



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

and these could have different sensitivities, affecting the generalizability of the results.

Overall, our results suggest RT-PCR for SARS-CoV-2 by nasopharyngeal swab has a high sensitivity in this cohort of older long-term care home residents.

References

1. Woloshin S, Patel N, Kesselheim AS. False negative tests for SARS-CoV-2 infection – challenges and implications. *N Engl J Med* 2020;383:e38.
2. Ai T, Yang T, Hou H, et al. Correlation of chest CT and RT-PCR testing in Coronavirus Disease 2019 (COVID-19) in China: A report of 1014 cases. *Radiology* 2020;296:E32–E40.
3. Comas-Herrera A, Zalakaín J, Litwin C, et al. Mortality associated with COVID-19 outbreaks in care homes: Early international evidence. Available at: [LTCcovid.org](https://ltccovid.org/2020/04/12/mortality-associated-with-covid-19-outbreaks-in-care-homes-early-international-evidence/). International Long-Term Care Policy Network, CPEC-LSE, 26 June 2020. Available at: <https://ltccovid.org/2020/04/12/mortality-associated-with-covid-19-outbreaks-in-care-homes-early-international-evidence/>. Accessed September 24, 2020.
4. Public Health Ontario. Daily epidemiologic summary: COVID-19 in Ontario. Available at: <https://www.ontario.ca/page/how-ontario-is-responding-covid-19#section-1>. Accessed July 24, 2020.
5. Ontario Ministry of Health. COVID-19 Reference Document for Symptoms. Version 4.0 – May 14th 2020, Ministry of Health. Available at: http://www.health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/2019_reference_doc_symptoms.pdf. Accessed September 4, 2020.
6. Corman VM, Landt O, Kaiser M, et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Euro Surveill* 2020;25:2000045.
7. Fang Y, Zhang H, Xie J, et al. Sensitivity of chest CT for COVID-19: Comparison to RT-PCR. *Radiology* 2020;296:E115–E117.
8. Long C, Xu H, Shen Q, et al. Diagnosis of the Coronavirus disease (COVID-19): rRT-PCR or CT? *Eur J Radiol* 2020;126:108961.
9. Magleby R, Westblade LF, Trzebucki A, et al. Impact of SARS-CoV-2 viral load on risk of intubation and mortality among hospitalized patients with Coronavirus Disease 2019. *Clin Infect Dis* 2020;1–33.

Dylan Kain, MD
Department of Medicine
University of Toronto
Toronto, Canada

Elizabeth McCreight, BSc
Department of Microbiology
Sinai Health/University Health Network
Toronto, Canada

Tony Mazzulli, MD
Department of Microbiology
Sinai Health/University Health Network
Toronto, Canada

Department of Laboratory Medicine and Pathobiology
University of Toronto
Toronto, Canada

Jonathan B. Gubbay, MD
Department of Laboratory Medicine and Pathobiology
University of Toronto
Toronto, Canada

Public Health Ontario
Toronto, Canada

Elizabeth Rea, MD
Toronto Public Health
Toronto, Canada

Dalla Lana School of Public Health
University of Toronto
Toronto, Canada

Jennie Johnstone, MD, PhD
Department of Microbiology
Sinai Health/University Health Network
Toronto, Canada

Department of Laboratory Medicine and Pathobiology
University of Toronto
Toronto, Canada

Dalla Lana School of Public Health
University of Toronto
Toronto, Canada

<http://doi.org/10.1016/j.jamda.2020.08.018>

A Comparison of COVID-19 Mortality Rates Among Long-Term Care Residents in 12 OECD Countries



To the Editor:

An early and persistent trend of the coronavirus disease 2019 (COVID-19) pandemic has been the large number of deaths occurring among older adults and those living in long-term care (LTC) homes.¹ Residents of LTC homes are at a disproportionately high risk of contracting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) due to their congregant living environments, greater likelihood of being exposed to asymptomatic and pre-symptomatic care providers, and difficulty in effectively implementing infection prevention and control practices.^{2,3} Most LTC home residents are also older adults, for whom advanced age represents a strong risk factor for COVID-19 morbidity and mortality due to the higher prevalence of immunosenescence and chronic illnesses.⁴ Although the proportion of deaths occurring in LTC homes at an international level has been explored, population-specific mortality rates for LTC home residents and their comparison with rates for community-dwelling older,⁶ and younger persons have neither been calculated nor analyzed.⁵

Using publicly reported data on COVID-19 deaths for 12 Organization for Economic Co-operation and Development (OECD) member-countries (Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, United Kingdom, and the United States), we calculated and compared the population-specific mortality rates and ratios for LTC home residents and community-dwelling older (age ≥65 years) and younger (age <65 years) persons. COVID-19 deaths data were collected directly from publicly available national health and epidemiological reports and were current as of July 24, 2020 (see [Appendix 1](#) for methodology and data sources). COVID-19 deaths included both those reported as confirmed and probable, and those that occurred in LTC home and acute hospital settings.

