay. They tested positive for COVID-19 on day 3-7 of their hospital admission, indicating indeterminate onset of infection (i.e. cannot be certain whether they were infected in the community or in hospital). At the point of discharge 8-14 days had elaspsed since their first positive test.

Care home 1's outbreak was confirmed 3-7 days after resident 1's discharge from hospital. In total, 12 residents had a laboratory-confirmed positive test for COVID-19 and 7 residents who died had COVID-19 mentioned on their death certificate.

There are 8 samples available from this care home outbreak in the national sequencing database. These are composed of 2 UK lineages and 4 phylotypes. Resident 1's sample is from a UK lineage which was widespread in the region at this time. The presence of multiple lineages within the care home is consistent with multiple introductions from the community, rather than there being a clear causal link between resident 1's hospital discharge and care home 1's outbreak.

Epidemiological association between hospital discharge and care home outbreak (before considering genomic sequencing analysis)	Possible (based on timing of discharge and subsequent care home outbreak)
Onset of infection in person discharged from hospital	Indeterminate onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	48 days
Number of laboratory confirmed resident cases	12 residents
Number of deaths in care home associated with COVID-19	7 resident deaths
Number of samples available in sequencing database	8 samples
Viral sequence lineages within the samples	2 UK lineages consisting of 4 phylotypes
Conclusion of clinical and genomic analysis	Multiple introductions from widespread community lineages.

<u>Outbreak 2</u>

Resident 2 was admitted to hospital B from their own home, and discharged from hospital B to care home 2 after a 7-13 day inpatient stay. They tested positive for COVID-19 on day 0-2 of their hospital admission, indicating community onset of infection. At the point of discharge 8-14 days had elapsed since their first positive test.

Care home 2's outbreak was confirmed 8-14 days after resident 2's discharge from hospital. In total, 20 residents had a laboratory-confirmed positive test for COVID-19 and 3 residents' who died had COVID-19 mentioned on their death certificate.

Resident 2's sample is the only sample available in the national sequencing database in association with care home 2. Therefore, the available data are inconclusive in relation to the role of resident 2's discharge and association with care home 2's outbreak.

Epidemiological association between hospital discharge and care home outbreak (before considering genomic sequencing analysis)	Possible (based on timing of discharge and subsequent care home outbreak)
Onset of infection in person discharged from hospital	Community onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	55 days
Number of laboratory confirmed resident cases	20 residents
Number of deaths in care home associated with COVID-19	3 resident deaths
Number of samples available in sequencing database	1 sample
Viral sequence lineages within the samples	1 UK lineage and 1 phylotype
Conclusion of clinical and genomic analysis	Inconclusive as no other sequencing data from care home outbreak.

<u>Outbreak 3</u>

Resident 3 was admitted to hospital C from care home 3, and discharged back to care home 3 after a 0-6 day stay in hospital. They tested positive for COVID-19 on day 0-2 of their hospital admission, indicating care home onset of infection. At the point of discharge 0-2 days had elapsed since their first positive test.

Care home 3's outbreak was confirmed 0-2 days after resident 3's hospital discharge (ie another resident tested positive). In total, 7 residents had a laboratory-confirmed positive test for COVID-19 and 6 residents' who died had COVID-19 mentioned on their death certificate.

Resident 3's sample is one of three samples available in the national sequencing database in association with care home 3, belonging to two UK lineages. This suggests the outbreak was not due to a single introduction of infection to the care home. The timing of resident 3's infection is not consistent with hospital introduction of infection to the care home because resident 3 tested positive very shortly after hospital admission (i.e. is very likely to have caught the virus in the care home before being admitted). This conclusion is supported by another sample from care home 3, with the same phylotype as resident 3, obtained while resident 3 was in hospital. This indicates that the outbreak is from an unsampled source within the home who likely infected both residents.

Epidemiological association between hospital discharge and care home outbreak (before considering genomic sequencing analysis)	Unclear (based on timing of discharge and subsequent care home outbreak) Care home outbreak confirmed 0-2 days after hospital discharge
Onset of infection in person discharged from hospital	Care home onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	65 days
Number of laboratory confirmed resident cases	7 residents
Number of deaths in care home associated with COVID-19	6 resident deaths
Number of samples available in sequencing database	3 samples
Viral sequence lineages within the samples	2 UK lineages and 2 phylotypes
Conclusion of clinical and genomic analysis	Limited data but evidence that outbreak was not due to a single introduction and the pattern is not consistent with hospital introduction of infection.
Positive discharges without epidemiological association between hospital discharge and the start of a care home outbreak

This analysis looked at the 87 cases of people who were discharged from hospital into a care home whose last test was positive where the clinical data did not support an epidemiological association between the hospital discharge and care home outbreak in the timing of in the person's infection and the care home outbreak. In this analysis, we are looking for evidence that the person discharged from hospital led to a new introduction (i.e. a new strain) to the care home, in the presence of an ongoing outbreak.

