Public Reporting of Adverse Events From Long-Term Care Facilities for Older Persons and People With Disability in Ireland 2013-2019: Development of an Openly Accessible Database and Descriptive Analyses.

JAMDA xxx (2021) 1–7

JAMDA

journal homepage: www.jamda.com

Original Study

Public Reporting of Adverse Events From Long-Term Care Facilities for Older Persons and People With Disability in Ireland 2013-2019: Development of an Openly Accessible Database and Descriptive Analyses

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Keywords:
Long-term care facilities
residential care
nursing home
notifications
monitoring
adverse events
patient safety
risk assessment

A B S T R A C T

Objectives: To describe the development of an analyzable database of statutory notifications received from long-term care facilities (LTCFs) and to describe trends in receipt of notifications from 2013 to 2019.
Design: Description of database development with descriptive and trend analyses.
Setting and Participants: LTCFs for older persons and for people with disability in Ireland.
Methods: Data on notifications received and on centers were extracted from a system internal to the health and social services regulator and combined into an analyzable database. Variables were screened for personal information, cleaned, transformed, or redacted and combined into a database suitable for open access publication. Descriptive analyses of the volume of notifications, trends over time and breakdown by service type, notification type, and risk-rating were conducted.
Results: The Database of Statutory Notifications from Social Care in Ireland was developed and an open access version published in February 2021. Protection of personal data was an important consideration in publishing the data publicly. Uses of the database include examination of national trends and identification of determinants of adverse events and areas for quality improvement. The number of notifications received increased over time. Quarterly notifications contributed to the largest proportion of notifications (older persons, 36.7%; disability, 39.1%). This was followed by serious injury notifications in LTCFs for older persons (33.3%) and abuse allegation notifications in LTCFs for people with disability (36.0%). Less than 1% of individual notifications were risk-rated red (highest severity level of impact on resident welfare). The types of notifications that were collectively risk-rated highest were staff misconduct, abuse allegations, and outbreaks of infectious disease.
Conclusions and Implications: The methodology and findings can inform publications of notifications, planning and resourcing for receipt and submission of notifications, target areas for quality improvement initiatives, mandating of timelines for receipt of notifications, and the mandating of notifications in legislation.

Long-term care facilities (LTCFs) are a key sector in the provision of long-term care for older persons and people with disability. Although the term LTCF has no specific definition, LTCFs in general provide housing, nursing, and supportive services to persons who cannot live independently.

In many jurisdictions, LTCFs are regulated and the regulation enshrined in legislation.[1–3] Regulation of LTCFs is aimed at improving quality of services and safeguarding residents.[4] One commonplace

This study was funded by the Health Research Board's Secondary Data Analysis Project Grant (SDAP-2019-005) and the Health Information and Quality Authority.

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https://doi.org/10.1016/j.jamda.2021.09.015

element of regulation is the statutory responsibility of LTCFs to notify the regulator of adverse events. Notifications are used by regulators to inform their monitoring approach for LTCFs and as part of assessments for compliance with regulations. However, notifications are also a source of information that could identify and reduce the occurrence of avoidable harm and inform quality and safety improvements.

Detailed notifications data are not typically made public, although most regulators publish regulatory reports with an overview of notifications received.[5–8] Under EU legislation on open data and the reuse of public sector information, there is an onus on member states to make public sector data freely available and reusable.[9] Although publishing regulatory reports in downloadable, machine-readable formats fulfil this obligation, notifications data can be considered a national data collection and suitable for publication as findable, accessible, interoperable, reusable (FAIR) data.

In Ireland, LTCFs for older persons (LTCFs-OP) have been regulated since 2009[10] and LTCFs for people with disability (LTCFs-D) since 2013.[11] Providers for these LTCFs submit statutory notifications, as mandated in the respective regulations.[10,11] The information is used by inspectors to assess the risk to residents and to inform their monitoring approach. Prior to February 2021, detailed data on notifications were not made publicly available and the nature of the data collection limited analyses.

Herein we describe the development of a publicly available, analyzable database of notifications received by the social care services regulator in Ireland. Facilitated by this newly constructed database, we also describe trends in receipt of notifications from LTCFs-OP and LTCFs-D in Ireland over a 6-year period (2014-2019) in terms of the volume received, breakdown by service type, notification type, and level of seriousness of the event.

Methodology

Development of the Database

The statutory notification data (as defined in the Health Act 2007[3]) from LTCFs-OP and LTCFs-D received by the social care services regulator in Ireland from 2013 to 2019 were extracted from PRISM (regulator's archive system) into R (R Studio, version 1.2.5019) in February 2020. An example of a notification as received is available in Supplementary Table 1. Demographic data on LTCFs were also extracted. Notifications data and LTCF data were linked using the LTCFs unique identifier to create the Database of Statutory Notifications from Social Care in Ireland, 2013-2019.