We report a total of 361,161 COVID-19 deaths for the 12 countries, which accounted for 90% of deaths in all 37 OECD countries and 56% of all global deaths.⁷ Within the 12 countries, LTC home residents, community-dwelling older persons, and younger persons accounted for an average of 47.3%, 44.7%, and 8.0% of COVID-19 deaths and an average of 0.9%, 18.2%, and 80.9% of national populations, respectively.

We calculate a 12-country average COVID-19 mortality rate of 2772 per 100,000 LTC home residents (range, 399 for Germany to 5295 for Spain) compared with 122 per 100,000 community-dwelling older persons (range, 22 for Canada to 244 for Spain), representing an average 24.2-fold higher rate of death (range, 14.2 for Germany to 73.7 for Canada). Even greater differences were observed when compared with COVID-19 mortality rates for community-dwelling younger persons, which averaged 4.9 per 100,000, representing a 644-fold higher rate of COVID-19 deaths

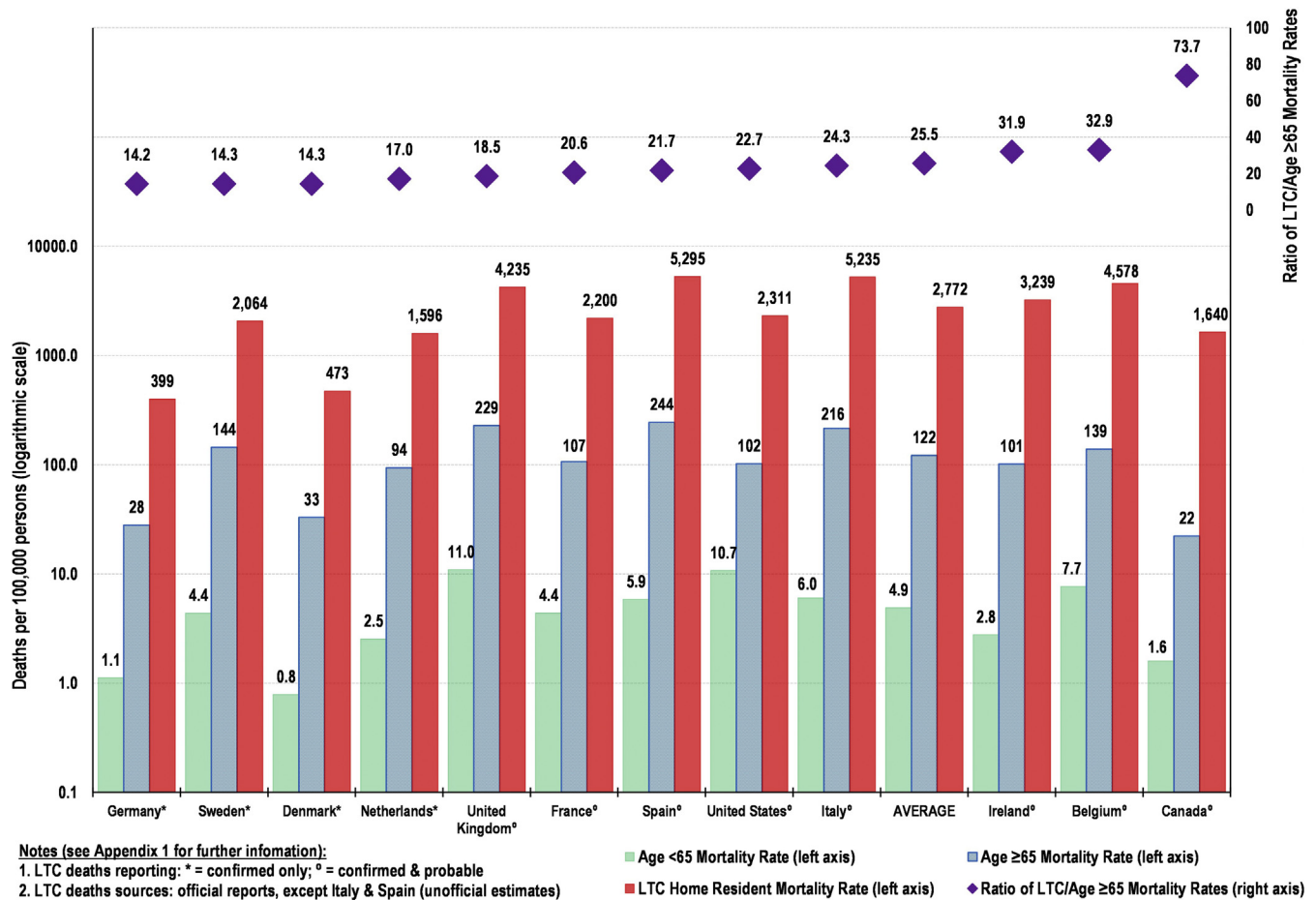


Fig. 1. COVID-19 mortality rates and ratios for LTC home residents and community-dwelling persons. Estimates for 12 OECD countries; deaths per 1000 of specific population.

among LTC home residents (range of 215 for the United States to 1165 for Ireland). (Figure 1).

Here we confirm a very high concentration of mortality of LTC home residents and report substantial variation among 12 OECD countries. Our results suggest that the level of community transmission, as reflected in the mortality rate for community-dwelling persons, and the level of policy response related to infection prevention and control practices in LTC homes and at the broader community level were important factors driving LTC home resident mortality rates.⁵ Reporting differences in our multinational data sources may limit some between country comparability, this includes: 1) four countries (Denmark, Germany, Netherlands and Sweden) reporting only confirmed LTC resident deaths, while the remaining eight report confirmed and probable deaths; 2) in the absence of official national estimates, we have used partial official or non-official figures to provide reasonable estimates of all LTC home resident deaths for Italy and Spain.