The reason the clinical data did not support an association between the hospital discharge and the start of a care home outbreak is because:

- The person received their positive test either before hospital admission or at the time of their hospital admission, supporting community onset of infection **AND**
- The care home outbreak had started before the person was discharged from hospital **OR** the person had been positive for COVID-19 infection ≥15 days before the onset of the care home outbreak.

For 8 people, discharged to 5 care homes, there is sufficient sequencing data available to describe the care home outbreak in both clinical and genomic detail and a summary of these cases is presented.

Residents 4, 5 & 6 received a positive test for COVID-19 within 0-2 days of their admission to hospital D from care home 4, supporting care home onset of infection. Residents 4 and 5 were in hospital for 0-6 days. At the time of discharge resident 4 was within 0-2 days and resident 5 within 3-7 days of their first positive test. Resident 6 was in hospital for 14-20 days and was discharged 15 or more days since their first positive test.

Care home 4's outbreak had been ongoing for 15 or more days at the time of these residents' hospital admissions. In total, 63 residents received a laboratory confirmed positive test for COVID-19 and 21 residents who died had COVID-19 mentioned on their death certificate.

Resident 4, 5 & 6's sample are three of 38 samples available in the national sequencing database in association with care home 4. The three resident samples are from three distinct lineages, but all had been identified in other care home residents before residents 4, 5 & 6 were admitted to hospital. Two of these lineages were widespread in the community at the time of testing. The genomic data is consistent with multiple introductions of infection within this care home outbreak. The lineages seen in Residents 4, 5 & 6 were already present in samples from care home 4, so the distribution of infection is not consistent with these lineages being introduced by the discharges of these residents from hospital.

Timing of care home outbreak in relation to hospital discharges	Before hospital discharge
Onset of infection in people discharged from hospital	Care home onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	54 days
Number of laboratory confirmed resident cases	63 residents
Number of deaths in care home associated with COVID-19	21 resident deaths
Number of samples available in sequencing database	38 samples
Viral sequence lineages within the samples	5 UK lineages, 9 phylotypes
Conclusion of clinical and genomic analysis	Five UK lineages identified within the care home outbreak.
	Lineages present in care home before hospital discharges.

Resident 7 received a positive test for COVID-19 within 0-2 days after being admitted to hospital E, supporting care home onset of infection. They were in hospital for 0-6 days and were discharged back to care home 5. At the time of discharge it was 0-2 days since their first positive test for COVID-19.

Care home 5's outbreak had been ongoing for 15 or more days at the time of resident 7's admission to hospital. In total, 48 residents received a laboratory confirmed positive test for COVID-19 and 15 residents' who died had COVID-19 mentioned on their death certificate.

Resident 7's sample is one of 28 samples which had been sequenced in the national database for care home 5's outbreak. Two UK lineages were identified in this care home. The lineage found in resident 7 had already been identified in other residents in the care home before resident 7 was admitted to hospital. The two lineages in this outbreak were common across the region in care home and community samples.

The genomic analysis identifies that the lineage of Resident 7's infection was present in care home 5 before Resident 7 was discharged from hospital. The distribution of infection is not consistent with these lineages being introduced to care home 5 by Resident 7's hospital discharge.

Timing of care home outbreak in relation to hospital discharge	Before hospital discharge
Onset of infection in person discharged from hospital	Care home onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	36 days
Number of laboratory confirmed resident cases	48 residents
Number of deaths in care home associated with COVID-19	15 resident deaths
Number of samples available in sequencing database	28 samples
Viral sequence lineages within the samples	2 UK lineages, 7 phylotypes
Conclusion of clinical and genomic analysis	Two UK lineages identified circulating in region and in other care home outbreaks. Discharged resident lineage present in care home before hospital discharge.

<u>Outbreak 6</u>

Resident 8 received a positive test for COVID-19 before being admitted to hospital F, indicating care home onset of infection. They were in hospital for 0-6 days and were discharged back to care home 6. At the time of discharge it was 3-7 days since their first positive test for COVID-19.

Care home 6's outbreak had been ongoing for 15 or more days at the time of resident 8's admission to hospital. In total, 39 residents received a laboratory confirmed positive test for COVID-19 and 12 residents' who died had COVID-19 mentioned on their death certificate.

There are 26 samples in the national database which had been sequenced for this care home outbreak, including resident 8. The majority of samples were from the same UK lineage, although there was a later sample from a separate UK lineage. The main lineage had been prevalent in the region and in other care home outbreaks at the time. The genomic analysis identifies genomically indistinguishable samples that belong to the same phylotype were found in other residents in care home 6 up to 8 days before Resident 8 tested positive (in the care home) and before their hospital discharge. The distribution of infection is not consistent with the lineage being introduced to care home 6 by Resident 8's hospital discharge.