To create a publicly available version of the database, notifications and LTCF data were screened for personal information and for risk of identification of a person through combination of the variable with others in the database or published elsewhere (eg, by combining with investigations published by the professional review boards[12]).

Residents from LTCFs-OP (n = 5) and LTCFs-D (n = 6) were telephone interviewed to capture their views on the publication of these data. Ethical approval was obtained from Daughters of Charity Disability Support Services Ethics Committee and Tallaght University Hospital/St. James's Hospital Joint Research Ethics Committee. One LTCFs-OP and one LTCF-D were selected based on largest bed numbers. The inspector responsible for the LTCFs introduced the researchers to the person in charge in the LTCF, who in turn nominated residents to participate. Nominated residents were posted participant information and a consent form. Interviews followed a schedule of questions and were conducted by one researcher who recorded key points and quotes. Interviews were conducted until saturation of themes was reached—agreed by 2 researchers based on iterative review of interview notes. A content analyses of the notes was undertaken. Themes were identified, summarized, and supported with quotations.

Every effort was made to retain variables through cleaning, recoding, and collapsing into categories. Variables that could not be desensitized were redacted. The unique identifier for LTCFs was deleted to prevent resident identification through knowledge of LTCF characteristics, particularly possible where resident numbers were small. Two people familiar with the data but external to the project, and a Data Protection Officer, reviewed the list of variables to be included with an emphasis on risk of inadvertent release of personal data. The database was compiled using R and stored as a CSV file. All steps were coded and the script annotated to support reproducibility and updates.

We developed several tools to assist users to interpret the data. A data map of variables outlining how they interlink and a data dictionary that included standardized definitions of the variables, information about the origin, and completeness of the variables and information to assist users to interpret the data, were prepared.[13,14] A Data Quality Statement that included an overview of the data collection, description of the data source, and the data quality, was also prepared.[15] Tools to support analyses were also developed, including an eLearning module (Articulate Rise, version dated January 28, 2021[16]) and a data visualization dashboard (Tableau Public).[17,18]

Descriptive Analyses

The Database of Statutory Notifications from Social Care in Ireland, 2013-2019, was used for analyses. Analyses were performed using R. There were 125,725 notifications in the database. Under the assumption of missingness at random, we excluded notifications from LTCFs with no bed numbers listed for the year of receipt (n = 21,808), notifications without risk-ratings (n = 7434), and notifications submitted during 2013 as this was a partial year (n = 1252), leaving 95,231 notifications for analyses.

The number of notifications received was expressed unadjusted and adjusted for registered bed numbers (n per 100 beds) and tabulated by service type (older persons, disability) and year. The number and percentage of notification types contributing to total notifications received were calculated and expressed by service type and by year.

On receipt, a notification is risk-rated by the inspector responsible for the monitoring of the LTCF.[19] The inspector assesses the notification and determines the risk impact on the safety and well-being of residents (1-5: negligible, minor, moderate, major, catastrophic) and the risk likelihood (1-5: rare, unlikely, possible, likely, almost certain). The risk-rating is a composite of the impact multiplied by the likelihood. The risks are collapsed into levels as follows: 1-3, green; 4-6, yellow; 8-15, orange; 16-25, red. The number and percentage of total notifications and individual notification type received were calculated for each risk-rating level. The risk-rating of notification types (mean ± SD) were calculated and expressed by service type and year.

Sensitivity Analyses

To check the impact of excluding notifications for these analyses, we recalculated the number of notifications received with no exclusions and tabulated by service type and year.

Pressure sores were reported by LTCFs-OP as a serious injury notification from 2013 to 2015 and as a quarterly notification from mid-2015 onward. One quarterly notification can include ≤10 pressure sore events. The number and percentage contribution to total notifications, of 3-day notifications received by year from LTCFs-OP was recalculated excluding pressure sore notifications.

Supplementary Analyses

The demographics n (%) of LTCFs in the data set were described by service-type, provision by sex (single-sex or mixed), age group, and

bed number category using LTCFs registered in 2018 (n = 1891). Describing the demographics using point-in-time data accounted for potential overcounting, as some LTCFs restructured during the 7-year period.

A change to reporting practices meant that during 2018, quarterly notifications were disaggregated into individual types (use of restraint, fire alarm activation, pattern of theft, other injuries, expected deaths, and pressure sores). The number and percentage of these notification types contributing to total quarterly notifications received was calculated and expressed by service type for 2019, along with the risk-rating of quarterly notification types (mean ± SD).

