

NATIONAL OFFICE OF CLINICAL AUDIT

IMPACT REPORT 2023



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Message from the NOCA Clinical Director and Executive Director

In the King's Fund 2016 paper, *Improving quality in the English NHS: A strategy for action* (Ham et al., 2016), quality improvement is defined as 'designing and redesigning work processes and systems that deliver healthcare with better outcomes and lower cost, wherever this can be achieved. This ranges from redesigning how teams deliver care in the clinical microsystems that make up healthcare organisations to large-scale reconfigurations of specialist services such as stroke care and cancer care. It includes redesign of training, budgeting processes and information systems and requires leadership and cultures that both understand and value quality improvement.' (p.3)

Clinical audit can provide data to support quality improvement at all levels, from the local clinical team through to organisation management and national policy-makers.

This report is a celebration of how the National Office of Clinical Audit's (NOCA's) national clinical audits have supported improvements across the Irish healthcare system. All our audits share a common goal of seeking to improve the delivery of care to best practice standards, resulting in better patient outcomes.

All of NOCA's audits are clinically led, and we would like to thank all of the frontline staff who have contributed to the success of our audits, most on a voluntary basis.

NOCA has a remit to report to the public and to the healthcare system it audits. All of NOCA's audits have public and patient representation. Listening to the patient voice is a cornerstone of how NOCA works. As NOCA's audits mature, their value is growing in relation to public health messaging and prevention of illness.

NOCA has a brilliant team of experts who continue to lead the way, and we thank them.

Finally, we would like to thank the Health Service Executive (HSE), the Department of Health and the Royal College of Surgeons in Ireland (RCSI), which have supported NOCA over the years. As a result, national clinical audit continues to grow from strength to strength each year.



A handwritten signature in black ink, appearing to read 'Brian Creedon'.

Dr Brian Creedon
Clinical Director
NOCA



A handwritten signature in black ink, appearing to read 'Collette Tully'.

Collette Tully
Executive Director
NOCA

“CLINICAL AUDIT DATA CAN PROVIDE DATA TO SUPPORT QUALITY IMPROVEMENT AT ALL LEVELS, FROM THE LOCAL CLINICAL TEAM THROUGH TO ORGANISATION MANAGEMENT AND NATIONAL POLICY-MAKERS.”

About NOCA

Since its establishment in 2012, NOCA has established itself as the trusted home for national clinical audit. NOCA is funded by the HSE, is based in the RCSI, and is independently governed by a voluntary Board.












NOCA manages the largest portfolio of national clinical audits and registers in the Irish healthcare system. NOCA audits include public and private healthcare providers.

NOCA audits inform the general public about how specific areas of their healthcare system are performing against recognised standards of care. They also support healthcare staff, management and policy-makers to better plan and improve patient care.

Through NOCA, there now exists a robust structure for the management, development and promotion of national clinical audits.

NOCA audit portfolio

NOCA

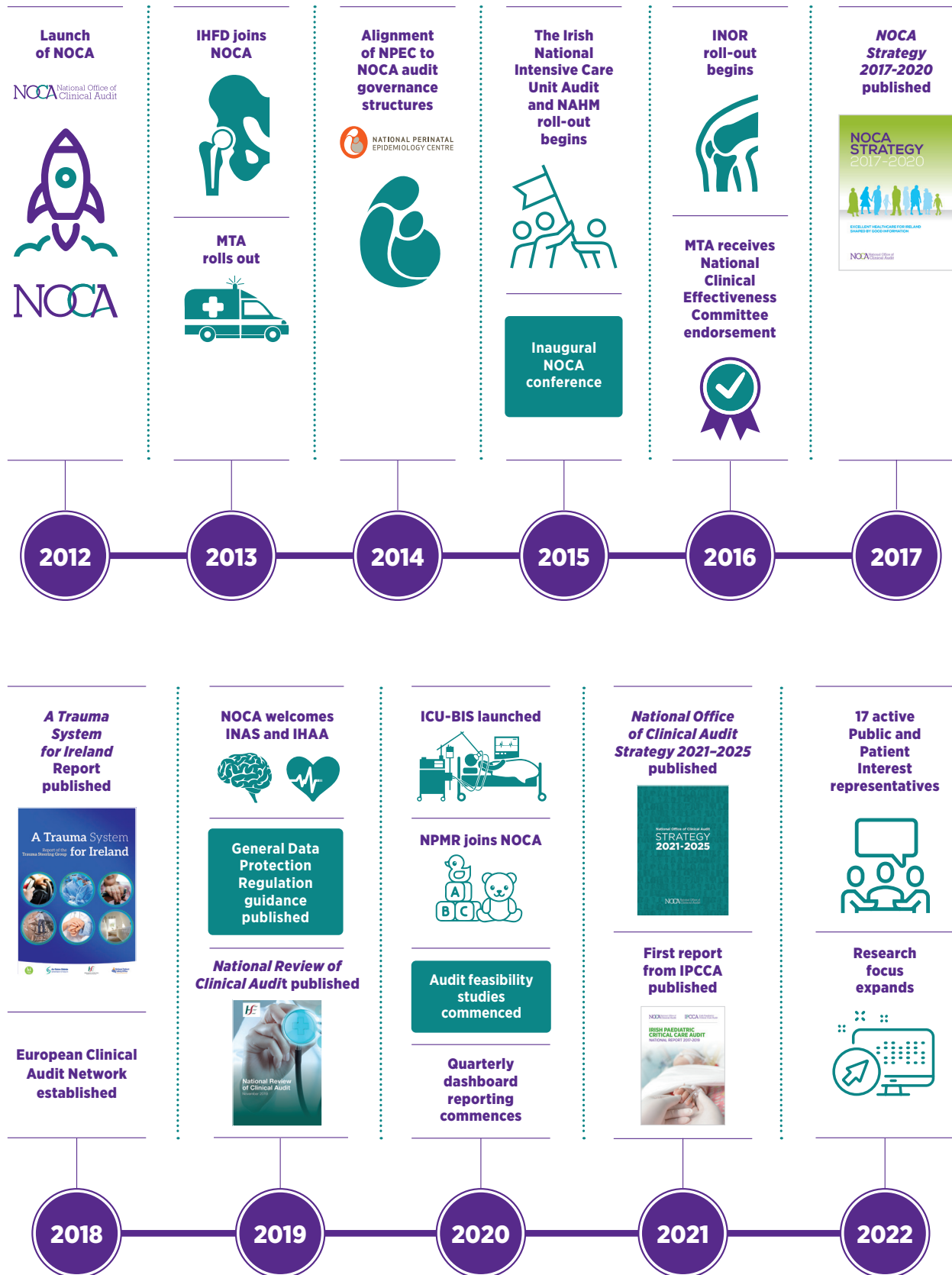
IHAA Irish Heart Attack Audit 	INAS Irish National Audit of Stroke 
MTA Major Trauma Audit 	Irish Hip Fracture Database IHFD  
INOR Irish National Orthopaedic Register 	ICU Irish National ICU Audit 
ICU Bed Information System (ICU BIS) 	IPCCA Irish Paediatric Critical Care Audit 
NPMR National Paediatric Mortality Register 	NAHM National Audit of Hospital Mortality 

NOCA also provides governance for the national maternity audits managed by the National Perinatal Epidemiology Centre



**NATIONAL PERINATAL
EPIDEMIOLOGY CENTRE**

Celebrating 10 years of NOCA



AUDIT IMPACT

This report summarises the key impacts each of the NOCA audits has delivered across the following areas:

National

How NOCA audits enable national improvements in key quality indicators of care and outcomes

Local

How NOCA supports local healthcare providers to make local improvements

Policy

How NOCA audits support policy development and changes to the delivery of care at a system level

Public



How data from NOCA audits have been used for public health messaging and/or advocacy

Irish Heart Attack Audit (IHAA)







In 2012, the National Clinical Programme for Acute Coronary Syndrome developed the optimal reperfusion service protocol aiming to standardise the treatment of patients suffering from heart attack nationally. In 2013, a mechanism for monitoring the programme, called Heartbeat, was developed. This dataset includes 66 variables collected on each ST elevation myocardial infarction (STEMI) case reflecting pre-hospital factors, demographics and risk factors, treatment timeliness and outcomes, and in-hospital outcomes. Governance of Heartbeat transferred to NOCA in 2019 and the IHAA was established. The IHAA has published one report, *Irish Heart Attack Audit National Report 2017–2020* (NOCA, 2022a). Results have been compared when possible against the *Heart Attack Care Ireland 2016 report* (HSE, 2018).


National

The figures below show how heart attack data have changed over time, both in terms of the quality of care and patient outcomes. Some Key Quality Indicators (KQIs) have improved, while others have not.

	KQI	2017-2020	2016
	The proportion of patients with a STEMI who received timely treatment to restore blood flow (known as reperfusion) has decreased.	67%	70%
	More radial access is being performed during primary PCI procedures.	91%	86%

The *Irish Heart Attack Audit National Report 2017–2020* (NOCA, 2022a) identified variation in the timeliness of care provided to patients with STEMI depending on how they arrived at a percutaneous coronary intervention (PCI) PCI centre, resulting in poorer outcomes.