Timing of care home outbreak in relation to hospital discharge	Before hospital discharge
Onset of infection in person discharged from hospital	Care home onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	29 days
Number of laboratory confirmed resident cases	39 residents
Number of deaths in care home associated with COVID-19	12 resident deaths
Number of samples available in sequencing database	26 samples
Viral sequence lineages within the samples	2 UK lineages, 3 phylotypes
Conclusion of clinical and genomic analysis	Two UK lineages identified circulating in region and other care home outbreaks. Discharged resident lineage present in care home before hospital discharge.

Resident 9 and 10 both received a positive test for COVID-19 before being admitted to hospital G, indicating care home onset of infection. They were in hospital for 0-6 days and were discharged back to care home 7. At the time of discharge it was 8-14 days since their first positive test for COVID-19.

Care home 7's outbreak had been ongoing for 15 or more days at the time of resident 9 & 10's admissions to hospital. In total, 20 residents received a laboratory confirmed positive test for COVID-19 and 8 residents' who died had COVID-19 mentioned on their death certificate.

There were 16 samples which were available in the national sequencing database for this care home outbreak, including residents 9 & 10. These are all from the same UK lineage and have been identified in other care home outbreaks across multiple regions of Scotland. The genomic analysis identifies that the lineage of infection Residents 9 and 10 had were present in care home 7 before the residents tested positive for COVID-19 (in the care home). The distribution of infection is not consistent with this lineage being introduced to care home 7 by these residents' hospital discharge.

Timing of care home outbreak in relation to hospital discharges	Before hospital discharge
Onset of infection in people discharged from hospital	Care home onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	36 days
Number of laboratory confirmed resident cases	20 residents
Number of deaths in care home associated with COVID-19	8 resident deaths
Number of samples available in sequencing database	16 samples
Viral sequence lineages within the samples	1 UK lineage, 4 phylotypes
Conclusion of clinical and genomic analysis	One UK lineage identified which was prevalent in multiple regions of Scotland and in this outbreak. Discharged resident lineage present in care home before hospital discharge.

Resident 11 received a positive test for COVID-19 before being admitted to hospital H, indicating care home onset of infection. They were in hospital for 0-6 days and were discharged back to care home 8. At the time of discharge it was 8-14 days since their first positive test for COVID-19.

Care home 8's outbreak had been ongoing for 15 or more days at the time of resident 11's admission to hospital. In total, 25 residents received a laboratory confirmed positive test for COVID-19 and 9 residents' who died had COVID-19 mentioned on their death certificate.

There were 11 samples in the national database which had been sequenced for this care home outbreak, including resident 11. These are all from the same UK lineage and phylotype, prevalent in the region at the time. The genomic analysis identifies genomically indistinguishable samples that belong to the same phylotype were found in other residents in care home 8 up to 4 weeks before Resident 11 tested positive (in the care home) and before their hospital discharge. The distribution of infection is not consistent with the lineage being introduced to care home 8 by Resident 11's hospital discharge.

Timing of care home outbreak in relation to hospital discharge	Before hospital discharge
Onset of infection in person discharged from hospital	Care home onset
Duration of outbreak (days between first and last positive laboratory confirmed case)	42 days
Number of laboratory confirmed resident cases	25 residents
Number of deaths in care home associated with COVID-19	9 resident deaths
Number of samples available in sequencing database	11 samples
Viral sequence lineages within the samples	1 UK lineage, 1 phylotype
Conclusion of clinical and genomic analysis	Widespread UK lineage
	Discharged resident lineage present in care home before hospital discharge.

Conclusions of viral genomic sequencing analysis

There was only sufficient sequencing data in two care homes to examine whether a person discharged from hospital before the start of a care home outbreak could have been responsible for starting the care home outbreak. These findings are not consistent with hospital introduction of infection in these care homes.

There was sufficient sequencing data in five care homes to examine whether a person discharged from hospital after a care home outbreak had started, could have been responsible for a further introduction of infection to the care home. In all cases examined the viral lineages of the positive residents discharged from hospital were already present in the care homes before the person was discharged from hospital.

Whole genome sequencing is an informative tool in investigating outbreaks of infection where sufficient sampling has been undertaken and the genomic information can be compared to detailed epidemiological and clinical data. However, this analysis is limited by the lack of sequencing data available for the care home outbreaks and discharges of interest where we identified a possible or unclear epidemiological association between the hospital discharge and care home outbreak

The care home outbreaks examined commonly have sequences from prevailing community lineages and samples from other care home outbreaks in the region. However, these cases highlight the complex flow of people between care homes and hospitals and back again, requiring careful allocation of the onset of infection and understanding of patient journeys.

Reducing community prevalence of infection is critical to protect those living in care homes from COVID-19 infection

Strengths & limitations

Strengths of the analysis include the use of data from across Scotland to describe discharges from hospitals to care homes in the first phase of the COVID-19 pandemic. Using national data linked together and working with NHS Boards and Health and Social Care Partnerships to triangulate information was required to ensure a comprehensive analysis. The statistical method is based on a similar analysis done in Public Health Wales, and allows the analysis to account for multiple care home characteristics. This is important because different care home characteristics are related both to each other, and to the risk of an outbreak. Examining the risk of an outbreak for individual care home characteristics on their own may therefore be misleading.