Results

Publication of the Databases

The Database of Statutory Notifications from Social Care, 2013-2019, was published internally to the social care services regulator on January 29, 2021. This contains 125,725 notifications and 409 variables (variable names, Supplementary Table 2). There were no redactions. Access is limited to regulator staff or by external request under a data-sharing agreement. The national database is updated in March of each year with the previous year's notifications, individual notifications are available to regulators as and when they are submitted. Current uses of the database include analysis of mortality and causes of death, use of restrictive practices, factors contributing to adverse events, and the cost associated with incidence of pressure sores. The database and associated tools took 3 researchers 9 months to develop.

There are 2 over-arching types of notifications included in the database, 3-day notifications where notification of a single event is mandated within 3 days of the event, and quarterly notifications where notifications are submitted in composite (≤10 events) at the end of the annual quarter detailing the events that occurred during the quarter. Individual notification types are outlined in Supplementary Table 3.

From the analysis of engagement with residents, 2 parent themes were identified: concerns about privacy and enthusiasm about publication of the data. Within concerns about privacy, there were 2 subthemes. Residents spoke about the importance of privacy and their desire that no personal information should be shared, "No personal information, names etc. Anything like GDPR. Privacy is very important to me." Residents, at the same time, thought that once data were anonymized that they should be shared: "Happy that this [anonymized data] is [made] available." All residents agreed with the intention to publish the data: "Yes very, everyone's voice should be heard." "It [publishing the data] is a good thing that can help people and how they live." Residents were happy that research would be undertaken using the data: "Happy that it's available to people and researchers. It will do good." Residents thought publishing the data would give a voice to residents and help inform the public as to the situation in LTCFs: "Yes we should be telling the public. The public don't understand how people with disability live in the community." "Can't think of any reason not to inform public."

The Database of Statutory Notifications from Social Care, 2013-2019 (Open Access), was published on 26 February 2021.[20] The data map, data dictionary, data quality statement, eLearning module, and data visualization dashboard (Figure 1) were published alongside it.[13–15,17,18] The open access database contains 125,725 notifications and 132 variables (variable names, Supplementary Table 2).

Descriptive Analyses

Before exclusions, 58,275 notifications (37,447 three-day, 20,828 quarterly) were received from LTCFs-OP over 7 years and 66,639

Fig. 1. Screenshot of the data visualization dashboard for the Database of Statutory Notifications from Social Care in Ireland. Available at: https://public.tableau.com/app/profile/lens.project.hiqa/viz/DatabaseofStatutoryNotificationsfromSocialCare/Home. NF01, unexpected death; NF02, infectious disease outbreak; NF03, serious injury; NF05, unexplained absence; NF06, abuse allegations; NF07, allegations of misconduct; NF09, unplanned evacuations; NF39A, use of restraint; NF39B, activation of fire alarm; NF39C, theft; NF39E, pressure sores.

Table 1
Total, 3-Day, and Quarterly Notifications Received by the Social Care Services Regulator in Ireland by Service Type and Year (N = 95,231)

	Year					
	2014	2015	2016	2017	2018	2019
Older persons						
Long-term care facilities (n)	276	524	560	592	580	581
Registered beds (n)	13,782	23,275	25,031	25,944	26,109	25,756
Total notifications (n)	3904	7302	6254	7023	9277	11,817
Total notifications (n per 100 beds)	28.3	31.4	25.0	27.1	35.5	45.9
3-d notifications (n)	2896	5447	4682	4819	5431	5567
3-d notifications (n per 100 beds)	21.0	23.4	18.7	18.6	20.8	21.6
3-d notifications, pressure sores removed (n)*	2043	3998	4600	4819	5431	5567
3-d notifications, pressure sores removed (n per 100 beds)*	14.8	17.2	18.4	18.6	20.8	21.6
Quarterly notifications (n)	1008	1855	1572	2204	3846	6250
Quarterly notifications (n per 100 beds)	7.3	8.0	6.3	8.5	14.7	24.3
Disability						
Long-term care facilities (n)	37	348	661	905	1169	1236
Registered beds (n)	464	2974	4718	6076	7366	7380
Total notifications (n)	176	2348	5036	9632	14,571	17,891
Total notifications (n per 100 beds)	37.9	79.0	106.7	158.5	197.8	242.4
3-d notifications	81	1242	3268	6446	9180	10,035
3-d notifications (n per 100 beds)	17.5	41.8	69.3	106.1	124.6	136.0
Quarterly notifications	95	1106	1768	3186	5391	7856
Quarterly notifications (n per 100 beds)	20.5	37.2	37.5	52.4	73.2	106.4

*Notification of pressure sores removed. In 2013, 2014, and 2015, notifications of pressure sores were submitted as serious injury notifications; from early 2016 onward, pressure sores were recorded as quarterly notifications.