Direct to PCI centre		Transferred to PCI centre
	84% of patients brought directly by ambulance to a PCI centre arrived within the 90 minutes or less goal, compared with 22% of patients transferred from another hospital to a PCI centre.	
	In patients brought directly to PCI centres by ambulance, the median time between diagnosis of a heart attack and treatment with primary PCI was 84 minutes, compared with 155 minutes for patients transferred from another hospital.	
	84% of patients who were admitted directly to a PCI centre had timely reperfusion compared with 27% of patients who were transferred to a PCI centre.	

 Patients who received timely primary PCI had a 2.8% mortality rate, compared with 5.2% for patients who did not receive timely primary PCI. 

Current smokers present with STEMI at a much younger age compared with non-smokers.

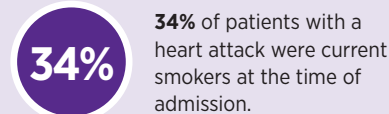
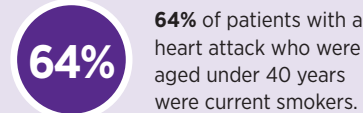
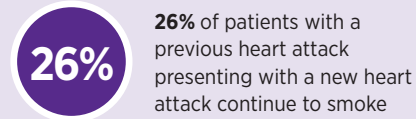
MEN



WOMEN



The rate of smoking in patients who have a heart attack is double the national smoking rate.



Local

- The development of the IHAA data validation reports has improved coverage of follow-up variables. Recording of the date of cardiac rehabilitation phase 3 has increased from 14% in 2019 to 25% in 2021, and survival status at 30 days post-myocardial infarction has increased from 47% in 2019 to 61% in 2021. These improvements in data quality will allow the IHAA to provide further insights on these aspects of patient care.
- The development of the IHAA quarterly dashboard allows each team locally to review KQIs against national results in order to identify areas for improvement.

Policy

- IHAA data have informed the forthcoming Department of Health National Review of Specialist Cardiac Services, which aims to achieve optimal patient outcomes at population level (with particular emphasis on the safety, quality and sustainability of the services that patients receive) by establishing the need for an optimal configuration of a national adult cardiac service.

Public

- Summary reports are created annually with the NOCA Public and Patient Interest (PPI) representatives to create a user-friendly document for the public to access.
- The *Irish Heart Attack Audit National Report 2017-2020* (NOCA, 2022a) identified important results based on the impact of smoking and the IHAA has engaged with the Tobacco Free Ireland programme to inform public health messaging (NOCA, 2022b).
- Public health messaging related to risk factors and signs and symptoms of heart attack has been incorporated into summary infographics produced for annual reports.
- Only 37% of patients with heart attack called for help within 60 minutes of symptom onset. Using IHAA data to identify the need for health promotion messaging is a key objective of the IHAA.

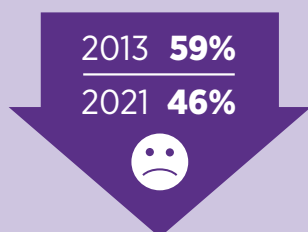
Irish National Audit of Stroke (INAS)

In 2013, the National Stroke Register (NSR) was established by the National Stroke Programme to monitor the implementation of the *Model of Care for Stroke* (HSE, 2012). Governance of the National Stroke Register was transferred to NOCA in 2019 and it was renamed the Irish National Audit of Stroke (INAS). The INAS is a clinically led audit measuring the processes, quality of care, and outcomes provided to patients with a stroke in all 24 hospitals providing acute stroke care.

National

While quality of care metrics have improved since 2013, some remain below nationally agreed targets.

The percentage of patients who arrive at hospital within 3 hours of stroke symptom onset has decreased.



The percentage of patients who receive intravenous thrombolysis has decreased.



The thrombectomy rate has increased.



The percentage of patients treated in a stroke unit has increased.



The crude mortality for ischaemic stroke has decreased.



The hospital length of stay has decreased.



Local

- Many hospitals participating in the INAS also participate in a national quality improvement project called 'Door to decision in under 30!' and can use INAS data to measure the impact of the quality improvement project on local stroke metrics using the INAS dashboard.
- Stroke teams are able to review their stroke data based on coverage and completeness through the implementation of data validation reports. Only hospitals with >80% coverage are included in national reports. In 2013, only 9 hospitals had >80% coverage, compared with all 24 participating hospitals in 2021.
- Examples of quality improvement initiatives are presented in the annual national report and on the NOCA website.
- Using data from the INAS, the National Stroke Programme will implement a quality improvement initiative in 2023 to improve swallow screening in all hospitals.

Policy

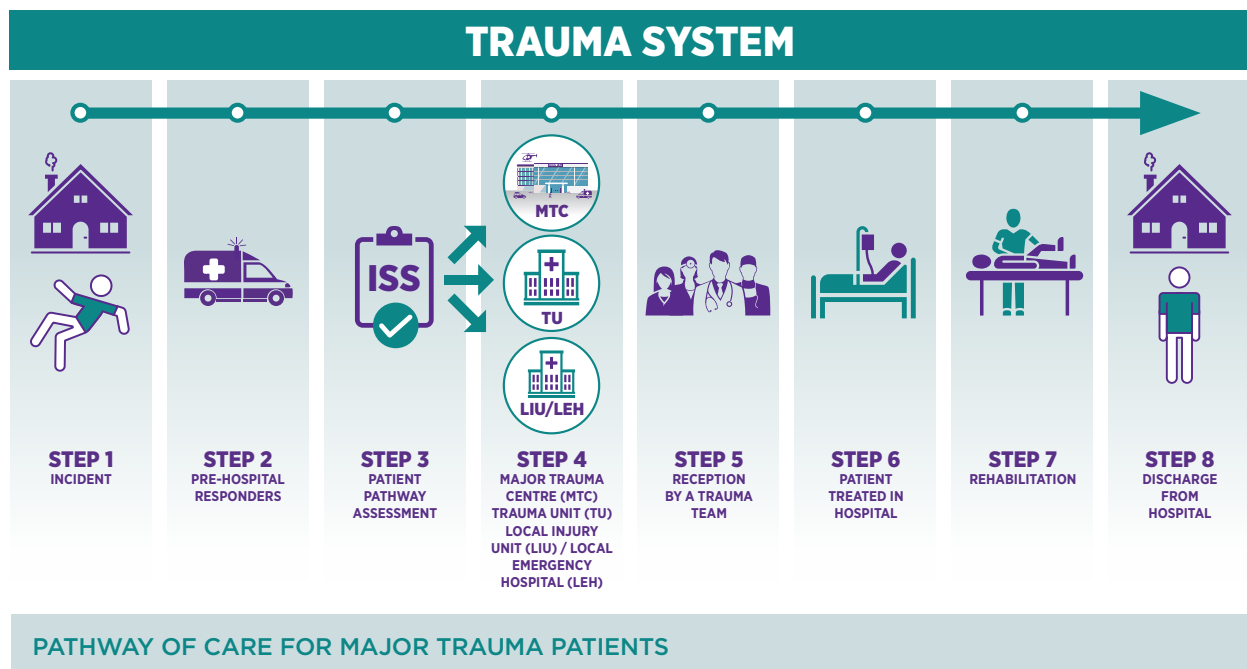
- INAS data have informed the recently published *National Stroke Strategy 2022-2027* ([HSE, 2022b](#)).

Public

- Summary reports ([NOCA, 2022](#)) are created annually with the NOCA PPI representatives to create a user-friendly document for the public to access.
- INAS data highlighted a decrease in the percentage of patients who arrive at hospital within 3 hours of stroke symptom onset. These data are now being used to support a new national *Act F.A.S.T. campaign* ([Irish Heart Foundation, n.d.](#)) in collaboration with the Irish Heart Foundation.