However, there are some important limitations.

1. The work has not included data submitted by care homes themselves. It was not possible to organise a completely new national data collection within the timeframe for analysis given the additional burden this would place on the sector at a time of ongoing high care needs and other new data collection in the Turas Care Management Safety Huddle Tool. We attended a surgery with Scottish Care to engage with the sector around the methodology and planned analysis and presented the findings of the original publication in November 2020.

We therefore do not have any data on people admitted to care homes from their own homes or transferred from other care homes. Our focus was on examining hospital discharge, but we recognise that care homes may have received other new residents during the period examined.

2. We lack consistent data on positive tests from staff working in care homes. This is primarily a result of changing practice in terms of testing. In March and early April, tests were only performed on those being admitted to hospital and testing of care home staff in the community was rare. We therefore have minimal staff data in the period when most outbreaks started, and therefore did not include staff testing in the analysis.

3. These data are observational, meaning they can tell us what appeared to happen, but do not tell us what the direct cause was. We cannot model or predict what would have happened if everyone discharged to care homes had remained in hospital. The main analysis examines patterns of hospital discharge and the start of care home outbreaks, but even if an outbreak starts shortly after a hospital discharge, we cannot be certain that the hospital discharge caused an outbreak.

4. Viral genomic sequencing analysis can help inform judgements about causality. The genomic sequencing analyses in the updated report do not find evidence that the hospital discharges examined either caused a new care home outbreak or introduced a new viral lineage into a care home with an ongoing outbreak. However, the analysis is restricted to the very small number of outbreaks where viral genomic sequencing data was available in sufficient quantity to examine this.

5. Although care home size is the strongest predictor of care home outbreaks, we do not have data to explore why this is so. Care home size is a marker for the number of non-residents coming into the care home. During COVID-19, this includes staff and professional

visitors coming into care homes (and in normal times, also family and friends, although care homes were largely closed to family and friends during the period examined). Additionally, the layout and design of individual care homes is very varied, as is how staff rotas are organised. These kinds of factor are likely to be important influences on whether care home outbreaks develop and grow, but cannot be easily examined with the current data.

Recommendations

Data management & infrastructure

This report has highlighted major issues surrounding the availability of data about people in care homes.

- Work is progressing, and should be prioritised, to improve the systematic recording of information on hospital records to identify when a person is either admitted from or discharged to a care home. PHS are working with NHS Boards and IT System suppliers to enable the name of the care home to be recorded on admission and discharge. This will then be submitted to PHS as part of the routine datasets. Alongside this PHS are planning training materials and reminders about why it is vital for all staff to record this information accurately.
- Priority should be given to the development of an individual level national dataset collected by care homes themselves which records information on all people resident in a care home including temporary stays. This would allow a better understanding of the capacity and use of the sector, and allow linkage to other data sources to better understand resident needs and patterns of care.
- Seeding the CHI register with the Unique Property Reference Number (UPRN) would allow better analysis of location including care home residence. Public Health Scotland have started work in collaboration with the Improvement Service to seed CHI with UPRN. Current work to explore the accuracy and refine this process should be prioritised.
- Standardisation of look-ups used to define addresses in NHS Scotland would be helpful to ensure full and accurate address data are recorded in all NHS data that includes an address.

Further research

- In the original report, we recommended that additional statistical modelling would be valuable that also took account of rates of COVID-19 infection in the area that care homes are located in, and that examined care home characteristics associated with the size of an outbreak rather than just the presence of an outbreak. This work is in progress.
- Linkage of epidemiological data with genomic epidemiology data to define whether or not infections in care homes are the same viral strain as each other, and/or the same viral strain as in hospitals.
- Work involving care homes to understand their experiences of managing COVID-19 to learn from and share best practice in the sector.
- Further work to examine the nature and outcomes of care home outbreaks since July 2020 and in the remainder of 2021 would be valuable. Systematic linkage of epidemiological data to viral genomic sequencing data would be informative.

Glossary

Care Home	A Care Home as defined by the Care Inspectorate list of Adult Care Home services, available from: <u>https://www.careinspectorate.com/index.php/statistics-and-analysis/data-and-analysis</u>
Confidence Interval	Confidence intervals (CI) are a measure of the degree of certainty of a result. The upper and lower CI are a range of values that are likely to include the 'true' value with a certain degree of confidence (often 95% - i.e 5% chance of error). The wider the CI, the less accurate the result is, and it is influenced by the size of the sample/population you are measuring.
Delayed Discharge	A delayed discharge is a hospital inpatient (aged 18 and over) who has been judged clinically ready for discharge by the responsible clinician in consultation with all agencies involved in planning that person's discharge, and who continues to occupy a bed beyond the ready for discharge date, which is the date on which a hospital inpatient is clinically ready to move on to a more appropriate care setting.
Discharge	A hospital discharge marks the end of an episode of care. Discharges include deaths, transfers to other specialties/significant facilities and hospitals, and discharges home or to other regular place of residence. For this analysis, those with discharge of death were excluded.
ECOSS	Electronic Communication of Surveillance in Scotland. The ECOSS system captures lab results from diagnostic and reference laboratories for analysis by Health Protection surveillance teams. It's a national tool for monitoring organisms, infections and microbial intoxications that are of clinical or public health importance.
Emergency Admission	An emergency admission occurs when, for clinical reasons, a patient is admitted unexpectedly at the earliest possible time. This might be after a visit to a doctor, emergency department or calling an ambulance.
Episode	An SMR episode is generated when a patient is discharged from hospital but also when a patient is transferred between hospitals, significant facilities, specialties or to the care of a different consultant.
Geriatric Long Stay	Inpatients admitted to and discharged from facilities for Long Term Care of the Elderly.

