TECHNICAL REPORT

Surveillance of COVID-19 in long-term care facilities in the EU/EEA

2020-2023

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Surveillance of COVID-19 in long-term care facilities in the EU/EEA, 2020–2023

This report of the European Centre for Disease Prevention and Control (ECDC) was coordinated by Tommi Kärki, and the surveillance activity was a joint activity with the Healthcare-Associated Infections Surveillance Network (HAI-Net) and the ECDC Respiratory Viruses surveillance team.

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Abbreviations

CFR	Case-fatality rate
HAI	Healthcare-associated infection
EU/EEA	European Union/European Economic Area
LTCF	Long-term care facility
TESSy	The European Surveillance System

Executive summary

Long-term care facilities (LTCFs) such as nursing homes or residential care homes, often serve as residencies for elderly individuals who have medical and social vulnerabilities. Before the COVID-19 pandemic, the EU/EEA lacked national incidence surveillance systems for healthcare-associated infections (HAIs) in long-term care facilities (LTCFs). In 2020, ECDC prepared a protocol for the surveillance of COVID-19 in European LTCFs, and countries started reporting data to The European Surveillance System (TESSy) in January 2021. From March 2021, ECDC published reports using these surveillance data.

From 2020 to March 2023, 17 EU/EEA countries have reported data to the voluntary surveillance system via TESSy; seven of them continuously during this period. All participating countries reported at least one indicator related to confirmed COVID-19 cases and fatalities, allowing the surveillance to reach its primary objective of monitoring national-level trends of COVID-19 in LTCFs. The highest incidence of COVID-19 in LTCFs was reported in 2020, and also from late 2021 until early 2022, depending on the country. The largest number of fatalities was reported during the spring and autumn of 2020.

The surveillance system also allowed analyses to support the assessment of the impact of COVID-19 on LTCFs in the EU/EEA. The case fatality rate (CFR) in pooled data from seven countries, weighted by number of reported cases in each country, declined from 21.3% in Q4-2020 to 16.3% in Q1-2021, remaining between 11 and 17% for the remainder of 2021, until declining further to 3.4% in Q1-2022, and remaining at 3 to 4% throughout 2022 and until Q1-2023.

Comparisons between different countries' weekly national data and indicators should be made with caution due to differences in national definitions, limited availability of denominator data, and changes in national testing strategies over time.

Prior to the COVID-19 pandemic, there were largely no established incidence surveillance systems for healthcare-associated infections (HAIs) in LTCFs in EU/EEA countries due to the low resources for surveillance in these settings. European-level surveillance of HAIs in LTCFs was performed through periodic point prevalence surveys (PPSs) in 2010, 2013, and 2016–2017 [3,4,5]. These surveys estimated that there were as many HAIs in LTCFs each year as in acute care hospitals in the EU/EEA [6].

The people who reside in LTCFs are commonly elderly people who have an increased vulnerability to respiratory tract infections, including COVID-19, and often suffer from an adverse outcome if ill with these infections. An EU/EEA network of national COVID-19 LTCF surveillance networks was established in 2020 [7], with data collection starting in early 2021. Retrospective data for 2020 was collected where possible [8].

These surveillance data were regularly reported in the ECDC weekly COVID-19 reports from spring 2021 until summer 2023, and in a separate technical report which was published in November 2021 [1,2]. This report collects all COVID-19 LTCF data reported to ECDC from 2021 and concludes the EU/EEA LTCF COVID-19 specific surveillance data collection from 2021-2023.

Scope and purpose of this report

From February 2021 to July 2023, ECDC published national trends for a subset of the data specified in the surveillance protocol weekly on its 'COVID-19 country overview' webpage [1]. In November 2021, ECDC also published a technical report 'Surveillance of COVID-19 in long-term care facilities in the EU/EEA' [2]. While these reports cover the primary objectives of this surveillance activity (see below), this updated report presents all data collected through this surveillance activity during 2021-2023.

Background and objectives

Background and rationale

Prior to the COVID-19 pandemic, there were largely no established incidence surveillance systems for healthcare-associated infections (HAIs) in LTCFs in EU/EEA countries, due to the low resources for surveillance in these settings. European-level surveillance of HAIs in LTCFs had been performed through periodic point prevalence surveys (PPSs) in 2010, 2013, and 2016–2017 [3,4,5]. These surveys estimated that there were as many HAIs in LTCFs each year as in acute care hospitals in the EU/EEA [6].

LTCFs are commonly homes for people with increased vulnerability to COVID-19 and other respiratory tract infections, especially elderly people, with often adverse outcomes. An EU/EEA network of national COVID-19 LTCF surveillance networks was established in 2020 [7], with data collection starting in early 2021 and collecting retrospective data for 2020, where possible [8].

These surveillance data were regularly reported in the ECDC weekly COVID-19 reports from spring 2021 until summer 2023, and in a separate technical report was published in November 2021 [1,2]. The current report updates the additional analyses from 2021. This report collects all COVID-19 LTCF data reported to ECDC and concludes the EU/EEA LTCF COVID-19 specific surveillance data collection 2021-2023.

Surveillance aims and objectives

Surveillance aims

The surveillance aimed to enable EU/EEA countries to report existing national surveillance data easily and regularly on COVID-19 in LTCFs. The protocol specified a set of similar variables, acknowledging that different countries are likely to report different subsets of these data [8].

Surveillance objectives

The objectives for the surveillance of national aggregate data on COVID-19 in LTCFs in EU/EEA countries were [8]:

Primary objectives:

- To monitor national-level trends in the number/proportion of COVID-19-affected LTCFs;
- To monitor trends in the national incidence of cases and fatal cases of COVID-19 among LTCF residents.

Secondary objectives

- To describe trends in indicators of long-term care services related to COVID-19[i];
- To assess the impact of COVID-19 on LTCFs in the EU/EEA.

