



## Mortality associated with COVID-19 outbreaks in care homes: early international evidence

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### Key findings:

- Official data on the numbers of deaths among care home residents linked to COVID-19 is not available in many countries but an increasing number of countries are publishing data
- Due to differences in testing availabilities and policies, and to different approaches to recording deaths, international comparisons are difficult
- There are three main approaches to measuring deaths in relation to COVID-19: **deaths of people who test positive** (before or after their death), **deaths of people suspected** to have COVID-19 (based on symptoms) and **excess deaths** (comparing total number of deaths with those in the same weeks in previous years).
- Data from 3 epidemiological studies in the United States shows that as many as half of people with COVID-19 infections in care homes were asymptomatic (or pre-symptomatic) at the time of testing. New data from Belgium shows that **73% of staff and 69% of residents who tested positive were asymptomatic**.
- Official data from 7 countries suggests that the share of care home residents whose deaths are linked to COVID-19 is much **lower in 2 countries where there have been fewer deaths** in total (14% in Australia, where there have been 63 deaths, and 20% in Singapore, where there have been 10 deaths).
- In the remaining 5 countries for which we have official data (Belgium, Canada, France, Ireland and Norway), and where the number of total deaths ranges from 136 to 17,167, the **% of COVID-related deaths in care homes ranges from 49% to 64%**.
- Data reported by media as coming from official sources for Portugal and Spain suggests rates of 33% and 53% respectively.
- The authors have considered that it is not possible to draw accurate estimates from the data that is currently in public domain in the United Kingdom.

### **1. Measuring the impact of COVID-19 on care home residents and staff: imperfect and limited data, but essential for resource allocation decisions**

There is growing international evidence that people living in care homes are particularly vulnerable to severe COVID-19 infections and that they are experiencing high rates of mortality as a result. There are also numerous examples from those countries of care homes becoming unviable as not enough staff is available due to sickness and self-isolation measures. This document uses “care homes” for all non-acute residential and nursing facilities that house people with some form of long-

term care needs. It is important to note that what is considered a care home is different in most countries.

The impact of COVID-19 on residents and staff has become apparent in two ways: distressing news reports of care homes becoming overwhelmed due to large number of deaths in a short amount of time and too many staff members being either sick or self-isolating, and, increasingly, estimates of deaths of care home residents.

Very few countries appear to be testing people in care homes (staff and residents) systematically. This makes it very difficult to estimate the numbers of people with COVID-19 infections and also to count how many care home residents and staff have died as a result of infection. Given this lack of consistent testing, it appears that the best way to estimate the mortality impact of COVID-19 in care homes will be by comparing mortality data from the period of the pandemic to mortality in previous years at the same time of the year to determine the amount of excess mortality. Not all of the excess mortality will be due to COVID-19, but it is increasingly apparent that there may be indirect deaths associated with COVID-19 (perhaps due to people not using health care services for other conditions, or due to difficulties linked to social isolation measures). Another difficulty in comparing data on deaths is that in some countries the data only records the place of death, while others also report deaths in hospital of care home residents. There may also be differences in the extent to which care home residents are transferred to hospital or not.

In the meantime, it is important to ensure that the levels of infections and deaths of care residents and staff are not ignored, and there is a danger that, by not attempting to measure them even if imperfectly, opportunities to inform the decisions that policymakers make, in terms of resource allocations to the care sector, may be missed.

This document, which will be updated and improved as new information and data become available, summarises information from three types of sources: epidemiological studies, official estimates and news reports.

## **2. Epidemiological studies**

As of the 11<sup>th</sup> April, there are 3 epidemiological studies of COVID-19 in care homes (this is based on a rapid search, a systematic review protocol is under development). All 3 studies are from the United States and have been carried by Public Health-Seattle and King County (PHSKC) and the Centers for Disease Control and Prevention (CDC).

The first study was carried out following the identification of a resident with COVID-19 in a skilled nursing facility on the 28th February (1). The study involved the investigation of a cluster of COVID-19-like illness. Data was collected on symptoms, severity, coexisting conditions, travel history and close contacts with known COVID-19 and diagnostic testing (which was conducted according to CDC guidelines). The study contacted at least 100 facilities in the same county and gathered information on clusters of influenza-like illness among residents and staff. Data was also collected on emergency medical transfers to acute care to identify influenza-like illness. All facilities with a high risk of COVID-19 were visited and those with influenza-like illnesses were tested. The facilities were given infection control assessments, training and support.