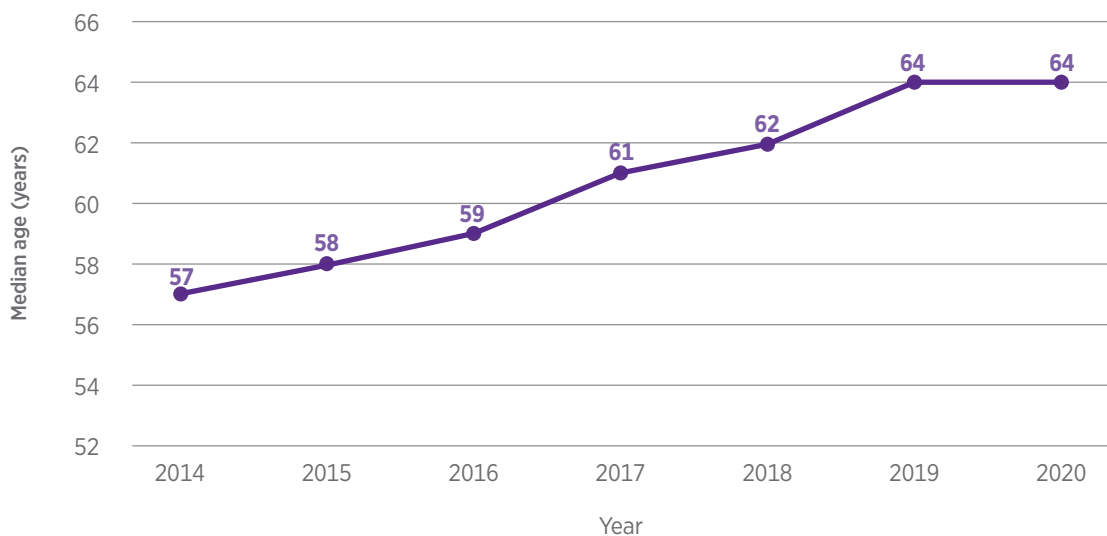
Major Trauma Audit (MTA)

The MTA collects data on patients who have suffered a trauma leading to life-changing or life-threatening injuries. NOCA has partnered with the United Kingdom (UK) Trauma Audit and Research Network (TARN) to use its methodological approach for the MTA in Ireland. TARN is the largest trauma registry in Europe and is clinically led, academic and independent. The MTA is now carried out in 26 trauma receiving hospitals in Ireland. The MTA collects data from across the pathway of care from pre-hospital to the acute hospital, capturing data on key assessments and interventions.









National

The figures below show how trauma has changed over time, not only in terms of the quality of care and outcomes of patients but also in terms of the age profile of these patients (the typical trauma patient is getting older).



MEDIAN AGE OF MAJOR TRAUMA PATIENTS BY AGE AND YEAR (2014-2020)

	KQI 1	KQI 2	KQI 3	KQI 4	KQI 5	KQI 6
						
	Percentage of patients with head injury with GCS<13, receiving CT within 1 hour	Percentage of patients transferred from hospital	Percentage of pre-alerted patients with ISS>15 brought in by either ambulance or helicopter	Percentage of patients received by a trauma team	Percentage of patients received by a trauma team, led by a consultant within 30 minutes	Percentage of patients discharged home
2016	33%	28%	9%	8%	8%	62%
2020	43%	18%	12%	9%	10%	60%

Local

- The MTA supported the development of the MTA Governance Committees through providing a comprehensive guidance document (covering their remit, membership and agenda items).
- Along with the annual report ([NOCA, 2022f](#)), the MTA provides quarterly reports to help drive change and encourage quality improvement. In addition to standardised clinical reports and dashboard reports, TARN has now developed an interactive data analytics portal called TARN Analytics where hospitals can access their own data and create live reports for specific categories.
- Hospital quality improvement projects are featured in the national reports and on the NOCA website ([NOCA, n.d.](#)).

Policy

- The MTA continues to work closely with the National Office for Trauma Services (NOTS). It has supported the designation process for the MTCs and TUs throughout the two trauma networks. In the current phase of work, the MTA is supporting the formation of pathways and guidelines for the care of major trauma patients.
- MTA data is regularly provided to the NOTS to support ongoing trauma system reconfiguration decisions.
- The MTA data utilised have allowed a focus on subgroups that are represented in the audit, including patients who are transferred, patients suffering from low falls, and older patients and paediatric patients with major trauma.
- In 2022, NOCA supported NOTS in running a workshop on rehabilitation with the two future MTCs..
- The MTA has been a powerful driver for changing the narrative about who major trauma patients are. It is now widely accepted that major trauma occurs most commonly in older people following a low-energy trauma (NOCA, 2022f). This has led to the development of national trauma guidelines for older persons by NOTS (HSE, 2022a).
- A collaborative research project with the National Ambulance Service (NAS), RCSI and NOCA is under way in a study funded by the Health Research Board (titled Targeted Review and Amalgamation of Unmapped Major trauma and Ambulance data in Ireland (TRAUMA)) to explore the possibility of combining the NAS electronic patient care record with the MTA dataset to create a more complete picture of the major trauma patient's journey through the hospital system. The data combined in both datasets will allow for pre-hospital care planning, pathway development for the new trauma system, analysis of the accuracy of triage tools, and areas for staff education.

Public








- Summary reports (NOCA, 2022g) are created annually with the NOCA PPI representatives to create a user-friendly document for the public to access.
- Public health messaging for falls prevention, activity at a home and home safety checklist for falls prevention have been produced by the MTA (NOCA, 2022g).
- The MTA has worked directly with Age Friendly Homes Ireland (a national programme funded by Sláintecare and Healthy Ireland) to use the audit data for home safety and injury prevention.
- In 2022, following the publication of *Our Journey Towards Vision Zero: Ireland's Government Road Safety Strategy 2021-2030* (Road Safety Authority, 2021), the Road Safety Authority engaged with the MTA to use the data from the audit to measure the impact of the strategy and to look at subgroups of the road trauma population.

Irish Hip Fracture Database (IHFD)

The IHFD measures case mix, best practice standards of care (known as the Irish Hip Fracture Standards (IHFS)), and outcomes of patients with hip fractures who are aged over 60 years in the 16 participating hospitals.

The IHFD started as a collaboration between the Irish Gerontological Society and the Irish Institute for Trauma and Orthopaedic Surgery.

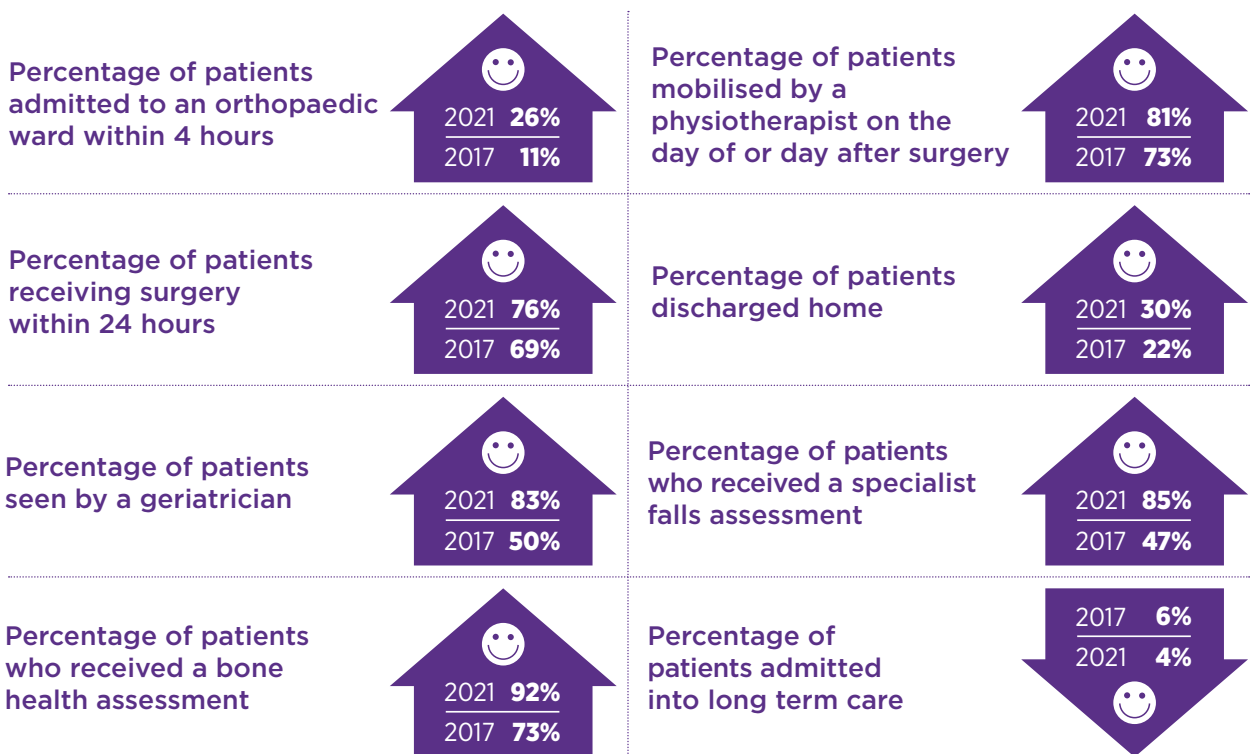
IRISH HIP FRACTURE STANDARDS (IHFS)

 <p>IHFS 1: Be admitted to an orthopaedic ward within 4 hours</p>	 <p>IHFS 2: Receive surgery within 48 hours</p>	 <p>IHFS 3: Not develop a pressure ulcer</p>	 <p>IHFS 4: Be seen by a geriatrician or advanced nurse practitioner</p>	 <p>IHFS 5: Receive a bone health assessment</p>	 <p>IHFS 6: Receive a specialist falls assessment</p>	 <p>IHFS 7: Be mobilised by the day after surgery by a physiotherapist</p>
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National

All standards of care presented below have improved over the 5-year period from 2017 to 2021. Monitoring and reporting on these standards nationally has helped to improve the care of hip fracture patients.