[i] For example, changes in the COVID-19 testing frequency, location of death of fatal COVID-19 cases, and the proportion of fatal cases.

Methodology

Long-term care facilities

Long-term care facilities (LTCFs) include institutions such as nursing homes, skilled nursing facilities, retirement homes, assisted-living facilities, residential care homes, or other facilities. These facilities provide care to people requiring support who find it difficult to live independently in the community, possibly because of old age or chronic medical conditions. LTCFs for all age groups are included [9].

LTCFs typically have residents who need constant supervision (24 hours a day); need 'high-skilled nursing care' (i.e. more than 'basic' nursing care and assistance for daily living activities); are medically stable and do not need constant 'specialised medical care' (i.e. care administered by specialised physicians); or do not need invasive medical procedures (e.g. ventilation) [9].

COVID-19 cases and clusters

COVID-19 cases were reported according to the current EU case definition and ECDC case classification as 'possible', 'probable', or 'confirmed', or otherwise according to national definitions. Countries were also allowed to have their own definitions of clusters of COVID-19 within the LTCFs. For the countries reporting data on clusters, in the previous report, the national definition was reported to be ≥2 confirmed cases observed within a period in Croatia, Germany and Lithuania, whilst Ireland and the Netherlands did not provide the definition they used [2]. In 2023, the Netherlands reported that its definition of a cluster was the occurrence of three or more cases within the past 28 days within an LTCF.

Laboratory confirmation of COVID-19

The use of this term is purposefully generic, to permit national use of national criteria for confirmation. The definitions for variables for weekly collection regarding confirmed cases or confirmed fatal cases specifies that the cases may be confirmed by 'e.g. a positive reverse transcriptase polymerase chain reaction test or a rapid antigen detection test of COVID-19'.

Inclusion and exclusion criteria for LTCFs

All facilities that meet the national definition of a LTCF [8] were eligible for inclusion. Countries could include the same types of LTCF that are reported in national outputs, to ensure comparability and minimise the additional reporting burden. However, countries were also encouraged to consider using an inclusive definition of LTCFs for this surveillance, as these facilities may also constitute an environment susceptible to COVID-19 outbreaks in vulnerable people. These facilities may have included types of LTCF that were excluded from the ECDC point prevalence surveys of HAIs and antimicrobial use in European LTCFs in 2010, 2013, and 2016–2017, for example hospital long-term care wards [3,4,5,8]. The protocol nevertheless advised countries selecting a subset of LTCF, to include types of LTCF with high proportions of residents who are in a risk group for COVID-19, e.g. homes for elderly people and LTCFs for the those with a mental disability[8].

Case-fatality rate calculation

The case-fatality rate (CFR) was only calculated for confirmed cases, by pooling the data from countries that provided surveillance data continuously for the whole period from October 2020 until March 2023. The data were further pooled by year quarter. The CFR was calculated as the number of weekly deaths reported in the quarter with a two-week lag, divided by the number of weekly cases reported in the same period. The assignment of cases and deaths to each reporting week was performed by each reporting country. A two-week lag was used for fatal cases to account for the delay in reporting of the outcome and disease progression. The quarterly country-specific CFR was then further weighted by the number of cases reported by each country in each quarter to acquire the weighted average CFR.

Timeline of the surveillance

In January 2021, ECDC incorporated the surveillance metadata specified in the surveillance protocol in TESSy, enabling EU/EEA countries to upload historical and prospective national aggregate data on COVID-19 in LTCFs [8]. This metadata specification was discontinued on 31 July 2023.