Testing identified a total of 4 cases of COVID-19 on the 28th February, including the initial resident and a member of staff. On the 18th of March there were 167 persons with COVID-19 that were epidemiologically linked to the first facility. Of these, 101 were residents, 50 were staff and 16 were visitors and, by that date, 34 residents and 1 visitor had died. Another 30 facilities were found to

have at least one confirmed COVID-19 case. At least 3 facilities had clear epidemiological links with the first facility where the outbreak was identified. Two of the facilities had staff that also worked in the first facility, and a third facility had received two patient transfers from the first.

The authors acknowledged two key limitations of the study: first, some infections would have been missed as not all residents and staff were interviewed and tested for COVID-19, particularly those who were pre-symptomatic or asymptomatic. Second, there were no complete records of visitors to the first facility, so some infections among visitors are likely to have been missed.

This study identified the following factors as contributors to the spread of COVID-19 in care facilities:

- Staff who worked while symptomatic
- Staff who worked in more than one facility
- Inadequate familiarity with and adherence to Personal Protection Equipment (PPE) guidance
- Challenges to implementing proper infection control practices, including inadequate supplies of PPE and alcohol-based hand sanitizer
- Delayed recognition of access due to low index of suspicion
- Limited availability of testing
- Difficulty identifying persons with COVID-19 on the basis of signs and symptoms alone

The second study, also conducted by the CDC involved testing 76 (93%) residents in a skilled nursing facility where there was an outbreak of COVID-19. They found that 23 (30%) residents tested positive. Of these, 10 (43%) had symptoms on the date of the test. The remaining 13 (57%) were asymptomatic. 7 days after testing, 10 out of 13 of the asymptomatic residents had developed symptoms. This study suggests that symptom-based screening in long-term care facilities could fail to identify approximately half of residents with COVID-19 (2).

The third study took place in an assisted living community in Seattle, following the hospitalization of 2 residents with confirmed COVID-19 infection on the 5<sup>th</sup> of March (3). On the 6<sup>th</sup> of March social distancing and other preventative measures were implemented. PHSKC and the CDC tested all residents and staff members on the 10<sup>th</sup> of March and also asked them to complete a questionnaire about their symptoms. The tests were repeated 7 days later. 3 out of 80 residents (3.8%) and 2 out of 62 staff members (3.2%) tested positive. The three residents had no symptoms at the time of testing, although one had had a cough earlier. A fourth resident who had tested negative in the first test, did test positive in the second (7 days later). This resident was asymptomatic on both days. The authors had expected to find larger numbers of cases, in part because of the results found in the previous two studies in skilled nursing facilities. They speculate that this may have been due to better opportunities for social isolation measures to be effective in assisted living facilities (where residents live in their own apartments), and also due to less frequent contact with health care providers. The authors also conclude that symptom screening is unlikely to be sufficient to identify people with COVID-19 infections.

### **3. International data on mortality associated with COVID-19 among care home residents**

This section aims to collect the latest information available from a number of countries and will be updated regularly as new information becomes available.

It is very important to note that the data reported here are not comparable. Data from official sources have been used where possible, and, when not available, information from news reports has been collected. There are a number of caveats that should be noted:

- We only have information for a few countries so far (please email [a.comas@lse.ac.uk](mailto:a.comas@lse.ac.uk) if you can contribute)
- The systems for recording deaths linked to COVID-19 in care homes (and the definition of what is a care home) vary between different countries and even regions.

### **Australia:**

Australia first published deaths linked to COVID-19 in care homes on the 15<sup>th</sup> of April, as well as deaths among users of home care services. On the 16<sup>th</sup> of April, Australia has had a total of 63 deaths, of these 9 (14.2%) were care home residents and 1 was a person who used publicly subsidized home care(4).