NATIONAL IMPACT



Local

- In 2019, a foundation programme for quality improvement was held in collaboration with the HSE National Quality Improvement Team to provide a team of three from each hospital with the skills to conduct quality improvement in their hospital. This has led to many local quality improvement initiatives, several of which have either won the NOCA QI Champion Award or been highly commended in recent years. Examples of quality improvement initiatives are presented in the *Irish Hip Fracture Database National Report 2017-2021* (NOCA, 2022c) and on the NOCA website (NOCA, n.d.).
- The IHFD has informed the development of orthogeriatric services. Three of the IHFS are core functions of an orthogeriatric service, and in 2020, the IHFD added advanced nurse practitioners to IHFS 4; since then, the number of services with orthogeriatric advanced nurse practitioners has increased. There has been an increase in orthogeriatric services from 7 in 2016 to 16 in 2021.
- In 2017, the Golden Hip Award was launched and awarded to the hospital with the highest level of compliance with the IHFS. This has generated a lot of healthy competition among the local hospitals, and for those who have won this award, it has brought great recognition of the work of the local teams.

Policy

- The IHFD has supported the NOTS (HSE, 2022a) with a suite of data access requests to enable the designation of the MTCs and TUs and inform the development of new and refined pathways of care for hip fracture and older trauma patients.
- Improvement in the hip fracture bypass (whereby patients suspected of having a hip fracture bypass the local hospital and are brought directly to a hospital with an orthopaedic service) has increased from 74% in 2013 to 96% in 2021.
- The IHFD is also supporting NOTS and the HSE on the development of trauma guidelines for older persons (HSE, 2022a).
- The IHFD was the first national clinical audit to introduce a Best Practice Tariff that recognises a commitment to continuous improvement. The funding received by the hospitals is used directly by the local hip fracture governance committees to improve the quality of patient care in the trauma service (e.g. staff training, equipment purchases for patient care). A full list of examples can be found in the *Irish Hip Fracture Database National Report 2020* (NOCA, 2021).
- The IHFD is partnering with the HSE Antimicrobial Resistance and Infection Control team to embed the first surgical site infection surveillance dataset in the IHFD, which will provide data on a full surgical cohort of patients. Further plans will follow to embed this dataset into other surgical areas to streamline surveillance of surgical site infection with national clinical audit data collections (eg. on Caesarean sections).

Public

- Summary reports ([NOCA, 2022d](#)) are created annually with the NOCA PPI representatives to create a user-friendly document for the public to access.

- Public health messaging for falls prevention, activity at home and a home safety checklist for falls prevention have been produced by the IHFD. Using data to identify this need for health promotion messaging is a key fundamental aspect of the IHFD.

- Many of these key messages have been adapted into patient information leaflets and poster presentations within the local hospital groups.

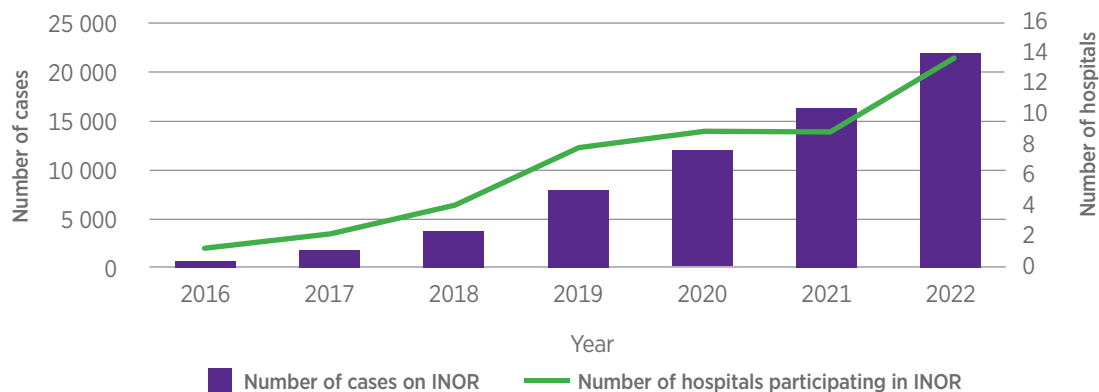
- NOCA was represented by the IHFD at the Irish Platform for Patient Organisations, Science & Industry in 2021 for the Citizens' Jury on Access to Health Information. The IHFD demonstrated how the collection of health data for the purpose of clinical audit can be done safely, and how this information is used to improve patient care.

Irish National Orthopaedic Register (INOR)

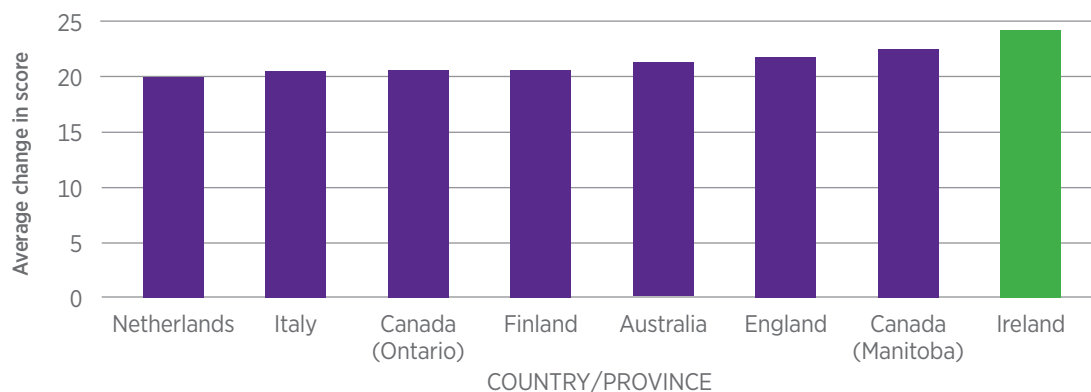
INOR was established by NOCA in 2014. INOR reports on demographic, clinical and implant component data for all patients admitted to hospital for primary and revision arthroplasty surgery in Irish hospitals. Clinical and patient-reported outcomes are also reported in order to monitor the performance of implants, institutions and surgical teams. The first national report was published in 2021.

National

- The number of elective hospitals included in INOR has increased year on year. NOCA’s objective is to have all public and private hospitals providing arthroplasty surgery included in the register by 2026.
- INOR plays a key role in patient safety, as it facilitates the prompt identification of patients with specific implants in the event of a recall or safety issue.
- The collection of patient reported outcome measures has facilitated the comparison of Irish outcomes internationally.
- INOR allows for the reporting of national quality indicators (periprosthetic fractures, infection rates, dislocations, etc.).



CUMULATIVE NUMBER OF CASES AND HOSPITALS PARTICIPATING IN THE IRISH NATIONAL ORTHOPAEDIC REGISTER, 2016-2022



ADJUSTED MEAN CHANGE BETWEEN PRE-OPERATIVE AND POSTOPERATIVE OXFORD HIP SCORE AND HOOS-PS, 2014-2020 (OR NEAREST YEAR)

Local

- Implementing INOR in a hospital requires a review of the patient pathway in order to align with the standards of INOR. This has enabled hospitals to review and change their pre-operative assessment, theatre and postoperative processes.
- The implementation of INOR in each hospital is locally managed by a clinician and a local audit coordinator. As well as managing INOR, the audit coordinator plays a vital role in the care of the patients. He/she is a key member of the multidisciplinary team providing pre-operative care, support and education, as well as postoperative care, assessment and follow-up to joint replacement surgery patients.
- INOR enables hospitals to track implants in the event of a product recall.
- INOR reports key metrics used to monitor performance at hospital level.
- Hospitals have access to data for local audit, service and quality improvement.
- A standardised electronic postoperative note is available on all surgeries.
- Implants from previous surgeries in other hospitals are available for surgeons to view in INOR in order to aid decision-making in subsequent surgeries.

Policy

- Establishment of INOR drove a review and update of the recall process at a national level, involving engagement with the HSE and the Health Products Regulatory Authority.
- Participation in INOR allows hospitals and the healthcare system to comply with European Union medical device regulations for hip and knee replacements.
- INOR data are used to inform the development of orthopaedic services in Ireland ([HSE, Trauma and Orthopaedic Surgery, n.d.](#)).