Countries, such as Denmark and Germany, that maintained relatively low levels of community transmission and acted early and aggressively to prevent the introduction and spread of COVID-19 into their LTC homes had the lowest LTC home resident mortality rates.⁸ These policy actions included the early restriction of nonessential visitors, enacting universal masking policies, improving LTC staffing levels, preventing care providers from working across multiple sites, implementing enhanced LTC

infection control training and audit procedures, and widespread testing and isolation protocols for infected residents and asymptomatic contacts.^{1,9,10}

In contrast, countries such as Spain and the United Kingdom, that had relatively high levels of community transmission and less robust LTC home-related policy responses, had the highest LTC home resident mortality rates. Other countries had mixed responses with uneven results. For instance, Canada promoted relatively forceful measures that were effective in limiting community transmission, but its LTC home-related responses were uneven and less robust for a system already characterized as being poorly staffed and funded at its baseline.¹¹ This may explain why Canada particularly stands out, with the highest mortality ratio comparing LTC home residents with community-dwelling older persons (73.7 vs. the OECD 12-country average of 25.5), and why Canada's LTC home resident deaths accounted for such a high percentage of its overall deaths (78.4% vs. the OECD 12-country average of 47.3%).

As some countries are still grappling with their first waves of COVID-19 infections and others are starting to combat their second waves, understanding the factors that led to substantial mortality rates for LTC home residents in certain jurisdictions could help allow for the implementation of key policies and practices that could prevent introduction, transmission, and death from COVID-19 across all jurisdictions.