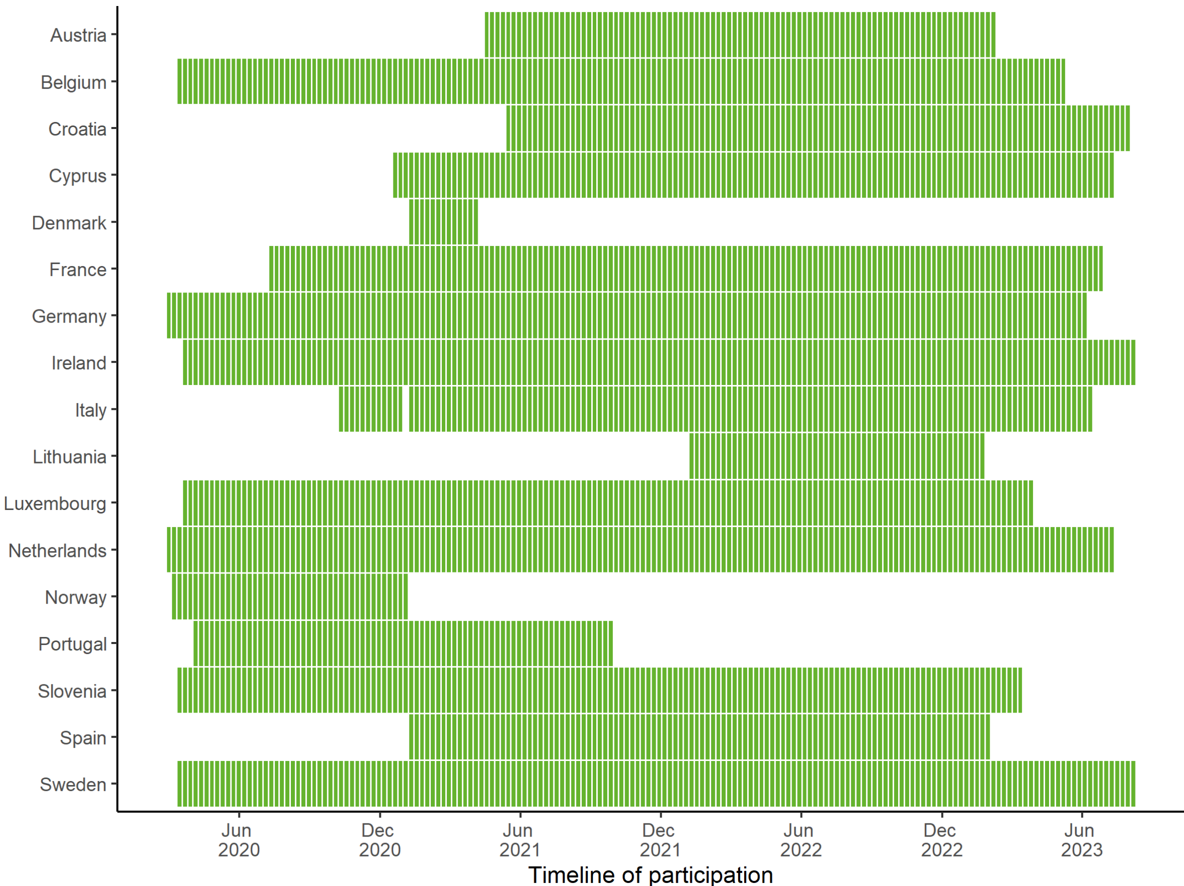
Results

National participation

Up until July 2023, a total of 17 EU/EEA countries reported weekly surveillance data to ECDC for this surveillance activity, via weekly uploads (i.e. prospectively) or via periodic uploads of historical data (i.e. retrospectively) [1].

Figure 1 presents an overview of the countries reporting any data for each reporting week. It highlights the differences in the participation periods and timelines from each country and shows that many countries ceased their surveillance activity or data reporting to ECDC during 2023. In many cases, this was due to the discontinuation of emergency acts and systems set up specifically for the COVID-19 pandemic, which varied between countries.

Figure 1. Participation in the ECDC COVID-19 surveillance in LTCFs, 17 EU/EEA countries, 2020–2023, as of October 2023



Denominator data

Countries provided denominator data in 2021 in 'Periodic Surveys' or in specific bilateral communications with ECDC. When unavailable, the denominator data were acquired from previous ECDC PPSs of HAIs and antimicrobial use in European LTCFs [1,5]. The main denominators were the number of LTCFs and the total number of LTCF beds. These denominator data were used throughout the surveillance period until 2023 (Table A1).

Notifications of new outbreaks/clusters of COVID-19 in LTCFs

Overall, 11 EU/EEA countries reported data from LTCFs that reported at least one new COVID-19 cases each week. Of these, five countries reported data on LTCFs meeting the national definition of a cluster of COVID-19 cases in an LTCF.

Over the entire surveillance period, the mean percentage of participating LTCFs that reported at least one newly confirmed case of COVID-19 during the reported week was 6.9% (median: 2.7%; Figure 2, Figure A1). The highest percentages (>50%) of LTCFs reporting confirmed cases during any week were reported by Cyprus in January, March and April in 2022, and by Slovenia in January and February 2022. Ireland and Lithuania also reported the highest proportion (approximately 5%) of LTCFs meeting the national case definitions for COVID-19 clusters in winter-spring 2022.

Notifications of new COVID-19 cases among LTCF residents

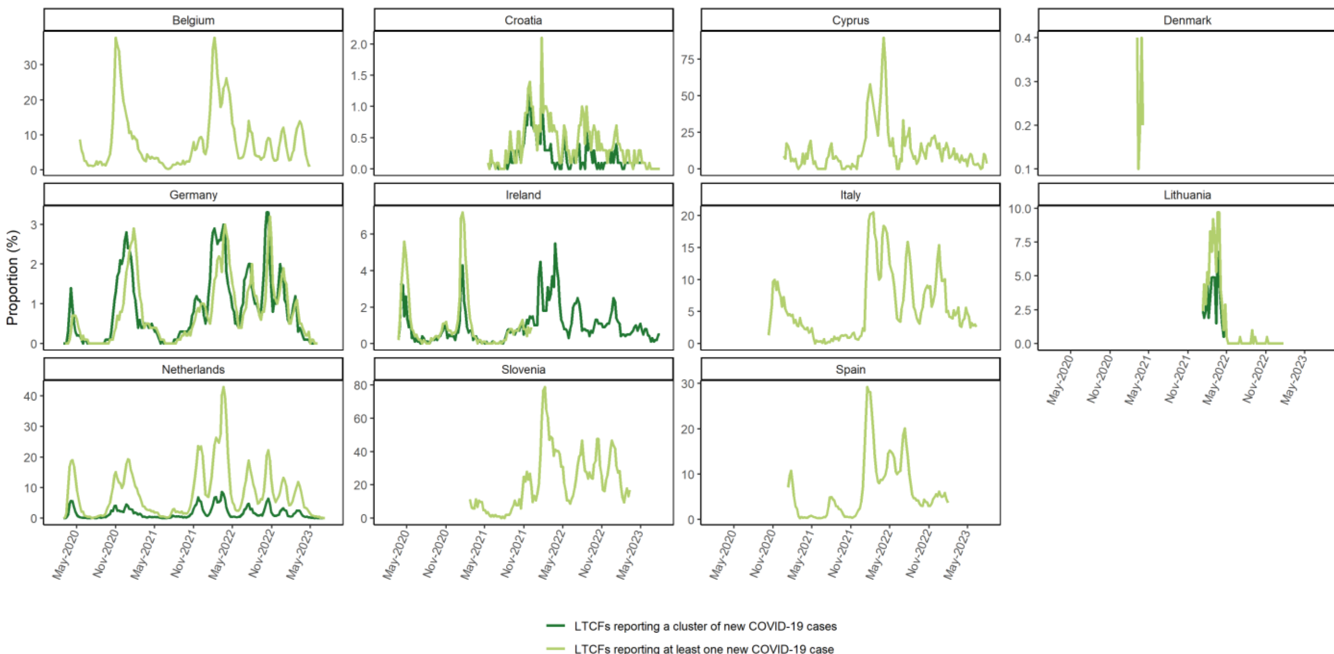
All 17 participating EU/EEA countries reported weekly data on new confirmed cases of COVID-19. Belgium and Cyprus also reported the total number of COVID-19 cases, which showed, especially in Belgium, a larger number of cases without confirmation during the early peaks in COVID-19 cases in 2020, and during later peaks in 2021-2022 (Figure 3, Figure A2).