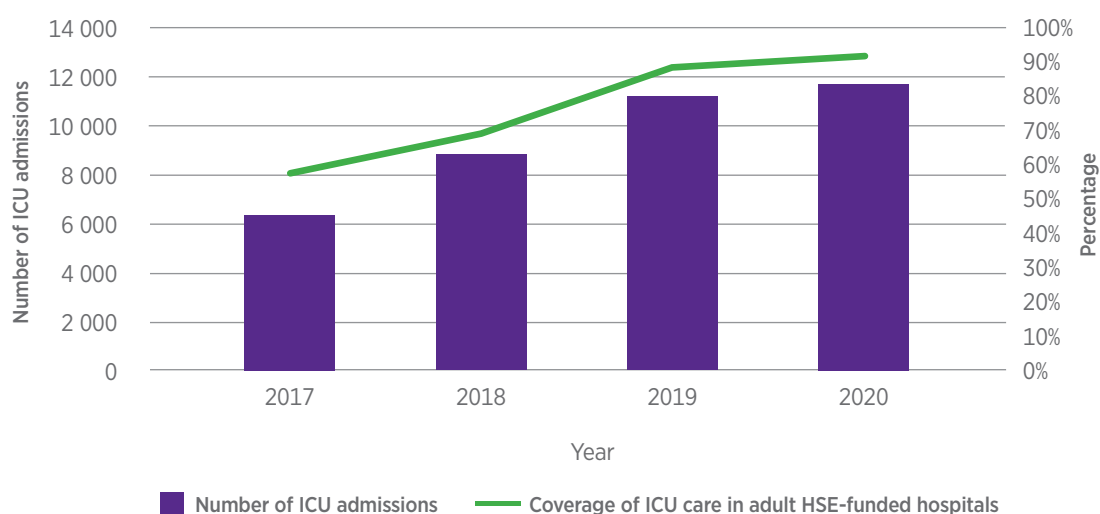
Public

- INOR produced a summary report for its first annual report, which is useful for the public, patients and families to aid in their understanding of the audit findings. Accompanying infographics increased the accessibility of the report's key messages.
- Making data available regarding clinical outcomes, patient-reported outcome measures and patient characteristics is a positive step forward in terms of transparency and accountability in our healthcare system.

Irish National Intensive Care Unit Audit (INICUA)

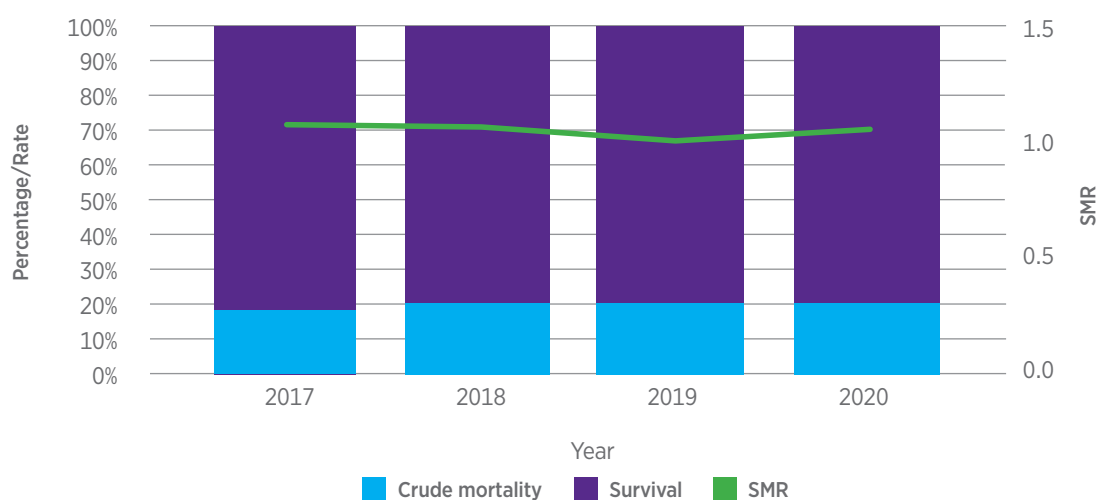
INICUA is a quality and patient safety initiative that measures the quality of care in each intensive care unit (ICU) benchmarking this against international standards. NOCA has partnered with the UK Intensive Care National Audit and Research Centre (ICNARC) to use its methodological approach for INICUA. In Ireland, activity within the participating ICUs is carefully measured to help improve the standard of critical care within hospital and to provide assurance to the public that the care of the sickest patients in the Irish healthcare system is being carefully monitored.

National



NUMBER OF INTENSIVE CARE UNIT ADMISSIONS INCLUDED IN THE IRISH NATIONAL INTENSIVE CARE UNIT AUDIT, BY YEAR

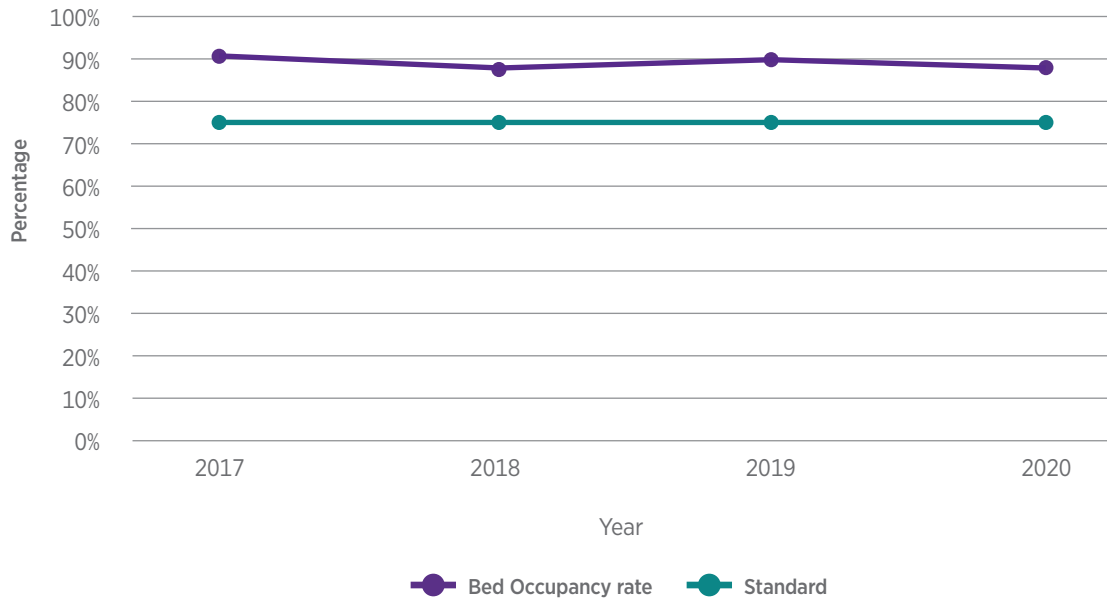
Numbers of observed deaths as a proportion of predicted deaths (ICNARC-2018 model) in Units in the Republic of Ireland (ROI) were similar to those in UK Units in 2020. All individual Units in the ROI were within the acceptable limits for risk-adjusted mortality rates. This is a very important finding, demonstrating consistently good outcomes and indicating that ICUs in Ireland provide safe and high quality care.



CRUDE MORTALITY RATE AND STANDARDISED MORTALITY RATIO (SMR) BY YEAR

Occupancy

Bed occupancy rates of 75% have been recommended by the European Society of Intensive Care Medicine (ESICM, 2011), ICUs in Ireland have been operating above this standard each year since 2017, with many individual Units having occupancy rates above 90%. This information provides supporting evidence for the need to increase the number of ICU beds in Ireland.



BED OCCUPANCY RATE BY YEAR

ICU access

Speedy admission to ICU for acutely ill patients improves outcomes. The HSE has defined two key performance indicators (KPIs) for timely admission to ICU:

- 50% of patients should be admitted within 1 hour of the decision to admit
- 80% of patients should be admitted within 4 hours of the decision to admit.

These KPIs apply only to patients admitted to ICU from the ward or Emergency Department (ED) in the same hospital. No hospital achieved the KPI of 50% of patients being admitted to ICU within 1 hour of the decision to admit in 2019 or 2020, while 36% and 47% of hospitals, respectively achieved the KPI of 80% of patients being admitted to ICU within 4 hours of the decision to admit.



**HOSPITALS
COMPLYING
WITH ICU
ACCESS KPI**



**50% of patients
should be admitted
to ICU within 1 hour
of a decision to admit**



**HOSPITALS
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WITH ICU
ACCESS KPI**



**80% of patients
should be admitted to
ICU within 4 hours of
a decision to admit**



Local

- INICUA quarterly reports benchmark quality of care and outcomes against Irish and UK ICUs.
- INICUA provides a robust outlier management process for 11 KQIs to ensure active review of the quality of care by the hospitals when issues arise. All learnings from these reviews are shared in the annual national report.
- INICUA provides daily support and training for audit coordinators..
- INICUA supports the establishment of critical care governance committees in all hospitals.

Policy

- INICUA data have supported the case for increased bed capacity in ICUs by reporting on the occupancy levels and timeliness of access to ICU, and the impact of this.
- INICUA data contributed to the coding of data for the HSE Hospital In-Patient Enquiry (HIPE) and activity-based funding programmes to support improved allocation of resources to ICUs.
- INICUA data were used by national programmes and offices to support management, planning and business cases, such as HSE Business Intelligence Unit reporting, the HSE Critical Care Programme, Organ Donation and Transplant Ireland's national audit of potential donors, the HSE's National Deteriorating Patient Improvement Programme, and the national in-hospital cardiac arrest audit.