References

1. Ouslander JG, Grabowski DC. COVID-19 in nursing homes: Calming the perfect storm [Epub ahead of print]. *J Am Geriatr Soc*. <https://doi.org/10.1111/jigs.16784>.
2. McMichael TM, Currie DW, Clark S, et al. Epidemiology of Covid-19 in a long-term care facility in King County, Washington. *N Engl J Med* 2020;382:2005–2011.
3. Goldberg SA, Pu CT, Thompson RW, et al. Asymptomatic spread of COVID-19 in 97 patients at a skilled nursing facility. *J Am Med Dir Assoc* 2020;21:980–981.
4. D'Adamo H, Yoshikawa T, Ouslander JG. Coronavirus disease 2019 in geriatrics and long-term care: The ABCDs of COVID-19. *J Am Geriatr Soc* 2020;68:912–917.
5. Canadian Institute for Health Information. Pandemic experience in the long-term care sector: how does Canada compare with other countries? 2020. Available at: <https://www.cihi.ca/sites/default/files/document/covid-19-rapid-response-long-term-care-snapshot-en.pdf>. Accessed July 1, 2020.
6. Comas-Herrera A, Zalakaín J, Litwin C, Hsu AT, Lemmon E, Henderson D and Fernández J-L (2020) Mortality associated with COVID-19 outbreaks in care homes: early international evidence. Article in LTCcovid.org, International Long-Term Care Policy Network, CPEC-LSE, 26 June 2020. Available at: <https://ltccovid.org/wp-content/uploads/2020/06/Mortality-associated-with-COVID-among-people-who-use-long-term-care-26-June-1.pdf>. Published 2020. Updated June 26, 2020. Accessed October 6, 2020.
7. Johns Hopkins University & Medicine. The Johns Hopkins Coronavirus Resource Center. 2020. Available at: <https://coronavirus.jhu.edu>. Accessed July 24, 2020.
8. Lorenz-Dant K. Germany and the COVID-19 long-term care situation. International Long Term Care Policy Network. LTC Responses to COVID-19 Web site. 2020. Available at: https://ltccovid.org/wp-content/uploads/2020/05/Germany_LTC_COVID-19-6-May-2020.pdf. Accessed May 25, 2020.
9. Lester PE, Holahan T, Siskind D, Healy E. Policy recommendations regarding skilled nursing facility management of Coronavirus 19 (COVID-19): Lessons from New York State. *J Am Med Dir Assoc* 2020;21:888–892.
10. National Institute on Ageing. The NIA's 'iron ring' guidance for protecting older Canadians in long-term care and congregate living settings. Available at: https://static1.squarespace.com/static/5c2fa7b03917eed9b5a436d8/t/5f0f4610bcc2c332db002e67/1594836496177/NIA+Iron+Ring+Guidance+Document+July+15_2020.pdf. Accessed August 7, 2020.
11. Hsu AT, Lane N, Sinha SK, et al. Understanding the impact of COVID-19 on residents of Canada's long-term care homes – ongoing challenges and policy responses. International Long Term Care Policy Network. LTC Responses to COVID-19 Web site. 2020. Available at: https://ltccovid.org/wp-content/uploads/2020/06/LTCCovid-country-reports_Canada_June-4-2020-1.pdf. Accessed August 7, 2020.

Edgardo R. Sepulveda, BA, MA
National Institute on Ageing, Ryerson University
Toronto, ON, Canada

Nathan M. Stall, MD
National Institute on Ageing, Ryerson University
Toronto, ON, Canada

Division of General Internal Medicine and Geriatrics
Toronto, ON, Canada

Sinai Health System and the University Health Network
Toronto, ON, Canada

Women's College Research Institute, Women's College Hospital
Toronto, ON, Canada

Division of Geriatric Medicine
Department of Medicine
University of Toronto
Toronto, ON, Canada

Institute of Health Policy, Management and Evaluation, University of
Toronto
Toronto, ON, Canada

Samir K. Sinha, MD, DPhil*
National Institute on Ageing
Ryerson University
Toronto, Canada

Division of General Internal Medicine and Geriatrics
Sinai Health System and the University Health Network
Toronto, Canada

Division of Geriatric Medicine
Department of Medicine
University of Toronto
Toronto, Canada

Institute of Health Policy
Management and Evaluation
University of Toronto
Toronto, Canada

Division of Geriatrics and Gerontology
Department of Medicine
Johns Hopkins University School of Medicine
Baltimore, MD

* Address correspondence to Samir K. Sinha, MD, DPhil, Division of
General Internal Medicine and Geriatrics, Mount Sinai Hospital,
Suite 475 - 600 University Avenue, Toronto ON M5G 2C4.
E-mail address: samir.sinha@sinaihealthsystem.ca

<http://doi.org/10.1016/j.jamda.2020.08.039>

Evaluation of Testing Frequency and Sampling for Severe Acute Respiratory Syndrome Coronavirus 2 Surveillance Strategies in Long-Term Care Facilities



To the Editor:

Identifying optimal testing strategies for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in long-term care facilities (LTCFs) is a public health priority.¹ Asymptomatic surveillance is necessary to detect asymptomatic and presymptomatic carriers to prevent widespread coronavirus disease 2019 (COVID-19) outbreaks in LTCFs. In the context of test availability, costs, and acceptability constraints, the trade-offs between testing intensity and potential benefits are currently unknown for LTCFs.¹ Unique features of COVID-19 transmission dynamics within LTCFs and communities need to be considered when implementing an optimal surveillance strategy. Using a dynamic model of COVID-19 transmission in a LTCF setting, we estimated the impact of several SARS-CoV-2 surveillance strategies varying in test frequency and sampling on the time to diagnosis and the cumulative number of cases at first diagnosis.

Methods

We developed an agent-based model² of SARS-CoV-2 transmission among (n = 280) residents and staff members of a hypothetical LTCF (Appendix, Supplementary Methods). Briefly, 1

The authors have no conflict of interest to disclose.

This research did not receive any funding from agencies in the public, commercial, or not-for-profit sectors.

Appendix 1. Data Sources and Methodology

COVID-19 Deaths

Population-specific mortality rates for the three population groups (community-dwelling younger persons age <65, community-dwelling older persons age ≥65 years and LTC residents) were calculated by dividing the COVID -19 deaths for each group (numerator) by their respective population (denominator).

Table 1 shows the calculated numerators and denominators for the three population groups for all 12 countries, which are the basis for the mortality rates presented in Figure 1.

- COVID-19 deaths for the three population groups were sourced from publicly available national health and epidemiological reports:
 - Deaths for community-dwelling persons age <65 were sourced directly from the corresponding epidemiological reports.
 - Deaths for community-dwelling persons age ≥65 were generally calculated by subtracting reported LTC deaths (see

Table 1: COVID-19 Deaths and Population Estimates								
	COVID-19 Deaths				Populations (000)			
	Age <65	Age ≥65	LTC Res.	Total	Age <65	Age ≥65	LTC Res.	Total
Belgium	712	2,818	6,275	9,805	9,290	2,028	137	11,455
Canada	492	1,431	6,981	8,904	30,789	6,431	426	37,646
Denmark	37	360	215	612	4,670	1,091	45	5,806
France	2,351	13,688	14,126	30,165	53,542	12,828	642	67,012
Germany	729	4,766	3,606	9,101	65,136	16,980	903	83,019
Ireland	117	671	975	1,763	4,213	661	30	4,904
Italy	2,805	29,230	12,250	44,285	46,576	13,549	234	60,359
Netherlands	355	2,940	2,841	6,136	13,968	3,136	178	17,282
Spain	2,217	21,304	19,646	43,167	37,832	8,734	371	46,937
Sweden	358	2,761	2,557	5,676	8,195	1,911	124	10,230
United Kingdom	5,956	26,807	23,225	55,988	54,375	11,724	548	66,647
United States	29,694	54,469	61,397	145,560	276,588	53,395	2,657	332,639
Totals	45,822	161,245	154,094	361,161	605,174	132,467	6,295	743,936

Population Estimates

- Population estimates for total population and for groups age <65 and age ≥65 years were for 2020 and for the 10 European countries sourced from the European Centre for Disease Prevention and Control (ECDC): <https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-long-term-care-facilities-surveillance-guidance.pdf> (Accessed July 24, 2020) and from the OECD for Canada and the USA <https://stats.oecd.org/Index.aspx?DataSetCode=POPPROJ> (Accessed July 24, 2020)
- Population estimates for LTC residents were generally proxied by LTC home beds and for the 10 European countries sourced from the WHO (Europe): https://gateway.euro.who.int/en/indicators/hfa_491-5101-number-of-nursing-and-elderly-home-beds/visualizations/#id=19556&tab=table (accessed July 24, 2020); from the CDC for the USA https://www.cdc.gov/nchs/data/series/sr_03/sr03_43-508.pdf to include “Nursing Homes” and “Residential Care Community” beds (accessed July 24, 2020) and from Statistics Canada for Canada <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?TABID=2&Lang=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=1234492&GK=0&GRP=1&PID=109537&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2016&THEME=116&VID=0&VNAMEE=&VNAMEF=&D1=0&D2=0&D3=0&D4=0&D5=0&D6=0> to include residents in “Nursing homes”, “Residences for senior citizens” and mixes of both (accessed July 24, 2020).

below) from all age ≥65 deaths, sourced directly from the corresponding epidemiological reports.