(40,492 three-day, 25,927 quarterly) from LTCFs-D over 6 years. 811 historical notifications without service-type were also contained in the database.

The number of registered LTCFs and beds increased in both service-types between introduction of regulation and 2019 (Table 1).

The total number of notifications and the number per 100 beds increased in both service types between 2014 and 2019 (Table 1). The findings were consistent when the data were split into 3-day and quarterly notifications, except for 3-day notifications from LTCFs-OP (Table 1). There were higher 3-day notifications per 100 beds from LTCFs-OP in earlier years. This is explained by a change in reporting practices from submission of a 3-day notification for each pressure sore to submission of one quarterly. When we removed all pressure sore notifications, there was a linear increase over time in the total 3-day notifications and per 100 beds.

The assumption of missing at random was not upheld; missingness was inflated in earlier years. On evaluating the number of notifications without exclusions, the trend of an increase over time was retained (Supplementary Table 4).

Overall, quarterly notifications contributed to the largest proportion of notifications from LTCFs-OP (36.7%) and LTCFs-D (39.1%) (Table 2). For LTCFs-OP, this was followed by serious injury (33.3%, pressure sores removed), abuse allegations (10.1%), and unexpected deaths (8.5%). For LTCFs-D, it was followed by abuse allegations (36.0%), notification of fire, loss of service or unplanned evacuation (10.4%), and serious injury (10.0%). Findings were largely consistent over time.

Most notifications received were risk-rated yellow (n = 61,571, 64%), followed by green (n = 28,097, 30%), orange (n = 5505, 6%), and red (n = 58, <1%). Notifications that were red risk-rated included notifications of abuse allegations (n = 27, 46%), serious injury (n = 12, 21%), unexpected death (n = 11, 19%), composite quarterly (n = 3, 5%), use of restraint (n = 2, 3%), unexplained absence (n = 1, 2%), fire, loss of service, or unplanned evacuation (n = 1, 2%), and staff misconduct (n = 1, 2%).

The mean risk-rating of all notification types from LTCFs-OP in any 1 year was ≤6.2. Notifications of staff misconduct, outbreak of infectious disease, and abuse allegations had the highest mean risk-rating over the 6 years (5.6 ± 2.2, 5.6 ± 1.8, 5.6 ± 2.1, respectively) (Table 3). The mean risk-rating of all notifications from LTCFs-D was ≤8.0. Notifications of staff misconduct had the highest mean risk-rating over the 6 years (5.5 ± 2.2).

Based on LTCFs registered in 2018-2019 only (n = 1891), 69% were LTCF-D and 31% were LTCF-O (Supplementary Table 5). LTCFs-D were typically smaller (<20 beds) and LTCFs-OP were typically larger (>20 beds). LTCFs were largely mixed-sex and catered for adults.

When quarterly notifications were disaggregated into separate types, notification of restraint contributed the largest proportion in both service types (Supplementary Table 6). Pressure sore notifications were risk-rated the highest (mean ± SD: 5.0 ± 2.1).

Discussion

Preventing adverse events is an ongoing challenge in health and social care. Adverse events can be defined as unintended injuries or complications that are caused by the management of a patient's health care, rather than by the patient's underlying disease.[21] This definition is typically used in acute settings, where reporting is often voluntary.[22]

In the context of regulation of LTCFs, adverse events are typically broader. They refer to events that may impact on the quality and safety of the care of residents. Reporting to the regulator is often mandatory and defined in legislation.

Reporting on and analyzing adverse events is important for understanding system failures and contributing factors, making risk management recommendations, identifying opportunities for quality improvement, and facilitating evaluation of new initiatives.[23,24] The World Health Organization, in their article on Global Priorities for Patient Safety Research, highlighted the lack of data and research into adverse events in settings outside of hospitals.[25] Statutory notifications of adverse events that take place in LTCFs are collected in Ireland. Although it is inherently challenging to publish these data owing to potential for identification of an individual, it is possible and a worthwhile endeavor given the potential for quality improvement.