Hazard Ratio	The relative risk of an event compared to a reference category. A hazard ratio of more than one means that the risk is increased compared to the reference category. A hazard ratio of less than one means the risk is decreased.
Inpatient	A patient is termed an inpatient when they occupy a staffed bed in a hospital and either remains overnight (whether intended or not), or is expected to remain overnight but is discharged earlier. An inpatient's admission can be an emergency, elective or a transfer.
Length of Stay	This is the total number of days that a patient spends in hospital during a continuous period of time in hospital.
Mean Age	The mean age is calculated by summing the ages of all discharges from hospital to care homes and dividing by the number of discharges to care homes.
Outbreak	Defined as a care home where one or more residents tested positive for COVID-19 based on a test taken in the care home.
SMR	Healthcare data for individual patients is collected as a series of Scottish Morbidity Records (SMR). The record type denotes the general type of healthcare received during an episode and/or the nature or status of the patient. e.g SMR01 – General/Acute, SMR04 – Mental Health.
Specialty	A specialty is defined as a division of medicine or dentistry covering a specific area of clinical activity.

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Further Information

Further information and data for this publication are available from the <u>publication page</u> on our website.

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Appendices

Appendix 1 – Timeline of Clinical Guidance

Full copies of guidance quoted are available from:

Archived Guidance from Health Protection Scotland: <u>https://www.hps.scot.nhs.uk/covid-19-guidance-archive/home/</u>

Current Guidance from Health Protection Scotland: <u>https://www.hps.scot.nhs.uk/a-to-z-of-topics/covid-19/</u>

Scottish Government Clinical and Practice Guidance for Adult Care Homes: <u>https://www.gov.scot/publications/coronavirus-covid-19-clinical-and-practice-guidance-for-adult-care-homes/</u>

Scottish Government, Coronavirus (COVID-19) update: Health Secretary's statement 21 April 2020: <u>https://www.gov.scot/publications/coronavirus-covid-19-update-health-secretarys-update-tuesday-21-april-2020/</u>

Date	Summary of Guidance
13/03/2020	Clinical Guidance for Nursing Home and Residential Care Residents and COVID- 19 issued, with the following relevant recommendations
	Measures to prevent and prepare for infection in residents It is recommended that long term care facilities be subject to 'social distancing' to reduce the risk of infecting residents and their carers and most significantly aims to reduce the mortality in this group. This should operate at 2 levels: (1) reducing visits to care homes to essential visits; and (2) social isolation in rooms.
	Transitions from hospital There are situations where long term care facilities have expressed concern about the risk of admissions from a hospital setting. In the early stages where the priority is maximising hospital capacity, steps should be taken to ensure that patients are screened clinically to ensure that people at risk are not transferred inappropriately but also that flows out from acute hospital are not hindered and where appropriate are expedited.
	Managing COVID-19 cases in long term care settings. Patients suspected of having symptoms of COVID-19 should be managed in line with other HPS guidance and specifically should be isolated in their own room. PPE equipment should be used as in line with other guidance for droplet spread precautions. Handwashing should continue rigorously in line with guidance elsewhere.
	It is not advised that residents in long term care are admitted to hospital for ongoing management but are managed within their current setting.
	Where a long term care facility is affected we should aim to deploy in-reach to bring care to residents. That may mean members of the community such as district nursing AHPs, GPs or where appropriate hospital at home. This will be considered in the context of business continuity planning of NHS Board's and Health and Social Care Partnerships where staff may be deployed to support care homes.
	Where a long term care facility has a resident who has tested positive for coronavirus, further admissions should be halted.

26/03/2020 Second Clinical Guidance for Nursing Home & Residential Care Residents and COVID-19

As stated above the care home sector is a vital part of the health and social care system. It is imperative that the care homes continue to take admissions if it is clinically safe to do so in order to prevent flows out from acute hospital being hindered and where appropriate expedited.

4.1 Admissions from the community to care home facilities

- HPS guidance states, prior to admissions the care home facility should:
 - source information on NHS Inform for current symptom and isolation advice, using the symptom and isolation checker
 - discuss with local senior facility healthcare staff and or a designated senior decision maker in the community prior to planned admission, including consideration of current isolation advice for that individual or the household from which they are being admitted.