### **Belgium:**

Belgium first reported official estimates of the number of deaths in care homes on the 11<sup>th</sup> April. The data is collected by Sciensano, a public research institution, which publishes very detailed epidemiological daily reports on COVID-19 (5). They include data on the number of deaths in care homes (“maisons de repos”). As of April 15, reports have also included the number of tests done within care homes.

On the 16<sup>th</sup> of April there had been 4,857 deaths linked to COVID-19 in Belgium, of these, 2,387 happened in care homes (49.1%). In the last 24 hours another 417 deaths had been added, of which 289 (69.3%) were in care homes. The report also includes suspected cases and, of the total deaths, 94% of all care home deaths were suspected cases, only 6.5% had been confirmed. In the last 24 hours, 31% of deaths in care homes were confirmed cases of COVID-19. The reported % of deaths in care homes has increased since the first date these data were published, from 42% on the 11<sup>th</sup> April to 49% on the 16<sup>th</sup>.

The report also contains data on the numbers of care home staff and residents that have been tested since the 10<sup>th</sup> of April. A total of 13,544 tests were done, 7,146 to staff (13% were positive, and of these, 73.3% were asymptomatic) and 6,398 to residents (20% were positive and of these, 69.0% were asymptomatic).

### **Canada:**

On March 5, the first outbreak in a Canadian long-term care home was reported in the province of British Columbia (BC), where a staff member at the Lynn Valley Care Centre in Vancouver had tested positive for COVID-19(6). On March 8, a resident at the home became the first Canadian to die from COVID-19. Since early March, BC’s Provincial Health Officer, Dr. Bonnie Henry, has provided regular updates to the public on the number of cases and deaths in care homes through press conferences. Similarly, many other provincial medical officers of health and premiers have provided frequent updates on the spread of COVID-19 in Canadian care homes. However, it was not until recently that reports about care homes have been presented systematically as part of the province’s epidemiological reports, such as the ones produced by the BC Centre for Disease Control(7) starting on March 23 and Public Health Ontario on March 31(8). Quebec is the latest province to disclose the number of cases and deaths of residents in long-term care homes, as of April 13(9). Other Canadian provinces and territories have had either no cases or [too few cases in long-term care homes](#) to provide meaningful estimates (10).

In British Columbia, the most recent published rates by the BC Centre for Disease Control(7) as well as the official update from the provincial health officer on April 12(11) illustrate a total of 64 deaths as a result of COVID-19, of which 30 (47%) were people residing in long-term care homes, assisted and independent living establishments. On that day, there was a total of 1,470 confirmed cases of COVID-19 in the province, of which 153 (10%) were in these establishments.

In Alberta, the most recent published estimates of April 14 are based on a collection of websites of long-term care homes and statements from the Premier and public health officers(12). These estimates showcase a total of 48 deaths as a result of COVID-19, of which 30 (62.5%) were people requiring 24h per day care through long-term care services. On that day, there were a total of 1,870 confirmed cases of COVID-19 in the province, of which 214 (11%) were in long-term care homes.

In Ontario, the most recently published numbers by Public Health Ontario on April 14 are based on data exclusively originating from long-term care homes, which offer services to all individuals requiring care 24h per day. These estimates report a total of 385 deaths as a result of COVID-19, of which 144 (37%) were people living in long-term care homes. On that day, there was a total 8,447 cases of COVID-19 in the province, with 834 (10%) confirmed cases in long-term care residents and 453 (5%) in long-term care staff members.

Quebec is the province with the most cases and the most deaths related to COVID-19 in Canada. According to the most up-to-date estimates from both governmental and media releases on April 14, a total of 435 deaths as a result of COVID-19 occurred in the province, of which 305 (70%) were people living in long-term care homes. In Quebec, long-term care homes include individuals residing both in independent and assisted living establishments. On that day, a total of 14,248 cases of COVID-19 were confirmed in the province, of which 2,356 were people living in long-term care homes (9,13,14).

The great majority of COVID-19 cases and deaths in Canada are in British Columbia, Alberta, Ontario and Quebec. Including the 2 additional deaths from long-term care home residents in Nova Scotia(15) and Manitoba(16), a total of 511 Canadians living in long-term care homes have died thus far as a result of COVID-19. Compared to the 903 deaths reported as of 14<sup>th</sup> April by the Public Health Agency of Canada(17) which would correspond to approximately 57% of all COVID-19 deaths in the country.