Table 2
Statutory Notifications Received by the Social Care Services Regulator in Ireland, by Notification Type, Service-Type, and Year (N = 95,231)

	Year																			
	2014			2015			2016			2017			2018			2019			2014-2019	
	n	n/100 Beds	%	n	n/100 Beds	%	n	n/100 Beds	%	n	n/100 Beds	%	n	n/100 Beds	%	n	n/100 Beds	%	n	%
Older persons																				
Unexpected deaths	292	2.1	7.5	782	3.4	10.7	708	2.8	11.3	693	2.7	9.9	715	2.7	7.7	693	2.7	5.9	3883	8.5
Outbreak of infectious disease	113	0.8	2.9	217	0.9	3	229	0.9	3.7	224	0.9	3.2	303	1.2	3.3	206	0.8	1.7	1292	2.8
Serious injury	2173	15.8	55.7	3742	16.1	51.2	2648	10.6	42.3	2554	9.8	36.4	2738	10.5	29.5	2913	11.3	24.7	16,768	36.8
Serious injury*	1320	9.6	43.3	2293	9.9	39.2	2566	10.3	41.6	2554	9.8	36.4	2738	10.5	29.5	2913	11.3	24.7	14,384	33.3
Unexplained absence	75	0.5	1.9	127	0.5	1.7	194	0.8	3.1	182	0.7	2.6	220	0.8	2.4	211	0.8	1.8	1009	2.2
Allegation of abuse	188	1.4	4.8	392	1.7	5.4	672	2.7	10.7	894	3.4	12.7	1187	4.5	12.8	1270	4.9	10.7	4603	10.1
Misconduct of staff or registered provider	34	0.2	0.9	61	0.3	0.8	128	0.5	2	103	0.4	1.5	109	0.4	1.2	107	0.4	0.9	542	1.2
Professional review of a staff member	3	0.0	0.1	4	0.0	0.1	4	0.0	0.1	15	0.1	0.2	7	0.0	0.1	6	0.0	0.1	39	0.1
Any fire, loss of power, heating, water, or unplanned evacuation	18	0.1	0.5	122	0.5	1.7	99	0.4	1.6	154	0.6	2.2	152	0.6	1.6	161	0.6	1.4	706	1.5
Quarterly notifications	1008	7.3	25.8	1855	8.0	25.4	1572	6.3	25.1	2204	8.5	31.4	3846	14.7	41.5	6250	24.3	52.9	16,735	36.7
Total	3904	28.3	100	7302	31.4	100	6254	25.0	100	7023	27.1	100	9277	35.5	100	11,817	45.9	100	45,577	100
Disability																				
Unexpected deaths	3	0.6	1.7	37	1.2	1.6	56	1.2	1.1	75	1.2	0.8	97	1.3	0.7	75	1.0	0.4	343	0.7
Outbreak of infectious disease	2	0.4	1.1	13	0.4	0.6	46	1.0	0.9	41	0.7	0.4	78	1.1	0.5	49	0.7	0.3	229	0.5
Serious injury	21	4.5	11.9	417	14.0	17.8	710	15.0	14.1	1004	16.5	10.4	1388	18.8	9.5	1414	19.2	7.9	4954	10.0
Unexplained absence	5	1.1	2.8	51	1.7	2.2	106	2.2	2.1	167	2.7	1.7	192	2.6	1.3	151	2.0	0.8	672	1.4
Allegation of abuse	10	2.2	5.7	363	12.2	15.5	1652	35.0	32.9	3665	60.3	38.1	5675	77.0	38.9	6504	88.1	36.4	17,869	36.0
Misconduct of staff or registered provider	0	0.0	0.0	52	1.7	2.2	129	2.7	2.6	247	4.1	2.6	239	3.2	1.6	321	4.3	1.8	988	2.0
Professional review of a staff member	0	0.0	0.0	1	0.0	0.0	0	0.0	0.0	1	0.0	0.0	2	0.0	0.0	0	0.0	0.0	4	0.0
Any fire, loss of power, heating, water, or unplanned evacuation	40	8.6	22.7	308	10.4	13.1	560	11.9	11.1	1246	20.5	12.9	1509	20.5	10.4	1521	20.6	8.5	5184	10.4
Quarterly notifications	95	20.5	54	1106	37.2	47.1	1768	37.5	35.2	3186	52.4	33.1	5391	73.2	37.0	7856	106.4	43.9	19,402	39.1
Total	176	37.9	100	2348	79.0	100	5027	106.5	100	9632	158.5	100	14,571	197.8	100	17,891	242.4	100	49,645	100

*Notification of pressure sores removed. In 2013, 2014, and 2015, notifications of pressure sores were submitted as serious injury notifications; from early 2016 onward, pressure sores were recorded as quarterly notifications.