HPS guidance also states that people being admitted from home / the community do not need to be tested for COVID-19 and should be managed based on symptoms.

4.2 Admissions/transfer from hospital to care home facilities

HPS updated guidance states that if the individual is deemed clinically well and suitable for discharge from hospital, they can be admitted to the facility after:

- appropriate clinical plan.
- risk assessment of their facility environment and provision of advice about selfisolation as appropriate (See NHS Inform for details).
- there are arrangements in place to return them to the facility

Decisions about any follow-up will be on a case by case basis.

If a patient being discharged from hospital is known to have had contact with other COVID-19 cases and is not displaying symptoms, secondary care staff must inform the receiving facility of the exposure and the receiving facility should ensure the exposed individual is isolated for 14 days following exposure to minimise the risk of a subsequent outbreak within the receiving facility.

Individuals being discharged from hospital do not routinely need confirmation of a negative COVID test. Facilities will be advised of recommended infection prevention and control measures on discharge. It is recommended that this includes a documented clinical risk assessment for COVID-19. Annex A contains a new admissions/ transfer form to provide a means for safely admitting a new resident and identifying that where possible they have been deemed clinically safe for transfer.

4.3 Advice on care home admissions where there are COVID-19 cases in homes The updated advice from HPS states that social or community care and residential settings may remain open to admissions in the following situations:

- Where a single case of laboratory confirmed COVD-19 has been identified and all appropriate infection prevention and control procedures are in place.
- Where more than 1 laboratory confirmed case has been identified and following risk assessment and discussion with the local Health Protection Team (HPT), it is possible to manage cases and ensure all appropriate infection prevention and control measures are in place.

Where there is evidence of a cluster or outbreak of COVID-19, senior facility staff should discuss this with the local HPT. An outbreak is defined as two or more clinical

	or laboratory confirmed cases of COVID-19 in a 24 hr period which have occurred as a result of cross transmission. In this situation the facility should close to admissions day care facilities and visitors. Any derivation from this should be done following a risk assessment with HPT as there may be exceptional circumstance where for example the schematic layout of the facility may allow for partial closure.
11/04/2020	Health Protection Scotland Guidance for stepdown of infection control precautions and discharging COVID-19 patients from hospital to residential settings (Version 1.0) Discharge to a single occupancy room in care facility, including nursing homes and residential homes
	This can be done when the patient's clinical status is appropriate for discharge, e.g. once assessed to have stable or recovering respiratory function, and any ongoing care needs can be met in their care facility. A risk assessment of the discharge location should be made. For example, if a patient is being discharged to a residential care setting where strict isolation is expected to be challenging, then confirmation of viral clearance may be sought.
	Patients should continue to be isolated for a minimum of 14 days from symptom onset (or first positive tests if symptom onset undetermined) and absence of fever for 48 hours (without use of anti-pyretics)
21/04/2020	Jeane Freeman, Cabinet Secretary for Health and Sport announces to the Scottish Parliament:
	Covid-19 patients discharged from hospital to a care home should have given two negative tests before discharge. I now expect other new admissions to care homes to be tested and isolated for 14 days in addition to the clear social distancing measures the guidance sets out.
26/04/2020	Guidance for stepdown of infection control precautions and discharging COVID- 19 patients from hospital to residential settings (Version 1.1) Patients being discharged into a care facility (residential or care home) must have 2 negative samples, prior to discharge.
	Discharge to a single occupancy room in care facility, including nursing homes and residential homes. This can be done when the patient has completed their 14 day isolation period and had two negative COVID-19 tests and the patient's clinical status is appropriate for discharge, e.g. once assessed to have stable or recovering respiratory function, and any ongoing care needs can be met in their care facility. A risk assessment of the discharge location should be made.
29/04/2020	Guidance for stepdown of infection control precautions and discharging COVID- 19 patients from hospital to residential settings (Version 1.2) Patients should always be isolated for a minimum of 14 days from symptom onset (or first positive test if symptoms onset undetermined) and absence of fever for 48 hours (without use of antipyretics). They should have 2 negative tests before discharge (testing can be commenced on day 8). Tests should be taken at least 24 hours apart. Where testing is not possible (e.g. patient doesn't consent or it would cause distress) and if discharged to care home within the 14-day isolation period then there must be an agreed care plan for the remaining period of isolation up to 14 days. They can be discharged once the patient's clinical status is appropriate for discharge, e.g. once assessed to have stable or recovering respiratory function, and any ongoing care

needs can be met in their care facility. A risk assessment of the discharge location should be made. The patient may complete the remaining 14-day isolation in the care home or in hospital depending upon clinical suitability for discharge.