Public

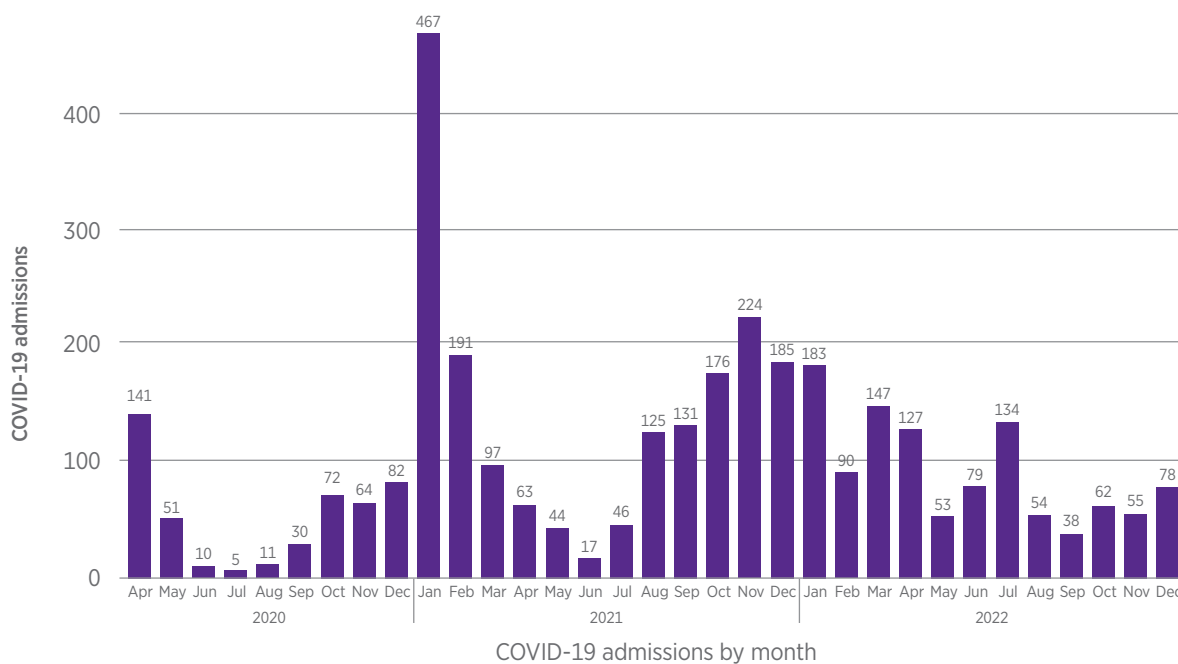
- Summary reports ([NOCA, 2020](#)) are created annually with NOCA PPI representatives to create a user-friendly document for the public to access.
- Patient stories are included in the annual national report and are shared at various NOCA events, supporting patients and their families to share the personal impact of being in an ICU.

Intensive Care Unit Bed Information System (ICU-BIS)

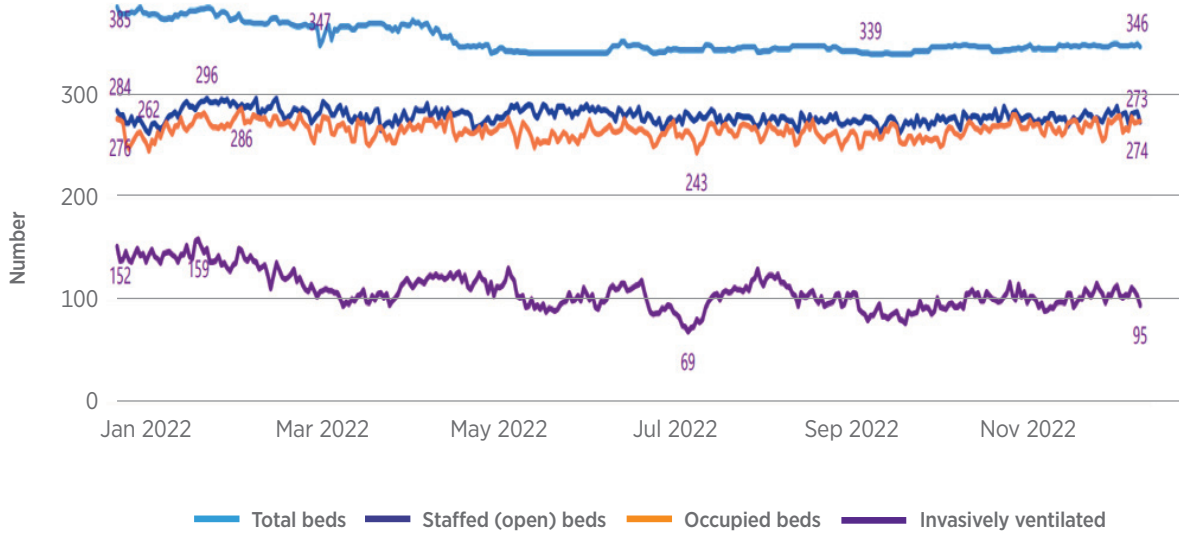
The ICU-BIS provides daily updates on ICU bed availability, bed occupancy, the numbers of patients invasively ventilated and undergoing renal replacement therapy, and specific patient data (e.g. relating to COVID-19). The ICU-BIS collects data from 26 adult public hospitals, 2 paediatric public hospitals and 5 private hospitals. The ICU-BIS supports clinicians and the NAS to find critical care beds for patients and produces data to aid system planning. The ICU-BIS is also an essential support required during times of increased demand or surge (e.g. during the recent COVID-19 pandemic, major disaster/incident response). The ICU-BIS is part of the INICUA.

National

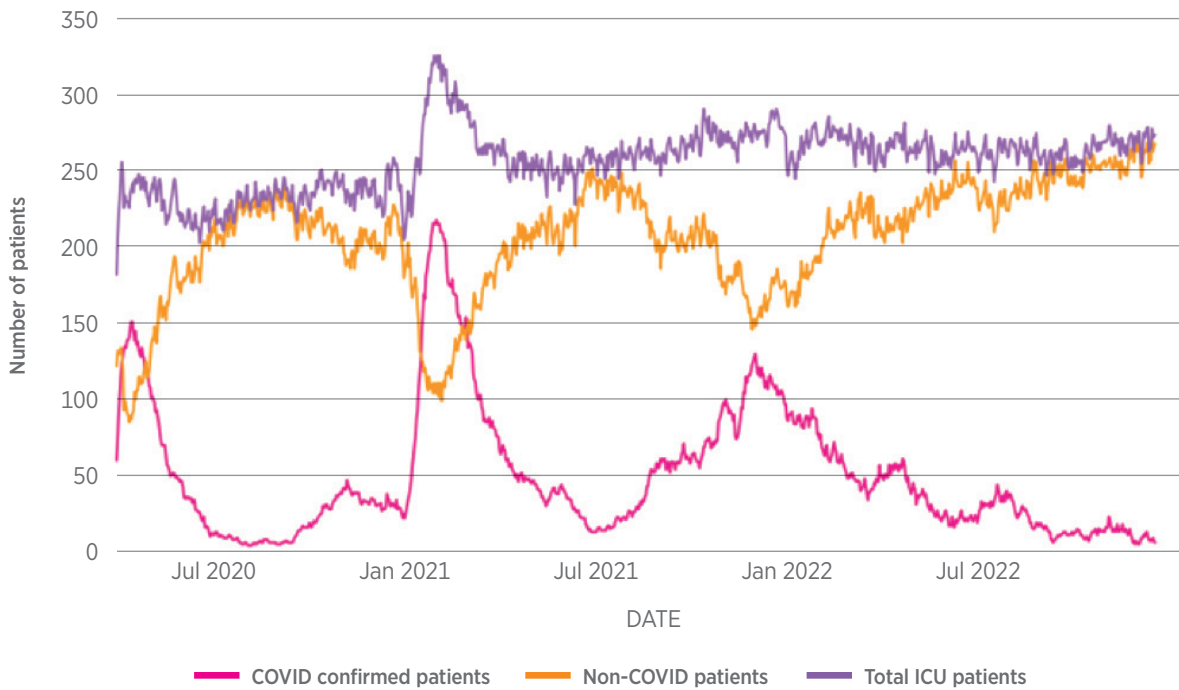
The figures below present ICU-BIS data from the start of the COVID-19 pandemic until the latter part of 2022. These data helped inform decisions around the logistics of managing the surge of critically ill patients during the pandemic.