- Deaths for LTC home residents were sourced directly as set out below.
- The following data-related notes and caveats apply:
 - Choice of countries
 - Our objective is to provide a summary snapshot of mortality rates and ratios for LTC home residents in a manageable number of reasonably comparable countries that have been significantly affected by COVID-19. To maximize comparability, we applied the following criteria to select the 12 study countries: 1) country should be an OECD member-state; 2) country should report periodic and official LTC home resident deaths (alternatively, there should be other periodic sources that provide reasonable estimates); 3) country should have significant total national COVID-19 deaths, adjusted for population.
 - Definition and coverage of LTCs
 - There is significant variability in the definition and coverage of LTCs in the 12 study countries. We have endeavored to take these differences into account, including by focusing on mortality rates and carefully matching the numerator (LTC home resident deaths) with the denominator (LTC home residents). However, as noted above, because of inconsistency in the reporting of number of LTC home residents in the ten European countries, we have opted to use LTC home beds as a proxy for LTC home residents.

○ Location of LTC home resident deaths

- Our objective is to include all LTC home resident deaths in our study. This includes deaths that occurred in LTC homes (“in-situ”) and in (acute) hospital and other/unknown settings (“hospital”). In this context, it is noteworthy that:
 - 10 countries (Belgium, Canada, Denmark, France, Germany, Ireland, Netherlands, Sweden, UK and US) include hospital **and** in-situ LTC home resident deaths in official total national deaths. Belgium, France and UK report in-situ and hospital deaths separately, while Canada, Denmark, Germany, Ireland, Netherlands, Sweden and US do not separately report the location of death.
 - 2 countries (Italy and Spain) include **only** hospital LTC home resident deaths in official national deaths totals. Further, such deaths are not reported separately from deaths of community-dwelling persons. For comparability with other countries, we 1) estimate additional “in-situ” deaths; and 2) estimate what proportion of official national deaths totals are indeed hospital LTC home resident deaths. Consequently, we adjust the official total national deaths to take into account our estimated additional “in situ” deaths. For specifics, please refer to Italy and Spain description below.

○ Confirmed only or confirmed and probable deaths

- Countries have generally applied two broad approaches for accounting for deaths generally and in LTCs in particular: 1) a narrower approach (only confirmed deaths) or 2) a broader approach (confirmed and probable deaths). In our study:
 - 6 countries use the broader approach (Belgium, Canada, France, Ireland, UK and US);
 - 4 countries use the narrower approach (Denmark, Germany, Netherlands and Sweden);
 - For the two countries (Italy and Spain) that include only hospital LTC home resident deaths in official national deaths totals, we have imposed the broader approach (see below).

○ Remaining data limitations

- By choosing a limited number of reasonably comparable countries with high quality data collected over a two-day period (July 23 to 24) we have attempted to maximize the comparability of the data to provide a solid basis for our comparative analysis. Nevertheless, data limitations remain, including as described above. Of particular note are the following:
 - We note that the four countries that employ the narrower approach for accounting for deaths (Denmark, Germany, Netherlands and Sweden) have the lowest ratios of LTC/ ≥ 65 age mortality rates in Figure 1. While it is true that Germany and Denmark have relatively low mortality rates across all three population groups, that is not the case for Sweden and Netherlands. This suggests that some part of the lower LTC/ ≥ 65 age mortality rates across this group is driven by the narrower approach. This would be the case, for instance, if the proportion of probable deaths, if such deaths were to be accounted, was higher among LTC home residents than for community-dwelling ≥ 65 age persons. There is evidence that this was the case in the one study country, Belgium, that separately reported confirmed and probable cases: in its July 22 report (see below) it reported that 95% of all hospital deaths (including those of LTC home residents) were “confirmed”, compared to only 26% of deaths in LTC homes being “confirmed”, with the rest (5% and 74% being probable).