HPS updated guidance: 2 negative tests before discharge (testing can be commenced on day 8). Tests should be taken at least 24 hours apart. Where testing is not possible (e.g. patient doesn't consent or it would cause distress) and if discharged to care home within the 14 day isolation period, then there must be an agreed care plan for the remaining period of isolation up to 14 days. And completion of the remaining 14-day isolation in the care home or in hospital depending upon clinical suitability for discharge

Note: an admission to hospital is considered to include only those patients who are admitted to a ward. An attendance at A&E that didn't result in an admission would not constitute an admission.

15/05/2020 Third National Clinical and Practice Guidance for Adult Care Homes in Scotland during the COVID-19 Pandemic

10. Admissions, discharges and transfers for care home during this pandemic The care home sector is a vital part of the health and social care system. It is imperative that the care homes put in place clear processes to facilitate the return of their residents from an acute setting and to accommodate the admission of new residents where it is clinically safe to do so. Residents can be safely cared for in a care home. The HPS guidance on care home settings can help support care homes to do this. All transfers from acute hospital or new admissions should have a risk assessment to ensure sufficient resources are available within the care home to support social distancing and isolation.

The Health Secretary's statement on 21 April stated that the following groups should be tested:

- All COVID-19 patients in hospital who are to be admitted to a care home
- All other admissions to care homes

The presumption should be that all residents being admitted to a care home should have a negative test before admission unless it is in the clinical interests of the person to be moved and then only after a full risk assessment.

Admission of COVID-19 recovered patients from hospital

Patients should always be isolated for a minimum of 14 days from symptom onset (or first positive test if symptoms onset undetermined) and absence of fever for 48 hours (without use of antipyretics). They do not require to spend the 14 days in hospital but should ideally have 2 negative tests before discharge from hospital (testing can be commenced on day 8). Tests should have been taken at least 24 hours apart and preferably within 48 hours of discharge. Where testing is not possible (e.g. patient doesn't consent or it would cause distress) and following risk assessment for discharge to care home within the 14 day isolation period, then there must be an agreed care plan for the remaining period of isolation up to 14 days in the home.

For an adult without the capacity to consent to this test, the responsible clinician will have to consult the patient's welfare attorney and crucially decide if the test is the best interest of the patient - this would be an individual clinical decision. Where a test would be too painful or distressing and not in the interest of a patient it would be

reasonable to return to the care home after discussion with the Home manager/senior staff. The individual would have to continue the 14 days of isolation in the care home.

In all instances, the discharging hospital should provide the care home with the following information on arrival of the individual:

- Where a COVID test has been taken, the date and results of the test. (Dates of a negative test in a non-COVID-19 infected individual, or the dates of two negative tests in a previously infected individual)
- The date of the onset of any symptoms.
- A care plan for completion of the isolation period and any follow-up treatment and care required.
- Prior to discharge the hospital must ensure that the care home is able to provide the care required e.g. if the individual requires to be isolated, that there is a suitable physical space and staff available for the delivery of care and support to an isolated resident.

Admission of non-COVID-19 patients from hospital

Testing should be done within 48 hours prior to discharge from hospital. A single test is sufficient. The patient may be discharged to the care home prior to the test result being available on condition that the care home is able to support all required care needs during this isolation period following discharge. Risk assessment prior to discharge from hospital should be undertaken in conjunction with care home staff to ensure that appropriate isolation facilities are available in the care home, taking into account requirements for the individual's care. See Guidance for Sampling and Laboratory Investigations for information.

Admissions from the community

All other admissions from the community should have at least one test performed before or on admission, and be isolated on admission for 14 days. Risk assessment prior to admission should be undertaken to ensure that appropriate isolation facilities are available in the care home, taking into account requirements for the individual's care.

New admissions should be considered for retesting if they become symptomatic including changes in the residents condition if indicated following a clinical assessment, after admission. The 14 day isolation period commenced on admission must be completed, even if a COVID-19 test result comes back negative. Staff should be alert to COVID-19 infection in older people in particular as it may be harder to detect (see earlier section on presentation). Where concerns exist that a resident may have COVID-19, they should be escalated and advice sought from the GP or other healthcare staff.

Transfer from the care home to hospital

If a transfer from the care home to hospital is required, the ambulance service must be informed if the individual is a suspected or confirmed COVID-19. Staff in the receiving ward/department should also be notified of this in advance of any transfer.

Hospital assessment of care home residents

Patients from a care home setting being assessed in an Acute Medical Unit (or other assessment unit) not requiring hospital admission only require COVID testing prior to discharge if they are clinically suspected of having COVID If they are admitted for another reason (e.g. a blocked catheter or a suspected DVT) with no clinical suspicion of COVID infection, then routine testing is not mandated. Clinicians should clearly stay alert to the fact that COVID frequently presents with atypical symptoms in the elderly.

Testing does not preclude the patient being discharged back to their care home, but they should isolate until the result is known (and the ability of the care home to undertake this should be confirmed prior to discharge). If the patient is still felt, clinically, to have COVID despite a negative test then they should be retested and continue isolation for 14 days as a subsequent test may be the confirmatory trigger for outbreak management. The need for isolation must be communicated to the care home in this circumstance. There may be circumstances where the risk assessment following discussion with the resident and/ or their family, that it is in the best interests of the resident to be transferred before the test is available.