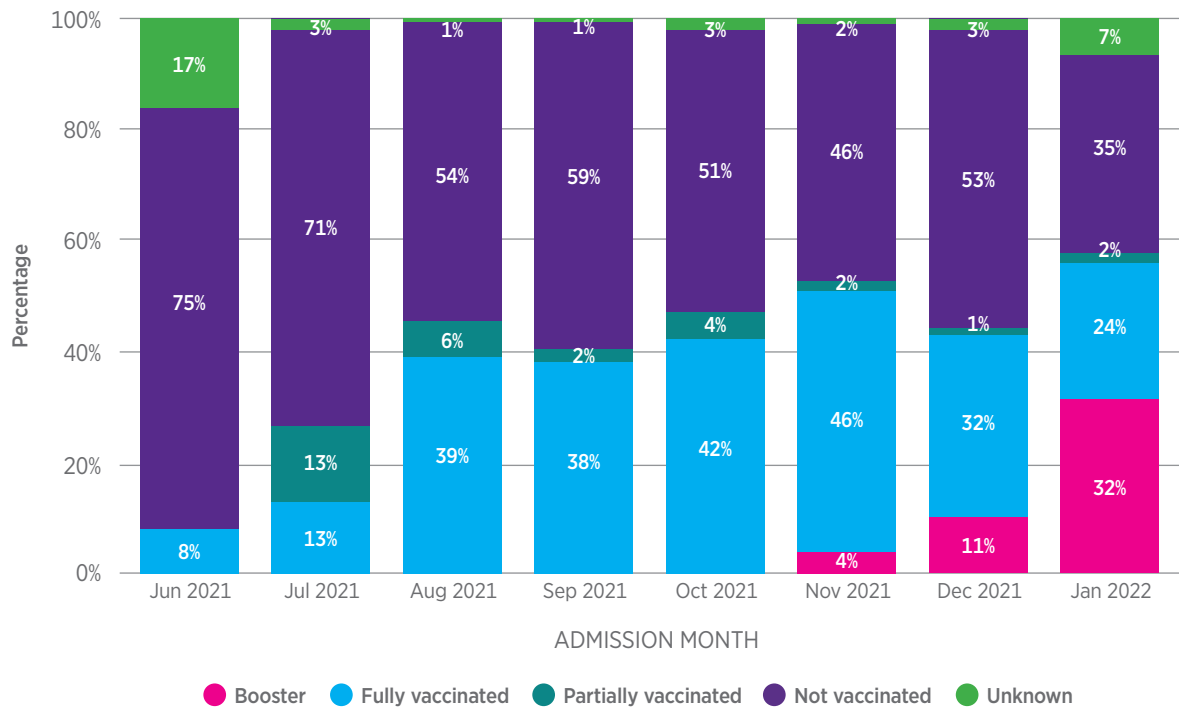
NUMBERS OF COVID-19 PATIENTS ADMITTED MONTHLY TO ICU (APRIL 2020 - NOVEMBER 2022)



BED OCCUPANCY AND NUMBERS OF PATIENTS (TOTAL NUMBER AND NUMBER INVASIVELY VENTILATED)



NUMBERS OF COVID-19 AND NON-COVID-19 PATIENTS IN ICU (MARCH 2020 - DECEMBER 2022)



VACCINATION STATUS OF PATIENTS ADMITTED TO ICU (JUNE 2021 -JANUARY 2022)

Local

- Hospital staff can see ICU bed availability in their own and other Units and identify hospitals with free capacity.
- Daily COVID-19 reports are provided to each ICU Unit.
- Data have been used to support ICUs with their business case submissions for increased ICU beds.

Policy

- The ICU-BIS provides the most reliable and up-to-date data on daily ICU bed availability to inform policy and planning decisions.
- Patient-level data on COVID-19 patients in ICU were used to predict and model the course of the pandemic and manage the national response at a governmental and societal level.
- In July 2021, the ICU-BIS reported an increase in the number of pregnant patients admitted to ICU with COVID-19. This triggered a specific vaccination programme for pregnant patients and a public health and media campaign encouraging all pregnant women to get vaccinated in order to prevent more serious illnesses and outcomes. This resulted in an increased uptake of vaccination among pregnant women and a reduction to ICU admissions of pregnant women because of COVID-19.
- ICU-BIS data were used to identify the country of birth of patients admitted to ICU with COVID-19. A successful public health campaign was undertaken targeting these specific cohorts to encourage them to get vaccinated. This resulted in a significant uptake of vaccination and reduction of admissions to ICU due to COVID-19.
- Data on travel-related COVID-19 admissions to ICU were also used to inform travel restriction policy.
- ICU-BIS data were used to inform procurement and stock management of ventilators, dialysis machines and dialysis supplies.

Public

- ICU-BIS data were used in the daily press/media briefings to update the public throughout the pandemic on the number of patients in ICU with COVID-19.
- Daily data from the ICU-BIS are used to update public information, including the HSE dashboards, the COVID-19 Tracker App, the Department of Health COVID-19 GeoHive public dashboard and the Open Data portal.

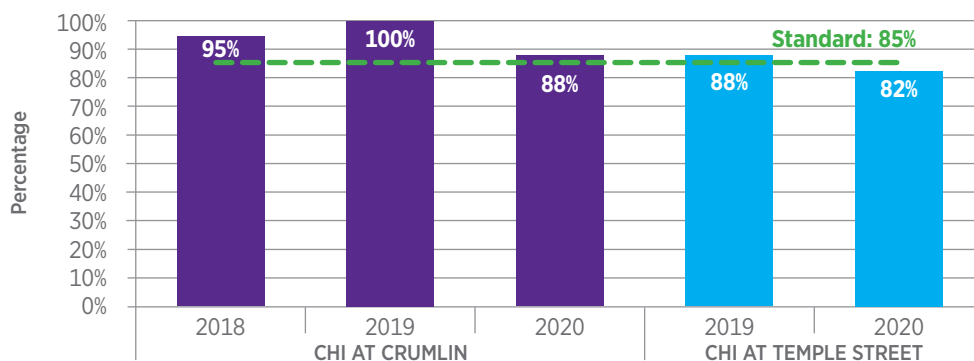
Irish Paediatric Critical Care Audit (IPCCA)

The IPCCA was established by NOCA in 2015 and reports on the care of patients transferred and/or admitted to Paediatric Critical Care Units (PCCUs) in Children’s Health Ireland (CHI) at Crumlin and CHI at Temple Street, which range in age from under 25 weeks’ gestation up to 18 years of age. NOCA partners with the Paediatric Intensive Care Audit Network (PICANet) in the UK to collect the data and to measure the quality of care in PCCUs and benchmark these against 30 other Units across the UK. CHI at Crumlin has the third-highest number of PCCU admissions of all Units in the UK and Ireland, and the largest proportion of patients admitted to its PCCU each year are those with cardiovascular diagnoses, as CHI at Crumlin is the tertiary referral centre for paediatric cardiothoracic surgery and cardiology. The IPCCA also reports on paediatric patients admitted to adult ICUs nationally, using data from INICUA.

National

OCCUPANCY

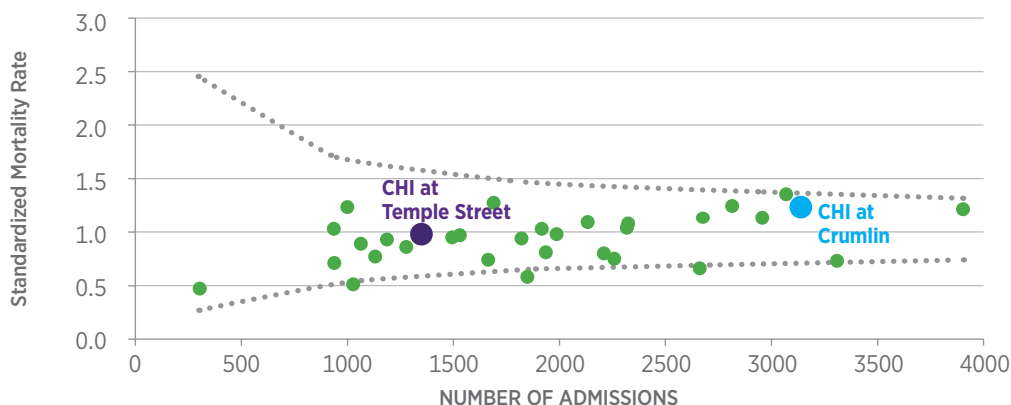
Bed occupancy rates of 85% have been recommended by the Joint Faculty of Intensive Care Medicine of Ireland (2018); both PCCUs in Ireland have experienced high occupancy levels and have regularly operated above this standard each year since 2018, at times having occupancy rates above 100%.