Table 3
Risk-rating of Statutory Notifications Received by the Social Care Services Regulator in Ireland (Mean ± SD) by Notification Type, Service Type, and Year (N = 95,231)

	Year						
	2014	2015	2016	2017	2018	2019	2014-2019
Older persons							
Unexpected deaths	3.3 ± 2.3	4.3 ± 2.3	4.4 ± 1.6	4.4 ± 1.6	4.3 ± 1.5	4.3 ± 1.8	4.2 ± 1.8
Outbreak of infectious disease	5.4 ± 2.3	5.4 ± 2.1	5.8 ± 1.6	5.4 ± 1.7	5.6 ± 1.6	6.0 ± 1.7	5.6 ± 1.8
Serious injury	4.8 ± 2.3	5.1 ± 2.1	5.5 ± 1.6	5.3 ± 1.5	5.3 ± 1.5	5.3 ± 1.8	5.2 ± 1.8
Serious injury*	4.8 ± 2.5	5.1 ± 2.3	5.4 ± 1.7	5.3 ± 1.5	5.3 ± 1.5	5.3 ± 1.8	5.0 ± 2.0
Unexplained absence	4.8 ± 2.5	5.2 ± 2.3	5.3 ± 1.7	5.3 ± 1.9	5.4 ± 1.8	5.5 ± 2.1	5.2 ± 2.0
Allegation of abuse	5.4 ± 2.5	5.8 ± 2.5	6.0 ± 2.0	5.5 ± 1.8	5.4 ± 2.0	5.5 ± 2.1	5.6 ± 2.1
Misconduct of staff or registered provider	4.7 ± 2.5	6.2 ± 2.9	5.7 ± 2.0	5.6 ± 1.8	5.8 ± 2.1	5.5 ± 2.2	5.6 ± 2.2
Professional review of a staff member	5.3 ± 1.2	5.0 ± 2.6	5.8 ± 0.5	5.0 ± 2.7	5.4 ± 1.0	6.0 ± 2.3	5.3 ± 2.1
Any fire, loss of power, heating, water, or unplanned evacuation	2.9 ± 1.9	3.5 ± 2.2	3.6 ± 1.7	3.4 ± 1.7	3.7 ± 2.0	3.6 ± 2.1	3.5 ± 2.0
Quarterly notifications	3.5 ± 2.0	3.7 ± 1.8	3.9 ± 1.8	3.9 ± 1.8	4.1 ± 1.8	4.1 ± 2.0	4.0 ± 1.9
Total notifications	4.3 ± 2.3	4.7 ± 2.2	5.0 ± 1.9	4.7 ± 1.8	4.8 ± 1.9	4.7 ± 2.0	4.7 ± 2.0
Disability							
Unexpected deaths	3.3 ± 1.5	4.3 ± 2.3	4.7 ± 2.2	4.9 ± 1.7	4.5 ± 2.5	3.7 ± 2.0	4.4 ± 2.2
Outbreak of infectious disease	2.5 ± 0.7	4.6 ± 2.4	4.7 ± 1.3	4.6 ± 1.4	4.6 ± 1.3	4.1 ± 2.0	4.5 ± 1.6
Serious injury	5.5 ± 2.5	5.2 ± 2.0	5.1 ± 1.8	5.2 ± 2.0	4.9 ± 1.8	4.7 ± 2.1	5.0 ± 2.0
Unexplained absence	4.4 ± 1.5	5.2 ± 1.9	5.3 ± 2.0	5.4 ± 2.0	5.1 ± 1.7	5.2 ± 2.5	5.2 ± 2.0
Allegation of abuse	5.8 ± 5.8	5.6 ± 2.1	5.4 ± 1.7	5.5 ± 1.9	5.2 ± 1.7	5.1 ± 2.1	5.2 ± 1.9
Misconduct of staff or registered provider	0	4.9 ± 2.7	5.4 ± 2.0	6.3 ± 2.3	5.3 ± 2.0	5.1 ± 1.8	5.5 ± 2.1
Professional review of a staff member	0	3.0 ± 0	0	2.0 ± 0	8.0 ± 2.8	0	5.3 ± 3.6
Any fire, loss of power, heating, water, or unplanned evacuation	2.3 ± 1.4	2.7 ± 1.5	2.7 ± 1.4	2.9 ± 1.4	2.7 ± 1.3	2.4 ± 1.4	2.7 ± 1.4
Quarterly notifications	3.7 ± 2.1	3.9 ± 2.0	4.1 ± 1.7	4.4 ± 1.7	3.9 ± 1.8	3.7 ± 1.9	3.9 ± 1.8
Total notifications	3.7 ± 2.3	4.3 ± 2.2	4.6 ± 1.9	4.8 ± 2.0	4.4 ± 1.9	4.2 ± 2.1	4.4 ± 2.0

*Notification of pressure sores removed. In 2013, 2014, and 2015, notifications of pressure sores were submitted as serious injury notifications; from early 2016 onward, pressure sores were recorded as quarterly notifications.