Wherever possible patients from care homes should be assessed in side rooms or individual assessment bays. If a patient from a care home has been assessed in a multi-person bay in hospital then they should be isolated on return to the care home for fourteen days. The ability of the care home to undertake this should be confirmed prior to discharge.

Residents who leave the facility to attend an essential non-hospital or hospital day visit, e.g. attending a funeral or hospital appointment, do not require the same measures as a new admission. The guidance outlined on NHS Inform on physical distancing, shielding and household isolation must be followed during day visits. Any concerns about potential exposure to COVID-19 during a day visit may require a local risk assessment to determine whether additional measures are needed.

Appendix 2 – Publication Metadata

Metadata Indicator	Description
Publication title	Discharges from NHSScotland Hospitals to Care Homes between 1 March and 31 May 2020 – Revised 21 April 2021
Description	This publication has three sections: Section 1 reports on the number of patients discharged from NHS hospitals to care homes between 1 March and 31 May 2020, and their COVID-19 test status. Section 2 reports on the impact of these hospital discharges on care homes, and any subsequent COVID-19 outbreaks. Section 3 reports on outcomes withn 30 days of discharge, classification of discharges based on pre-hospital residency (where people lived before they were admitted to hospital); and analysis of those individuals whose last positive test before discharge was positive (including relationship with care home outbreaks).
Theme	Health and Social Care
Торіс	Hospital Discharges and Care Homes
Format	PDF, Excel
Data source(s)	SMR01,01E (acute and geriatric long stay), SMR04 (psychiatry), RAPID (preliminary inpatient records), Delayed Discharges, Patient Transport Service (PTS), CHI (institution flag), National Records of Scotland (deaths), Care Inspectorate list of care homes, HSCP list of temporary placements
Date that data are acquired	September 2020
Release date	28 October 2020 Revised 21 April 2021
Frequency	One off report
Timeframe of data and timeliness	Discharges between 1 March and 31 May 2020, as at September 2020.
Continuity of data	N/A
Revisions statement	N/A
Revisions relevant to this publication	N/A
Concepts and definitions	Please see the <u>Glossary</u> section within this report and the excel data tables which accompany this publication. There is also a detailed <u>methodology</u> document to accompany this publication.
Relevance and key uses of the statistics	To report on the number of discharges to care homes during the first wave of the COVID-19 pandemic in Scotland, and the response to changing COVID- 19 testing practices and policy around discharges to care homes. To examine whether discharges from hospital to care homes had any impact on COVID-19 outbreaks in care homes
Accuracy	Please refer to the data validation section of the methodology report
Completeness	Please refer to the data validation section of the methodology report
Comparability	This is a one off publication using unique linkage of multiple datasets, so is not comparable with other published data section 2 statistical methodology similar to Public Health Wales report
Accessibility	It is the policy of Public Health Scotland to make its web sites and products accessible according to <u>published guidelines</u> .
Coherence and clarity	Measures to enhance coherence & clarity within this report include: explanatory table/chart notes, minimal use of abbreviations/abbreviations explained in text and notes on background and methodology.
Value type and unit of measurement	Figures are shown as numbers or percentages

Disclosure	Disclosure control methods have been applied to the data in order to protect patient confidentiality, therefore some figures may not be additive. The PHS protocol on <u>Statistical Disclosure Protocol</u> is followed.
Official Statistics designation	Management statistics
UK Statistics Authority Assessment	Not been put forward for assessment
Last published	not applicable
Next published	not applicable
Date of first publication	28 October 2020; Revised 21 April 2021
Help email	
Date form completed	13/04/2021

Appendix 3 – Early access details

Pre-Release Access

Under terms of the "Pre-Release Access to Official Statistics (Scotland) Order 2008", PHS 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 Mental Health and Social Care Directorate

NHS Board Chief Executives

NHS Board Communication leads

Chief Officers of Integrated Joint Boards formed under the Public Bodies (Joint Working) (Scotland) Act 2014

Early Access for Management Information

These statistics will also have been made available to those who needed access to 'management information', ie as part of the delivery of health and care:

Care Inspectorate

Early Access for Quality Assurance

These statistics will also have been made available to those who needed access to help quality assure the publication:

NHS Boards

Scottish Government Mental Health & Social Care Directorate

Appendix 4 – PHS and Official Statistics

About Public Health Scotland (PHS)

PHS is a knowledge-based and intelligence driven organisation with a critical reliance on data and information to enable it to be an independent voice for the public's health, leading collaboratively and effectively across the Scottish public health system, accountable at local and national levels, and providing leadership and focus for achieving better health and wellbeing outcomes for the population. Our statistics comply with the Code of Practice for Statistics in terms of trustworthiness, high quality and public value. This also means that we keep data secure at all stages, through collection, processing, analysis and output production, and adhere to the 'five safes'.