#### **France:**

France first published official death estimates for people in care homes on the 31<sup>st</sup> of March, then again on the 7<sup>th</sup> April and, from the 12<sup>th</sup> of April the figures are available daily. The % of all deaths among care home residents has ranged from 39.2% to 49.4%).

The most recent numbers published by the Ministry of Health on the 15<sup>th</sup> of April declared a total of 17,167 deaths as a result of COVID-19, of which 8,479 (49.4%) were residents in care homes<sup>1</sup>. Of these, 6,524 died in care homes and 1,955 in hospital (18). There had been 106,206 cases of confirmed COVID-19 infections, of these, 41,657 were care home residents.

#### **Ireland**

Ireland has a centralised system to collect epidemiological information in relation to cases of COVID-19 infections (19). All deaths, in all care settings and dwellings, related to COVID-19 that are notified to the Health Prevention Surveillance Centre are included in the official count of deaths. The number

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<sup>1</sup> établissements sociaux et médico-sociaux (ESMS)

of notified deaths in care homes is not published in the daily epidemiology reports (20), however, deaths in nursing homes have been mentioned in some of the National Public Health Emergency Team (NPHET) daily press briefing by the Chief Medical Officer and are picked up by the press<sup>2</sup>.

As at the 13<sup>th</sup> April, Ireland had registered 12,547 cases of COVID-19 and 444 deaths, of which 245 (55.2%) were linked to nursing home residents. The total number of nursing home places is 31,000, so the rate of mortality would be 0.5%. As of the same date, Ireland had identified a total of 413 clusters<sup>3</sup> of COVID-19, of which 236 (57%) were in care homes<sup>4</sup> (20). The % of deaths in nursing homes on the previous dates we have data for were: 54.2% as announced on 10<sup>th</sup> April and 45.8% as announced on the 13<sup>th</sup>.

### **Italy**

The most recent official source is a preliminary report of the National Institute of Health (21) published on the 6<sup>th</sup> of April based on a survey sent to 2,166 of the 4,629 care homes for older people in Italy. At the time it was published, 577 homes, with 44,457 residents, responded (26% of those invited to take part in the survey, and just over 10% of all care homes in Italy). Between the 1st February and the 6<sup>th</sup> of April, there were 3,859 deaths in the homes that responded, about 8.6% of residents, with regional differences, for example 13.1% in Lombardy and 7.0% in Veneto. It is estimated that 37.4% of these deaths were associated with COVID-19 (3.2% of the total number of residents). There is more information about how COVID-19 has impacted people using and providing long-term care in Italy in the [country report](#) published in LTCcovid.org (22).

### **Norway<sup>5</sup>**

On the 15th of April The Norwegian Institute of Public Health published data on the number of deaths linked to COVID-19 that have occurred in institutions/care homes. This has since been included in their daily report (23,24) published every day at 1pm. The most recent report from the 16th of April states that they have been notified of 136 COVID-19 deaths. Of these, 44 deaths (32.3%) occurred in hospitals, 87 (63.9%) in health institutions (care homes and other institutions) and 5 (3.7%) in private homes. The Norwegian newspaper VG publishes detailed data on the location of all deaths, including care homes (25).

### **Portugal**

The Portuguese Government has not shared the number of deaths in nursing homes. However, a newspaper reported that the Minister for Health announced on the 15<sup>th</sup> of April that the number of deaths in nursing homes was around a third of the total deaths from COVID-19 in the country. On that date, the total number of deaths was 567, and therefore the number of people living in nursing homes whose deaths were linked to COVID-19 would amount to 187 (26).

### **Singapore<sup>6</sup>**

The Ministry of Health centrally collects and publishes epidemiological information about COVID-19 on a daily basis(27). As of April 16, 2020, there are 4,427 confirmed cases of COVID-19 infection and 10 deaths (0.23%). There were 15 confirmed cases who were nursing home residents (0.34%), living in 3 different nursing homes, and 2 deaths. The deaths among nursing home residents represented 20% of the total number of deaths among people with confirmed COVID-19 infections.