The mean weekly incidence of new confirmed COVID-19 cases during the entire surveillance period was 576 cases per 100 000 beds (median: 210). The highest incidences of confirmed cases (weeks with >5 000 cases per 100 000 beds) were reported by Cyprus in February and April 2022, Portugal in April 2020 and January 2021, and Slovenia in November-December 2020.

Notifications of new fatal COVID-19 cases among LTCF residents

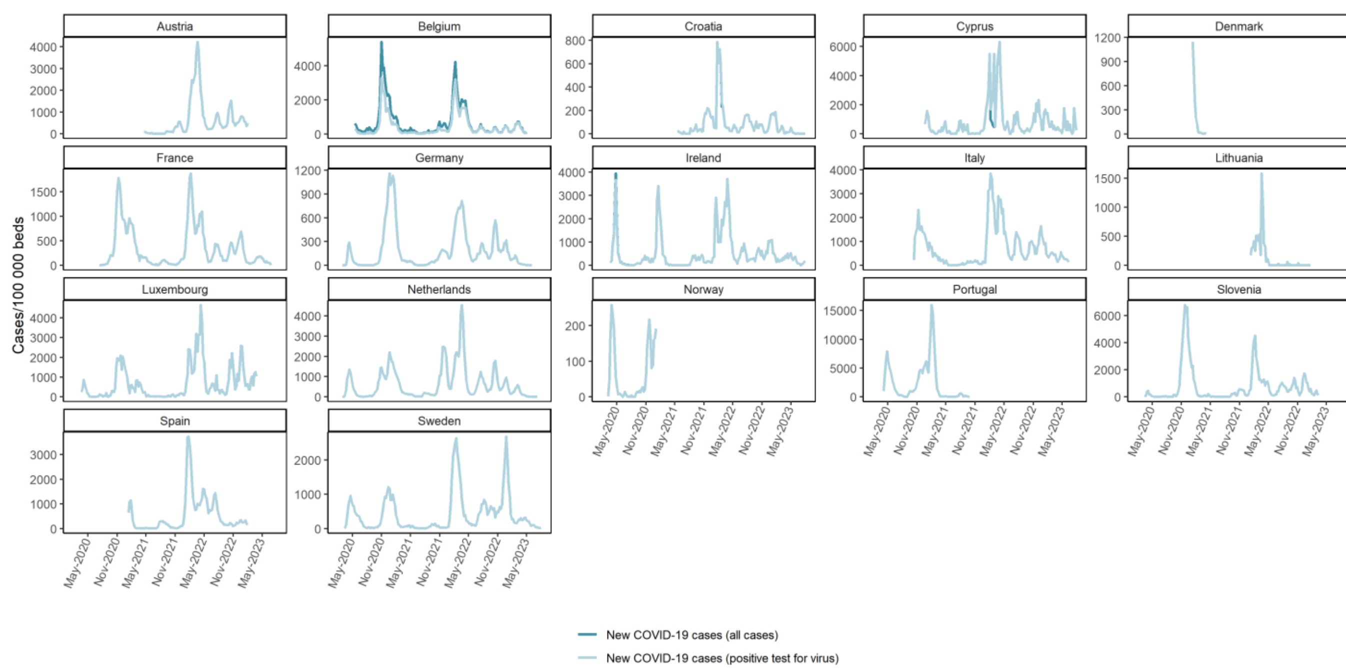
Fourteen EU/EEA countries provided data on new fatal cases among LTCF residents: 10 of them for confirmed COVID-19 cases with a positive test for the virus, two countries provided data both for confirmed COVID-19 cases and all fatal COVID-19 cases (i.e. also fatal cases without a positive test), and two countries provided data only for all fatal COVID-19 cases (Figure 4, Figure A3). The highest incidences of fatal confirmed cases (weeks with >500 per 100 000 beds) were reported by Ireland in April 2020 and January 2021, and Slovenia in November 2020 and until January 2021. In addition, both Belgium and Ireland reported a high number of fatal non-confirmed cases in April 2020.

Figure 1. Proportion of LTCFs with new confirmed COVID-19 cases and/or affected by COVID-19 outbreaks, 11 EU/EEA countries, 2020–2023, as of October 2023 (automatically adjusted Y-axis scale)



Note: if a country reported the same numbers for 'LTCFs reporting a cluster of new COVID-19 cases', and 'LTCFs reporting at least one new COVID-19 case', only the latter is displayed in this figure.

Figure 2. Incidence of COVID-19 cases among LTCF residents, 17 EU/EEA countries, 2020–2023, as of October 2023 (automatically adjusted Y-axis scale)



Note: if a country reported the identical numbers for 'new COVID-19 cases (all cases)' and 'new COVID-19 cases (positive test for virus)', only the latter is displayed in this figure.

Figure 3. Incidence of COVID-19 fatal cases among LTCF residents that occurred in any location, 17 EU/EEA countries, 2020–2023, as of October 2023 (automatically adjusted Y-axis scale)

Died (all cases)
Died (positive test for virus)

Note: if a country reported the identical numbers for 'Died (all cases)' and 'Died (positive test for virus)', only the latter is displayed in this figure. Similarly, if a country reported the same numbers for 'Died (all cases)' and 'Died in LTCF (all cases)', the country data is displayed in Figure 5 and not in this figure.