To address this gap, we developed the Database of Statutory Notifications from Social Care in Ireland. This is a national data collection of the notifications relating to adverse events in LTCFs-OP and in LTCFs-D in Ireland from 2013 to 2019. An open access version of this database has been made publicly available for research purposes and will be updated on a yearly basis.[20] This newly constructed database can facilitate research including examination of trends over time in receipt of notifications, analyses of adverse events at a national level, and identification of system-level and organizational determinants of quality of care.

Herein, we have used the database to describe trends in receipt of notifications from LTCFs in Ireland over a 6-year period, in terms of the volume received, breakdown by service-type, notification type and level of seriousness of the event. The number of notifications received from both service types increased between the introduction of regulation and 2019. On the surface, this could be explained by an increase in the numbers of registered LTCFs; however, when adjusted for bed numbers, the increase remained evident. This may be that there are more events each year. Or, it may be that LTCFs improved their reporting practices over this period. In support of this second hypothesis is that the increase was larger in LTCFs-D than from LTCFs-OP. LTCFs-D are newer to regulation and the submission of notifications; therefore, the increase may reflect the learning curve. In further support, there was evidence of a plateau in 3-day notifications from LTCFs-OP in recent years. LTCFs-OP have been regulated since 2009 and are more familiar with requirements and likely have more consistent interpretation of what constitutes a notifiable event. As such, although we cannot rule out the occurrence of more events, more comprehensive reporting practice likely contributed to much of the increase.

Quarterly notifications contributed to the largest proportion of notifications received. This is unsurprising as quarterly notifications include the reporting of a range of events. Of the individual notification types, notification of serious injury in LTCFs-OP and of abuse allegations in LTCFs-D were the most frequent. Notifications of abuse allegations include both suspected and confirmed allegations and, as such, many end as unfounded allegations. Nonetheless, this highlights serious injury and abuse allegations as priority areas for research into the causes, development of preventive measures, and quality improvement initiatives.

Overall, risk-ratings were low. The notification types that were risk-rated highest were, notifications of staff misconduct, abuse allegations, and outbreaks of infectious disease. Timely notification of high-risk events to the regulator is important as it facilitates action such as triggering an inspection that may prevent reoccurrence or prompt quality improvement initiatives. These findings can support regulators and policy makers in identifying appropriate reporting timelines for the different notification types mandated within their jurisdictions.

Strengths and Limitations

To the authors' knowledge, this is the first openly accessible database of its kind. Data on adverse events are notoriously sparse, and access to reports when submitted is limited. Furthermore, the database is a national database and is therefore not susceptible to sampling biases. Notwithstanding the evidence of more comprehensive reporting over time, the data are still susceptible to potential underreporting. The data are on notifications received rather than events occurred. It is possible that events may not have been reported, particularly in LTCF-D in earlier years as they were new to being regulated.

The database is a means for analyses of notifications at a national level rather than a summary of quality parameters for individual LTCFs. As such, it is limited in what an LTCF or the public can learn about an individual LTCF; however, it does provide opportunities for examination of national trends and identification of determinants of adverse events and areas for quality improvement.

Earlier years in the database had a higher degree of missingness. To address missingness, we excluded notifications without risk-rating or bed numbers. As this missingness was not at random, this may have artificially led to the conclusion that notifications increased over time.

Sensitivity analyses using all notifications were undertaken and supported the finding of an increase over time for number of notifications. However, given that we were unable to adjust for bed numbers using the total sample, we cannot fully confirm that there is a true increase.

Conclusion and Implications

The methodology for the development of the database, as used in Ireland, can be used by others, if planning to publish notifications data—in particular, how included personal level data were anonymized, how we linked and aggregated data to create an analyzable database, and the various tools that were created to support its use.

Publishing notifications data is an avenue to providing a voice for residents, and it may increase transparency and promote innovation. It facilitates analyses at a national level, such as mortality rates, use of restrictive practices, and contributing factors and costs associated with adverse events. A consideration for the publication of notifications data that is particularly important to residents is ensuring the protection of personal data.

Although we cannot rule out the occurrence of more events, it is likely that the increase in notifications over time is due to more comprehensive reporting practices as providers become familiar with reporting. This should be accounted for when planning for management of receipt of notifications and for training when introducing new notifications.

A large proportion of notifications were of serious injuries from LTCFs-OP and of abuse allegations from LTCF-D, highlighting priority areas for quality improvement initiatives.

Notifications of staff misconduct, abuse allegations, and outbreaks of infectious disease were risk-rated highest. These higher risk notifications should be considered when mandating timelines within which the regulator should be notified and when considering notifications for inclusion in legislation.