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<sup>2</sup> The authors are very grateful to Maria Pierce for keeping a record and providing us with the figures

<sup>3</sup> Defined as 2-3 or more cases in the same setting within a 72 hour period

<sup>4</sup> Including nursing homes, residential institutions, community hospitals and long-stay units

<sup>5</sup> With thanks to Norwegian newspaper VG

<sup>6</sup> With thanks to Wong Chek Hooi and Wan Chen K Graham

## **Spain**

There are no official estimates for COVID-19-related mortality in care homes in Spain, but the media have shared information sent by the regional governments to the Ministry of Health on the number of deaths. The latest data published by the main national public television estimates that, on the 16<sup>th</sup> April, out of the 19,516 linked to COVID-19 in Spain, 10,924 (52.7%) were care home residents (28).

## **United Kingdom**

The official death counts for COVID-19 only include people who die in hospital and had tested positive. The death count published on the 16<sup>th</sup> of April, for the 15<sup>th</sup> of April was for 13,729 in the United Kingdom (of which 12,395 in England, 140 in Northern Ireland, 699 in Scotland and 495 in Wales) (29). There are sources of data from statistics of death registrations in care homes for England and Scotland, but these data are considered to under-estimate the number of deaths in care homes and not used for official counts of COVID-related deaths.

### *England*

Currently the only publicly available source of data covering deaths in care homes in England are the Office for National Statistics statistical bulletins, which include deaths where the register mentioned “novel coronavirus (COVID-19)”. The latest data, published on the 14<sup>th</sup> April (30), covered deaths until the 3<sup>rd</sup> of April, these accounted for 3,716 deaths, and of these, 217 deaths (5.8%) happened in care homes (as well as 33 in hospices and 136 in private homes). The same statistical bulletin also reports that, in the previous week, there had been 6,082 “excess” deaths, compared to the five year average. This latter figure is more likely to accurately reflect the mortality impact of COVID-19 but on the 16<sup>th</sup> of April it had not been possible to obtain a breakdown of how many of those estimated excess deaths would have happened in care homes.

### *Scotland<sup>7</sup>*

The care Inspectorate revealed that around 470 care homes (over 40% of the total) in Scotland had recorded cases of COVID-19 (31). And, whereas the daily data on deaths refer only to symptomatic cases recorded in hospitals, National Records of Scotland (NRS) publishes a weekly analysis of death registrations which mention COVID-19 in the death certificate. This measure captures COVID-related deaths in care homes and other settings as well as those in hospital. Data for the period up to April 13 show that of the 962 deaths registered in Scotland by that date, 237 (24.6%) were in care homes (32).

The NRS dataset also includes information on date of death as well as date of registration. Registration can occur several days after date of death. For example, on April 5, 633 deaths had occurred, but only 354 had been registered. Actual deaths invariably exceeds registered deaths.