Case-fatality rate among LTCF residents

Seven countries (Belgium, Germany, Ireland, Luxembourg, the Netherlands, Slovenia, and Sweden) continuously reported data on confirmed COVID-19 cases and fatal cases from Q4-2020 to Q1-2023 (Figure 5). In these countries, the average CFR, weighted by number of reported cases in each country, declined from 21.3% in Q4-2020 to 16.3% in Q1-2021, remaining between 11 and 17% for the remainder of 2021, until declining further to 3.4% in Q1-2022, and remaining at 3 to 4% throughout 2022 and until Q1-2023.

Figure 4. Confirmed COVID-19 cases and deaths among LTCF residents in seven EU/EEA countries* that provided continuous data from Q4-2020 until Q1-2023, as of October 2023

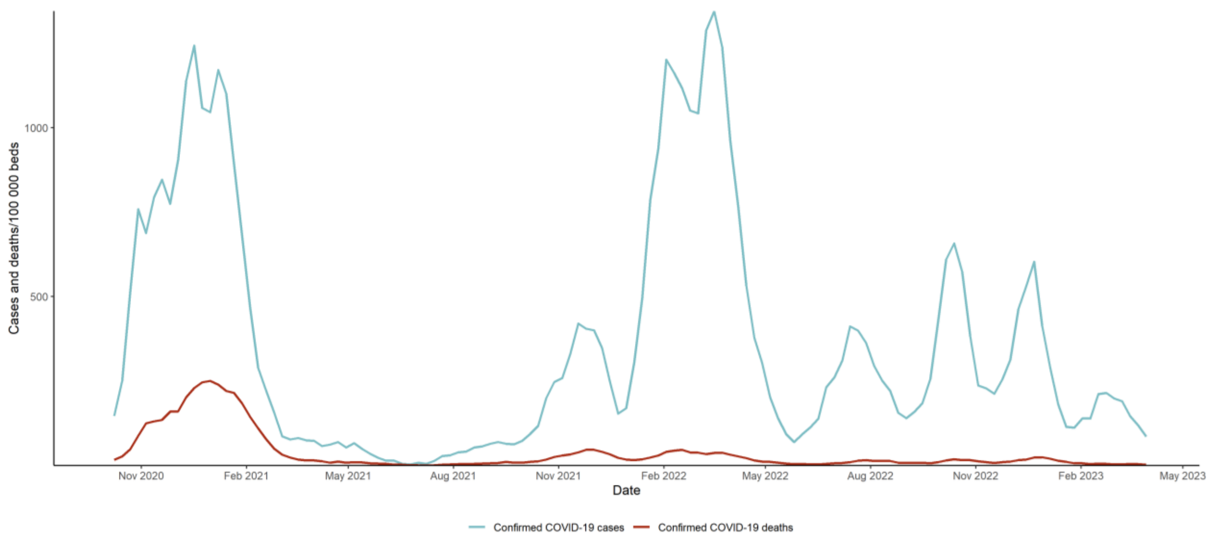
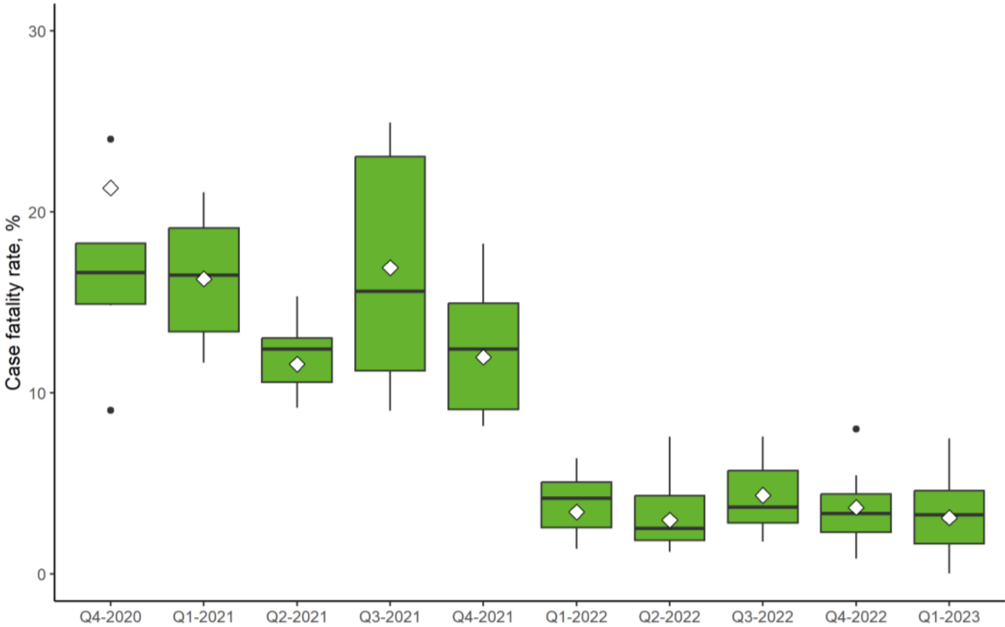


Figure 5. **Case-fatality rate by quarter, in confirmed COVID-19 cases among LTCF residents, in 7 EU/EEA countries* that provided continuous data from Q4-2020 to Q1-2023, as of October 2023**



*Belgium, Germany, Ireland, Luxembourg, Netherlands, Slovenia, Sweden
Diamond indicates weighted average

Limitations

The limitations of this surveillance activity included difficulties in comparing national data due to different surveillance systems, their coverage, the participating types of LTCF and their population characteristics, for which this surveillance could not collect additional information apart from the periodic surveys performed in 2021. In addition, aggregate data did not allow important epidemiological information regarding vaccination coverage and COVID-19 variant distributions at different time points to be considered. Furthermore, the incidence calculations relied on an estimated number of LTCF beds, as no accurate denominator was available for the changing number of current LTCF residents. Finally, mortality reporting might have varied between countries, including how confirmed COVID-19 cases were followed up and how mortality among these residents was registered and reported for each surveillance week.