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Supplementary Table 3
Type of Notifications Mandated by the Health Act 2007* to be Reported to the Social Care Services Regulator in Ireland

Code	Notification Type
Three-day notification period	
NF01	Unexpected death
NF02	Outbreak of infectious disease
NF03	Serious injury
NF05	Unexplained absence
NF06	Allegation, suspected or confirmed, of abuse
NF07	Misconduct of staff or registered provider
NF08	Professional review of a staff member
NF09	Any fire, loss of power, heating, water, or unplanned evacuation
Quarterly notification period†	
NF39A	Any occasion where a restraint was used
NF39B	Any occasion of fire alarm activation
NF39C	Any recurring pattern of theft or burglary
NF39D	Any injury that did not require a 3-day notification (Disability) Any deaths other than notified under NF01 (Older persons)
NF39E	Any deaths other than notified under NF01 (Disability) Any pressure sore (grade II or higher) sustained by a resident (older persons)
NF39	A composite of the above quarterly notifications*

*Health Act 2007, Stat. No. 23 of 2007.
†Quarterly notifications were split into 5 separate notification types in 2018 and reported as such thereafter.

Supplementary Table 4
Total, 3-Day, and Quarterly Notifications Received by the Social Care Services Regulator in Ireland by Service Type and Year—No Exclusions for Missing Bed Numbers or Risk Rating (n = 125,725)

	Year						
	2013	2014	2015	2016	2017	2018	2019
Older persons							
Statutory notifications (n)	7666	7801	8169	6429	7055	9284	11,871
3-d notifications (n)	5248	5588	6033	4738	4822	5431	5587
3-d notifications, pressure sores removed (n)*	4586	4028	4410	4652	4822	5431	5587
Quarterly notifications (n)	2418	2213	2136	1691	2233	3853	6284
Disability							
Statutory notifications (n)	387	4803	7720	8902	12,035	14,596	18,196
3-d notifications (n)	104	2309	4600	6092	8138	9180	10,269
Quarterly notifications (n)	283	2494	3120	2810	3897	5416	7927
No service type listed							
Statutory notifications (n)	219	533	29	25	5	0	0
3-d notifications (n)	207	483	23	26	0	0	0
Quarterly notifications (n)	12	50	16	9	5	0	0

*Notification of pressure sores removed. In 2013, 2014, and 2015, notifications of pressure sores were submitted as serious injury notifications; from early 2016 onward, pressure sores were recorded as quarterly notifications.

Supplementary Table 5
Demographics of Long-Term Care Facilities From Which Statutory Notifications Were Received by the Social Care Services Regulator in Ireland in 2018-2019

	Older Persons	Disability
Total long-term care facilities	594 (31)	1297 (69)
Sex		
Women	4 (<1)	72 (6)
Men	1 (<1)	95 (7)
Mixed-sex	589 (99)	1130 (87)
Age-group		
>18 y	0 (0)	90 (7)
<18 y	594 (100)	1201 (93)
Bed numbers		
1-4	0 (0)	483 (37)
5-9	1 (<1)	511 (39)
10-19	25 (4)	244 (19)
20-49	281 (47)	59 (5)
50-99	232 (39)	0 (0)
100-200	55 (9)	0 (0)

Values are n (%).

Supplementary Table 6
Number and Risk Rating of Quarterly Statutory Notifications Received by the Social Care Services Regulator in Ireland in 2019 by Quarterly Notification Type, Service Type, and Year*

	n	n per 100 Beds	% of Total Quarterly	Risk Rating, Mean ± SD
Older persons				
Any occasion where a restraint was used	2118	8.2	33.9	4.6 ± 1.8
Any occasion of fire alarm activation	735	2.9	11.8	2.8 ± 1.7
Any recurring pattern of theft or burglary	155	0.6	2.5	2.2 ± 2.2
Any deaths other than notified under NF01	2004	7.8	32.1	3.8 ± 1.7
Any pressure sore (grade II or higher) sustained by a resident	1238	4.8	19.8	5.0 ± 2.1
Disability				
Any occasion where a restraint was used	4074	55.2	51.9	3.9 ± 1.9
Any occasion of fire alarm activation	745	10.1	9.5	2.3 ± 1.4
Any recurring pattern of theft or burglary	49	0.7	0.6	2.6 ± 2.3
Any injury that did not require a 3-day notification	2879	39.0	36.6	3.9 ± 1.8
Any deaths other than notified under NF01	109	1.5	1.4	3.0 ± 1.8

*Excluding notifications without LTCF bed number or risk rating, as per main analyses.