- In spite of the above-noted issues with LTC home residents data for Italy and Spain, we include them in the study given that these two countries had some of the highest official national deaths in the world, adjusted for population, and for which there were widespread media reports of large numbers of deaths of LTC home residents. We have endeavored to identify and use non-official partial and/or periodic sources that we believe provide reasonable estimates. Further, we carried out sensitivity and other comparative analysis to ensure that the resultant rates and ratios in Italy and Spain are consistent with those of other European countries that also had comparably high official national deaths totals (e.g. Belgium, France, Ireland, UK). Nevertheless, until the national governments of Italy and Spanish provide comprehensive official national deaths totals, these remain our unofficial estimates.
- **Belgium:** The COVID-19 – Bulletin Epidémiologique hebdomadaire du 26 juin 2020 by Sciensano reported “Maison de repos” and “Maisons de repos et de soins” (MR/MRS) resident deaths of 4,857 in MR/MRS (78%) and 1,377 in Hospitals and 13 unknown locations (together 22%) as of June 21 (http://covid-19.sciensano.be/sites/default/files/Covid19/COVID-19_Weekly%20report_20200626%20-%20FR_0.pdf (accessed October 6, 2020)). The COVID-19 – Bulletin Epidémiologique du 22 Juillet 2020 by Sciensano reports 4,877 LTC residents deaths in MR/MRS http://covid-19.sciensano.be/sites/default/files/Covid19/COVID-19_Daily%20report_20200722%20-%20FR.pdf (Accessed July 23, 2020). Based on the above-noted, most recently-available 78%/22% in-situ/hospital ratio, we estimate 1,398 hospital deaths to July 22, for a total of **6,275** deaths for MR/MRS residents for that date.
- **Canada:** The “National Institute on Aging (NIA) Long Term Care COVID-19 Tracker reports **6,981** deaths of LTC residents <https://ltc-covid19-tracker.ca/> as of July 23 (accessed July 24, 2020)
- **Denmark.** The Danish “Statens Serum Institut” in the “Overvågning af COVID-19” <https://www.ssi.dk/sygdomsberedskab-og-forskning/sygdomsovervaagning/c/covid19-overvaagning> reports **215** deaths of nursing homes residents in Table 7.1 (Accessed July 23, 2020)
- **France:** The COVID-19 Point épidémiologique hebdomadaire du 23juillet 2020 reports **14,126** deaths of EHPA residents (3,696 (26%) in hospitals and 10,430 (74%) in EHPAs <https://www.santepubliquefrance.fr/content/download/269451/2684823> (accessed July 23, 2020).
- **Germany:** The COVID-19 Daily Situation Report of the Robert Koch Institute 23/07/2020 – Updated Status for Germany” reports **3,606** deaths for residents of s36 IfSG facilities https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Situationsberichte/2020-07-23-en.pdf?__blob=publicationFile (Accessed July 23, 2020)
- **Ireland:** On June 15 the Department of Health’s “Nursing Homes - Summary paper provided to Special Committee on COVID-19 Response” <https://assets.gov.ie/77340/b73b66ea-01d8-41da-ba01-4bd9dadd449e.pdf> (Accessed July 24) noted that as of June 13 there were 943 deaths for nursing home residents, which at the time accounted for 55.3% of all national deaths (1,705). The national number had increased to 1,763 to July 23 and we estimated the number of additional nursing home deaths over that period to be 32 (55.3% of 58), for a total of **975** deaths for nursing home residents for that date.
- **Italy:** The Government of Italy has to date not reported figures for RSA resident deaths outside of hospitals. We used three sources to “triangulate” a reasonable estimate for total LTC Resident deaths: 1) On May 5 the Istituto Superiore di Sanità

(ISS) in “Survey nazionale sul contagio COVID-19 nelle strutture residenziali e sociosanitarie - REPORT FINALE » <https://www.epicentro.iss.it/coronavirus/pdf/sars-cov-2-survey-rsa-rapporto-finale.pdf> (accessed July 23, 2020) reported the final results of a survey of RSAs, based on which we project about 11,400 confirmed and symptom-compatible RSA deaths to July 24; 2) the Milan ATS (regional health unit) released the COVID-19 results of their survey of RSAs under their jurisdiction “RSA Flusso Covid 19 REPORT AL 15/07/2020” to July 15 https://www.ats-milano.it/Portale/desktopmodules/dnn_gestionedocumenti/Images/download.png (accessed July 24, 2020), based on which we project about 12,400 RSA deaths nationally 3) on May 19 an online publication interviewed a lawyer that was pursuing class action against RSAs and noted that there had been 12,000 COVID-19-related deaths <https://www.ildigitale.it/morti-nelle-rsa-per-covid-in-atto-una-class-action-legale/> (access July 24, 2020). Taking into account these projections we use an estimate of **12,250** deaths for LTC residents. Based on an assumed in-situ/hospital distribution of LTC deaths of 75%/25% (see France and UK average), we estimate that of these total LTC deaths, 3,063 were in hospitals. Such in-hospital deaths are already included in the national totals. However, the LTC in situ deaths are not included and hence we add 9,188 deaths to the Government of Italy total of deaths for July 24 of 35,097 for a revised national total of 44,285.