This COVID-19 surveillance activity needed to use data on crude estimates on the participating LTCFs and their available number of beds as reported by the participating countries. Therefore, the comparisons between countries should be made with caution, as the testing rates and the surveillance coverage might have varied between countries, as demonstrated in the previous report with an overall coverage varying between 46% in Italy to 100% in seven countries, and impossible to estimate for six countries [2]. In addition, the denominator inaccuracies or shorter length of participation in some countries might significantly affect the data and the estimates, depending on which period the country was able to provide the data during the COVID-19 pandemic.

Discussion and conclusions

Since early 2021, surveillance data on COVID-19 in LTCFs has provided information on COVID-19 infections in the highly vulnerable populations within LTCF. The data were reported every week in the ECDC COVID-19 Country Overview reports until July 2023 [1]. The surveillance system enabled the national and international trends within these facilities to be followed and allowed for an overall assessment of the disease situation and impact in LTCFs in EU/EEA countries.

Participation to this surveillance system was voluntary, with over half EU/EEA countries providing data over certain periods. Given the limited resources for surveillance and for infection prevention and control in LTCFs in the EU/EEA, and the fact that not many countries had continuous surveillance systems in place in the LTCFs, such a wide participation in continuous LTCF surveillance was unprecedented for the EU/EEA. The ease of participation in the surveillance with aggregated indicators and periodical early denominator data collection, as well as allowing the reporting of slightly different indicators with national definitions, were arguably the most important factors allowing for a good, continued participation.

Data on confirmed cases were reported from all countries and data on fatalities were reported from almost all countries. This allowed additional analyses to achieve the secondary objectives of the surveillance of examining the CFR and its evolution over time during the COVID-19 pandemic in the EU/EEA countries that reported the data continuously for an extended period. This enabled a quantitative estimation of the impact of COVID-19 among LTCF residents. The CFR was calculated from Q4 2020, i.e. at a time when testing capacity had stabilised to relatively high rates [1,2].

The system proved useful in providing data on the COVID-19 incidence and CFR, including after the introduction of COVID-19 vaccines and during changing COVID-19 variant landscapes, and enabled episodes of resurgence in COVID-19 incidence and increases in the proportion of LTCFs experiencing a recent cluster or outbreak of COVID-19 among its residents to be highlighted.

Additionally, the surveillance were able to show that despite increases in the vaccination coverage [10], the CFR of COVID-19-cases in LTCF residents in the EU/EEA remained high in 2021, as also shown in other analyses studying breakthrough infections and outbreaks in COVID-19 outbreaks in LTCFs [11,12]. However, changes in severity metrics such as CFR during the COVID-19 pandemic always need to be put in perspective considering possible changes in testing strategy, since there were increases in COVID-19 testing until late 2020, mostly increasing testing throughout 2021, until finally decreasing in 2022 [1]. Nevertheless, the sharp decrease in the CFR from late 2021 to early 2022 is very likely due to the change in the COVID-19 variant distribution, especially the change from the more severe Delta to the Omicron variant, as reported in previous studies across different age groups [13,14].

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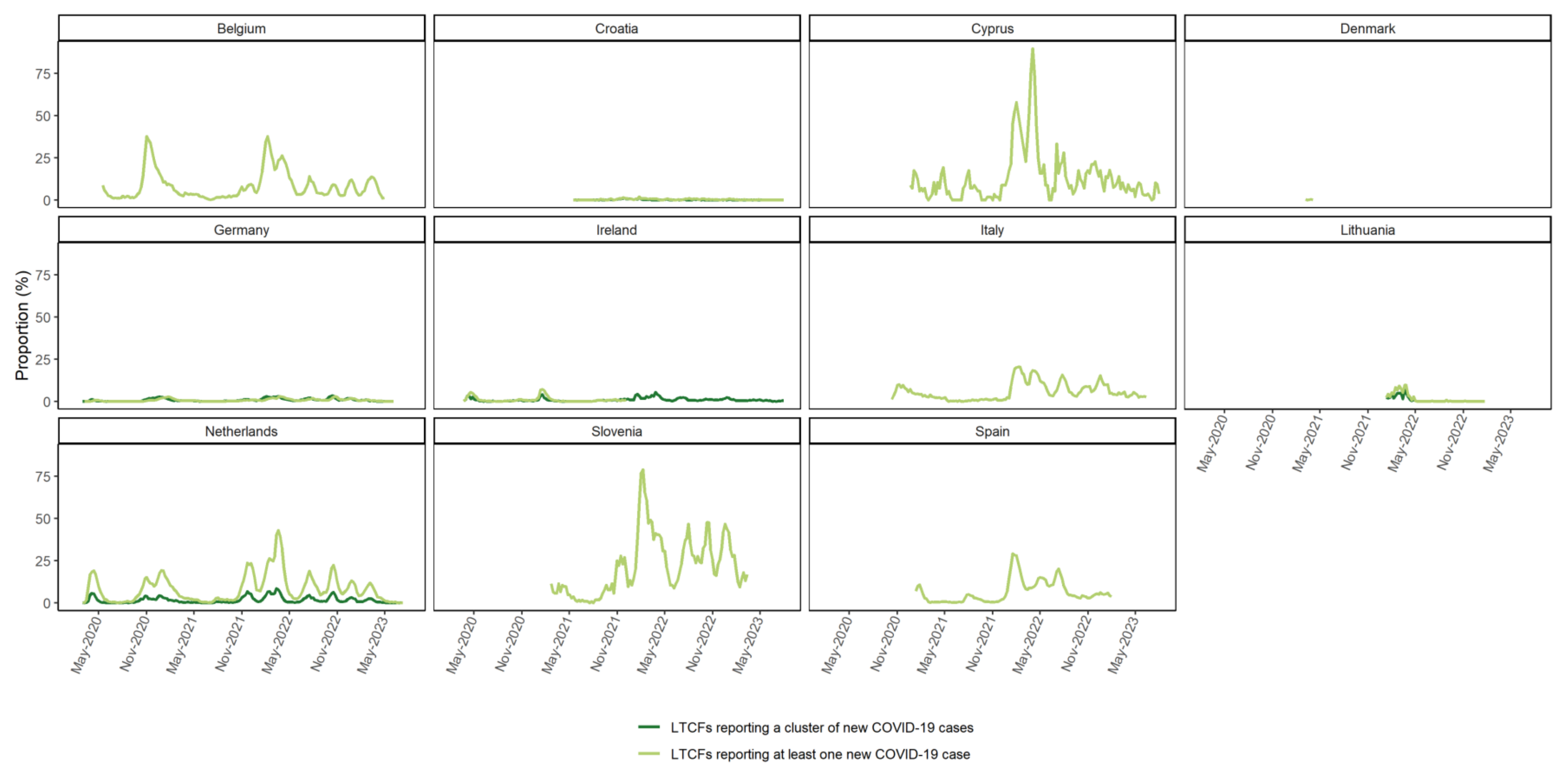
Annex 1.