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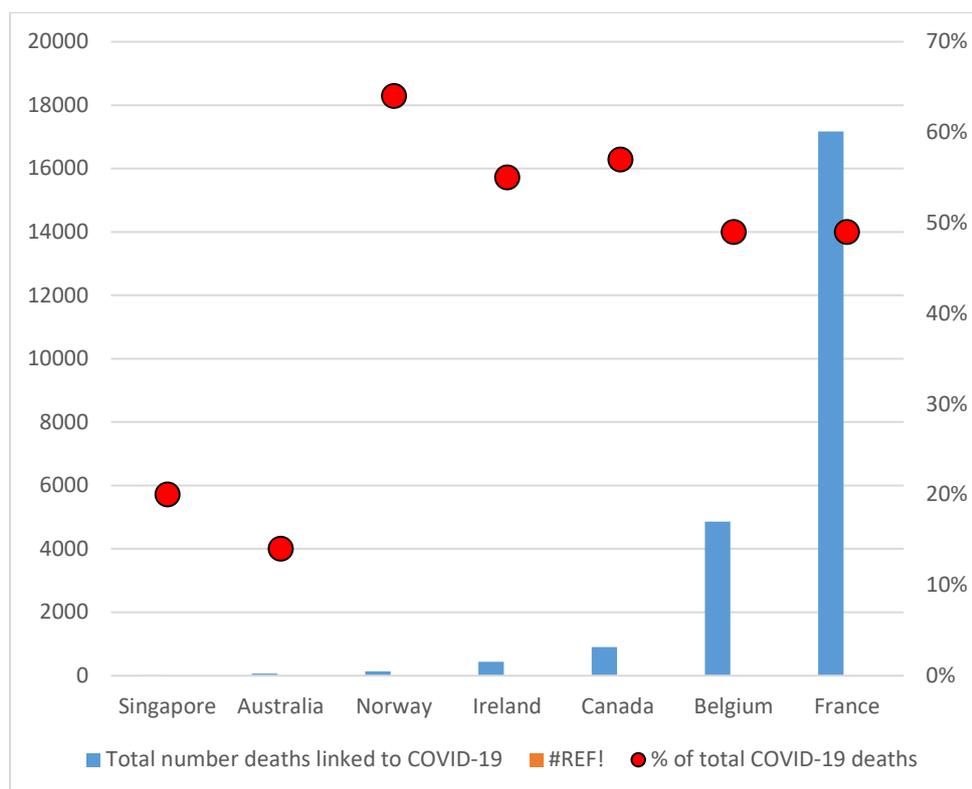
<sup>7</sup> With thanks to David Bell

**Comparison table:**

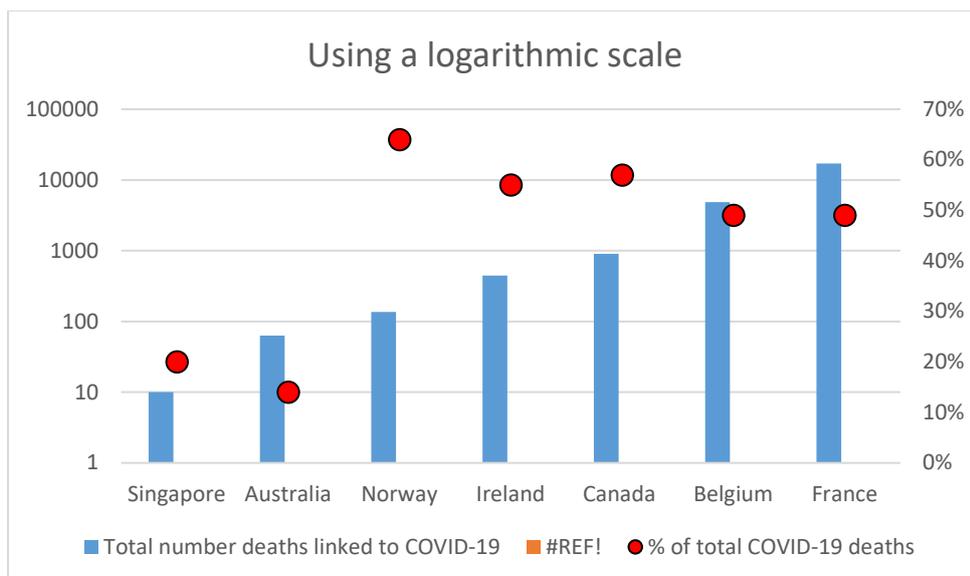
This table summarises the most recent data from official sources gathered in this document so far, but needs to be interpreted with the limitations and caveats described above.

Country	Date	Total number deaths linked to COVID-19	Number of deaths of care home residents linked to COVID-19	% of total COVID-19 deaths
Australia	16/04/2020	63	9	14%
Belgium	16/04/2020	4,857	2,387	49%
Canada	14/04/2020	903	511	57%
France	15/04/2020	17,167	8,479	49%
Ireland	13/04/2020	444	245	55%
Norway	16/04/2020	136	87	64%
Singapore	16/04/2020	10	2	20%

In these graphs we have presented the same data from official sources, comparing the total numbers of deaths linked to COVID-19 and the share of COVID-19 related deaths among care home residents. When data from more countries becomes available we may be able to analyse the relationship between the total numbers of death in a country and the share of those deaths among care home residents.



The same data is presented here using a logarithmic scale, to make the countries with smaller numbers more visible:



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