- **Netherlands:** The “Epidemiologische situatie COVID-19 in Nederland: Rijksinstituut voor Volksgezondheid en Milieu – RIVM (21 juli 2020)” reports **2,841** deaths of LTC residents “verpleeghuizen” as of July 21 https://www.rivm.nl/sites/default/files/2020-07/COVID-19_WebSite_rapport_wekelijks_20200721_1135.pdf (Accessed July 23, 2020), confirmed <https://coronadashboard.rijksoverheid.nl/> (Accessed July 23, 2020)
- **Spain:** The Government of Spain has to date not reported figures for LTC resident deaths outside of hospitals. The Spanish national broadcaster (RTVE) has compiled the reports of LTC residents deaths submitted to the National Government by the regional health authorities, indicating **19,646** deaths (confirmed and suspected) of LTC residents as of July 24, 2020. <https://www.rtve.es/noticias/20200523/radiografia-del-coronavirus-residencias-ancianos-espana/2011609.shtml> (accessed July 24, 2020). Based on an assumed in-situ/hospital distribution of LTC deaths of 75%/25% (see France and UK average), we estimate that of these total LTC deaths, 4,912 were in hospitals. Such in-hospital deaths are already included in the

national totals. However, the LTC in situ deaths are not included and hence we add 14,735 deaths to the Government of Spain total of deaths for July 24 of 28,432 for a revised national total of 43,167.

- **Sweden:** the National Board of Health and Welfare “Socialstyrelsen” reports 2,425 deaths of LTC “Särskilt boende” residents aged 70+ as of July 20, 2020 <https://www.socialstyrelsen.se/globalassets/1-globalt/covid-19-statistik/statistik-om-covid-19-bland-aldre-efter-boendeform/statistik-covid19-70-ar-och-aldre.xlsx> (accessed July 23, 2020), to which we added 132 deaths for those aged 65-69 based on applying the same LTC/community proportion, for a total of **2,557** deaths.
- **United Kingdom:** The Office of National Statistics (ONS) reported 15,122 deaths in England and Wales “care homes” to July 10 that mentioned COVID-19. <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/weeklyprovisionalfiguresondeathsregisteredinenglandandwales> (Accessed July 24, 2020). The National Records of Scotland reported 1,950 deaths in “care homes” to July 137 <https://www.nrscotland.gov.uk/covid19stats> (accessed July 24, 2020). The Northern Ireland Statistics and Research Agency reported 347 in “care homes” to July 17 <https://www.nisra.gov.uk/publications/weekly-deaths> (accessed July 24, 2020). These three figures sum to a UK total of 17,419 in situ deaths. The ONS reports the distribution of in-situ/hospital deaths of “care home” residents of 24%/76% (see “Number of deaths in care homes notified to the care quality commission, England” at <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/numberofdeathsincarehomesnotifiedtothecarequalitycommissionengland> (accessed July 24, 2020). Using a 25%/75% distribution to be consistent as France (see above), we estimate 5,806 resident deaths in hospitals, for a total of **23,225** deaths of care home residents.
- **United States:** The Kaiser Family Foundation (KFF) has compiled the reports of LTC resident deaths published by State, regional and local agencies <https://www.kff.org/health-costs/issue-brief/state-data-and-policy-actions-to-address-coronavirus/> (Accessed July 24, 2020) indicating 59,506 deaths of LTC residents in the 41 reporting states as of July 23. That total is equal to 44.0% of total deaths for those 41 reporting States. We applied that ratio to the deaths totals of the 9 States that had not reported (based on CDC data (total deaths as well) <https://www.cdc.gov/covid-data-tracker/index.html#cases> (Accessed July 24, 2020) and calculated an additional 1,891 deaths. Summing these two estimates, the national total is **61,397** deaths of LTC residents.