Denominator table and additional figures

Table A1. National denominators (number of LTCF beds and number of participating LTCFs), 17 EU/EEA countries, as reported via the Periodic Survey 2021, via specific communications or via the weekly surveillance data, as of October 2023

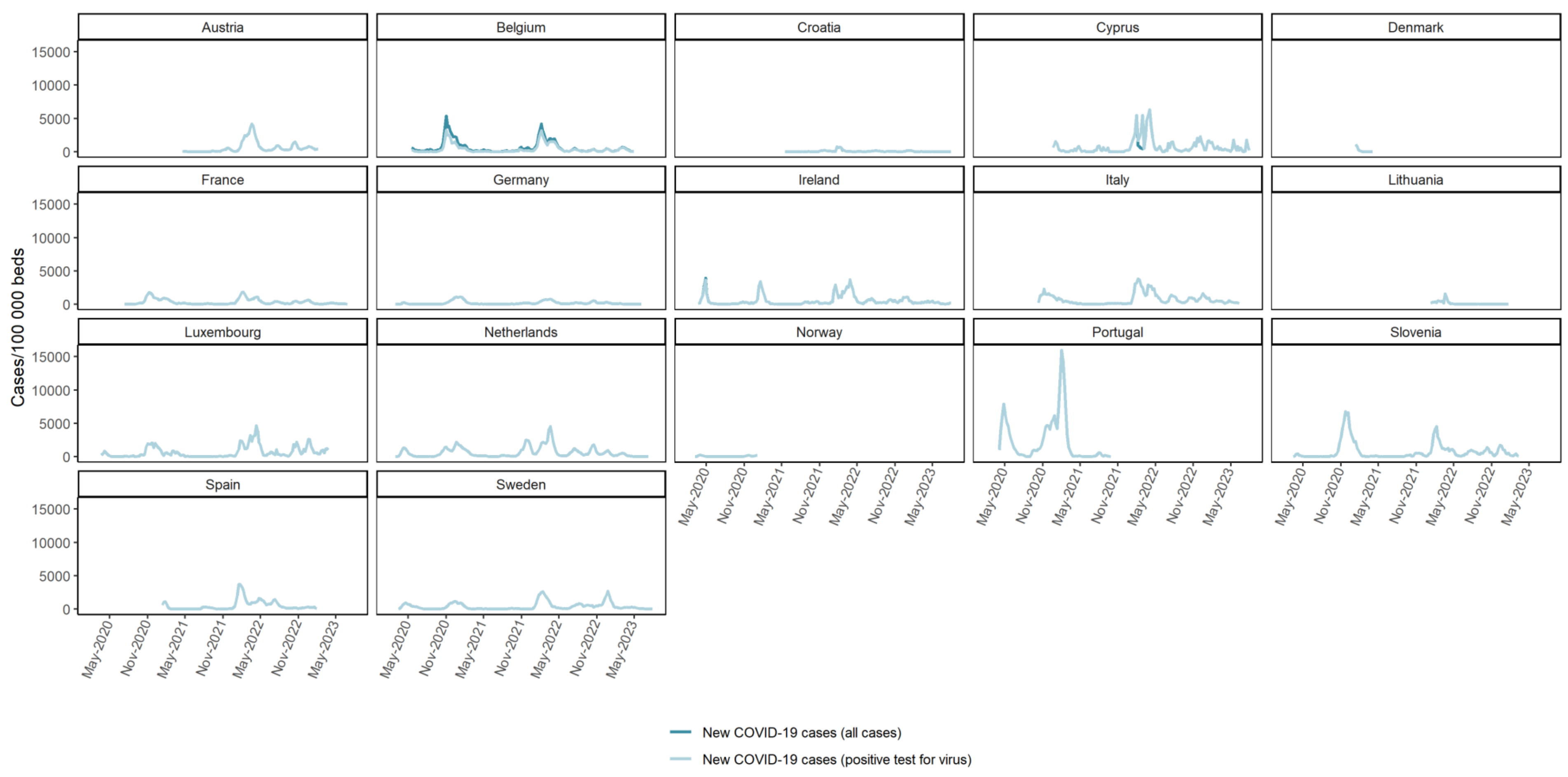
Country	Number of LTCF beds	Weekly number of participating LTCFs, mean (range)
Austria	75 710	928 (928–928)
Belgium	144 783	1 544 (1 542–1 545)
Croatia	37 249	701 (686–704)
Cyprus	3 597	67 (57–107)
Denmark	40 599	951 (951–951)
France	842 177	Not available
Germany	757 925	14 494 (14 494–14 494)
Ireland	32 000	2 555 (2 555–2 555)
Italy	30 906	696 (578–793)
Lithuania	12 700	206 (206–206)
Luxembourg	6 966	66 (64–72)
Netherlands	115 000	2 552 (2 549–2 597)
Norway	39 583	Not available
Portugal	9 599	Not available
Slovenia	21 321	104 (104–106)
Spain	389 031	5 200 (4 938–5 242)
Sweden	79 410	Not available

Figure A1. Proportion of LTCFs with new confirmed COVID-19 cases and/or affected by COVID-19 outbreaks, 11 EU/EEA countries, 2020–2023, as of October 2023 (fixed Y-axis scale)



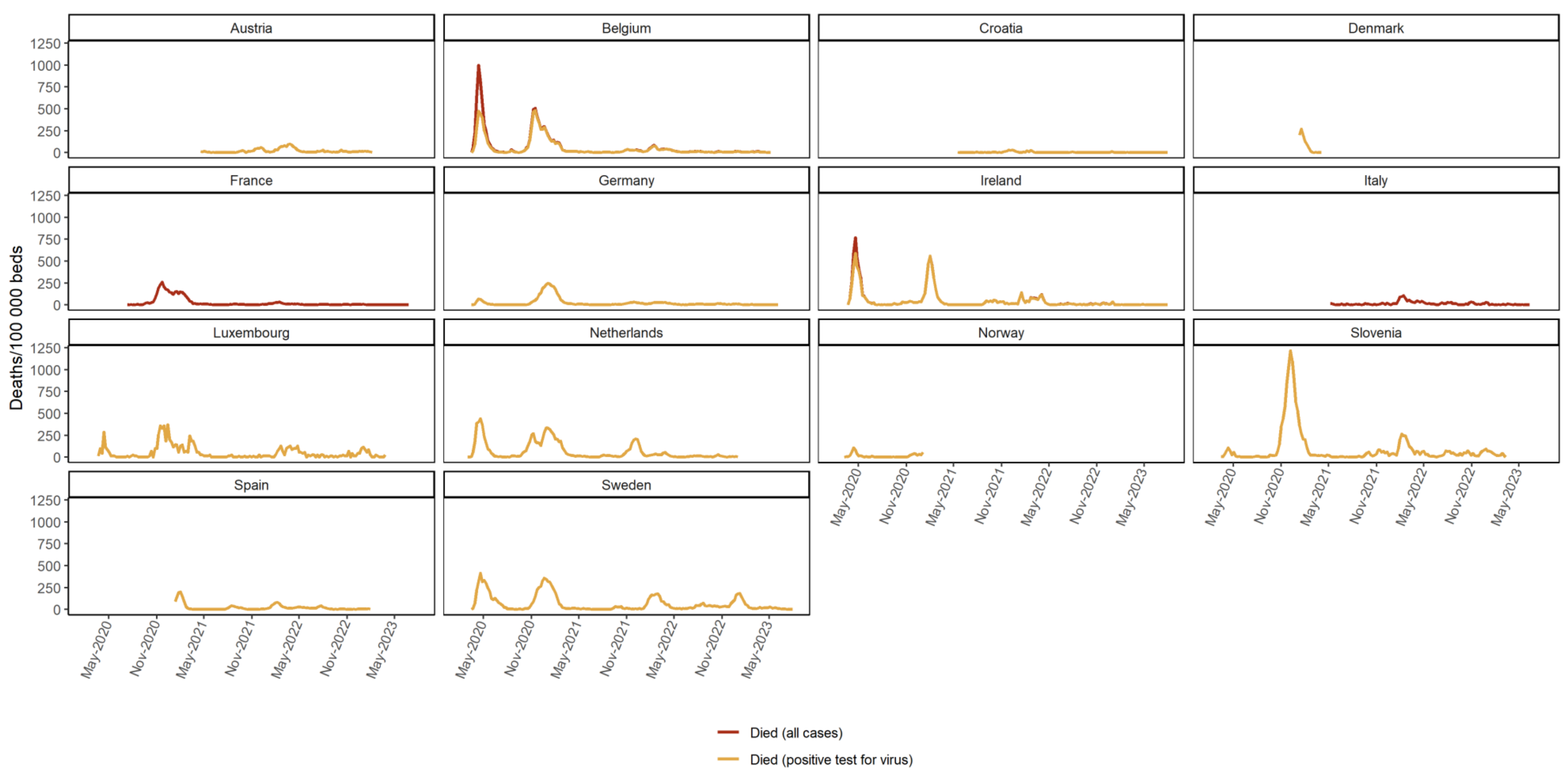
Note: if a country reported the same numbers for 'LTCFs reporting a cluster of new COVID-19 cases', and 'LTCFs reporting at least one new COVID-19 case', only the latter is displayed in this figure.

Figure A2. Incidence of COVID-19 cases among LTCF residents, 17 EU/EEA countries, 2020–2023, as of October 2023 (fixed Y-axis scale)



Note: if a country reported the identical numbers for 'new COVID-19 cases (all cases)' and 'new COVID-19 cases (positive test for virus)', only the latter is displayed in this figure.

Figure A3. **Incidence of COVID-19 fatal cases among LTCF residents that occurred in any location, 14 EU/EEA countries, 2020–2023, as of October 2023 (fixed Y-axis scale)**



Note: if a country reported the identical numbers for 'Died (all cases)' and 'Died (positive test for virus)', only the latter is displayed in this figure. Similarly, if a country reported the same numbers for 'Died (all cases)' and 'Died in LTCF (all cases)', the country data is displayed in Figure 5 and not in this figure.

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