BED OCCUPANCY RATE BY PCCU (2018-2020)

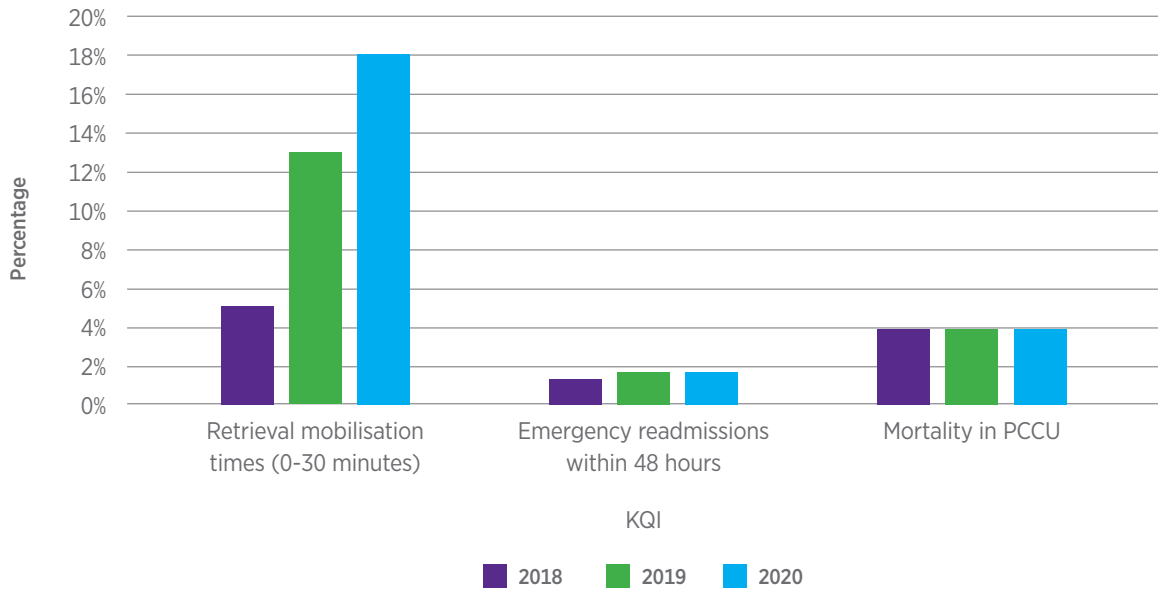
OUTCOMES

Risk-adjusted mortality is an important high-level quality indicator. After allowing for level of sickness at time of admission, no Irish PCCU had a mortality rate higher than expected. Transparent presentation of this information is important to assure the public, parents, and the health service at large that hospitals are continuously monitoring important outcomes and that there are systems in place to review any areas of concern.

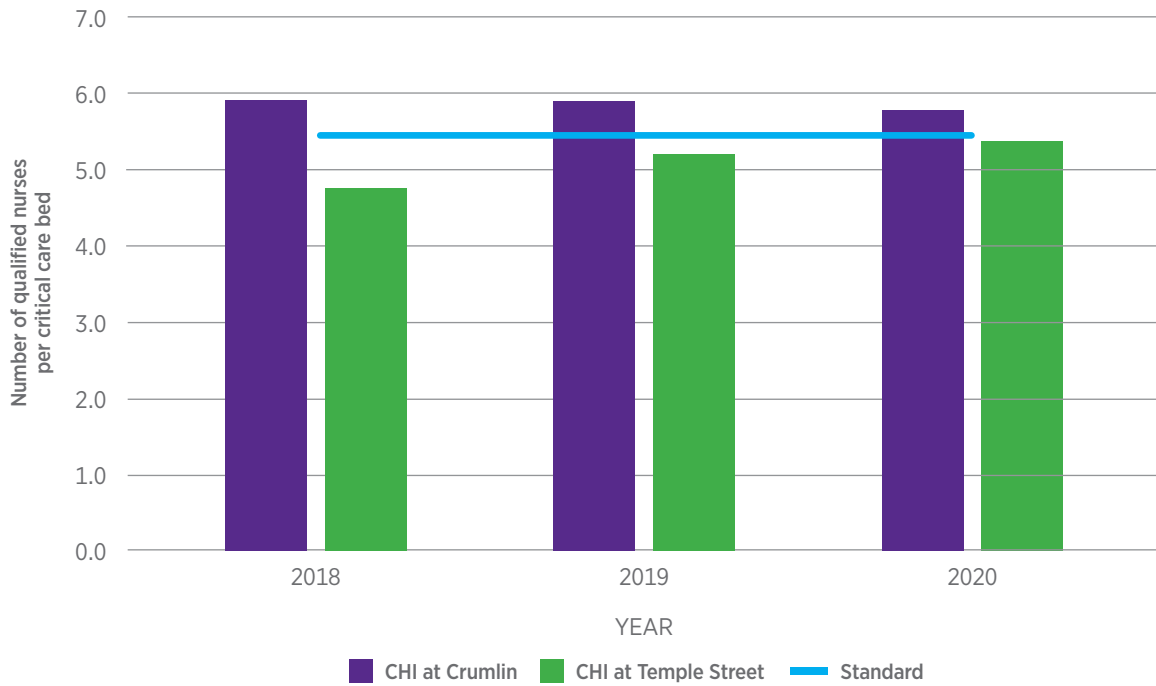


RISK-ADJUSTED MORTALITY BY PAEDIATRIC CRITICAL CARE UNIT (2020)

The figures below present data for some KQIs of care in the two major PCCUs in Ireland from 2018 to 2020.



KEY QUALITY INDICATORS BY YEAR (2018-2020)



NUMBER OF QUALIFIED NURSES PER CRITICAL CARE BED BY YEAR (2018-2020)

Local

- By continuously monitoring unplanned extubation rates at CHI at Crumlin and CHI at Temple Street, it was possible to show the effect of change in practice, showing the value of surveillance and audit (NOCA, 2021b). Multiple areas of improvement were identified, and these measures led to a reduction in the number of unplanned extubations (from 4.2 per 1,000 in 2019 to 2.5 per 1,000 in 2020).
- Clinical teams can monitor the PCCU's mortality rate in real time via the risk-adjusted standardised mortality ratio. PICANet provides training to support individual PCCU mortality monitoring with a dedicated session at the PICANet Annual Meeting.
- The IPCCCA allows for the monitoring of bed occupancy for capacity planning.
- The IPCCCA provides a description of activity levels and outcomes of the Regional Paediatric High Dependency Unit in University Hospital Limerick.
- The IPCCCA reports benchmark quality of care against Irish and UK PCCUs (PICANet, 2022).

Policy

- IPCCCA data were used to help inform the roll-out of the COVID-19 vaccination programme for children. The IPCCCA produced national-level data summarising the characteristics, interventions received and outcomes for patients with confirmed COVID-19 or paediatric inflammatory multisystem syndrome temporally associated with COVID-19 admitted to PCCU.
- The IPCCCA informs and contributes to the development of the Paediatric Critical Care Society's quality standards and the model of care for paediatric critical care.
- IPCCCA data (NOCA, 2021b) provided evidence for the recommendation to extend the Irish Paediatric Acute Transport Service hours of operation.
- IPCCCA data were used in the planning for the new children's hospital (HSE, 2019).
- IPCCCA data are used for advocating changes to the system; for example:
 - > agreed standards of care (JFICMI, 2018) for children admitted to an adult ICU
 - > the need for a national respiratory extracorporeal life support programme (NOCA, 2021b) in Ireland rather than sending very sick children to Sweden.

Public

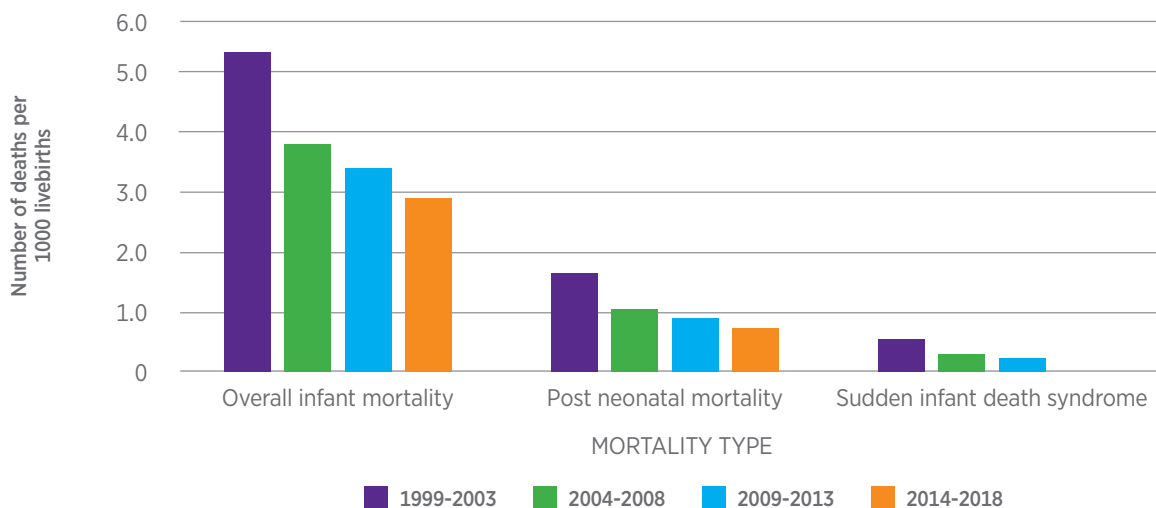
- An annual summary report (NOCA, 2021c) is produced each year, which is useful for the public, patients and families to aid in their understanding of the audit findings. Accompanying infographics increase the accessibility of the report's key messages.

National Paediatric Mortality Register (NPMR)

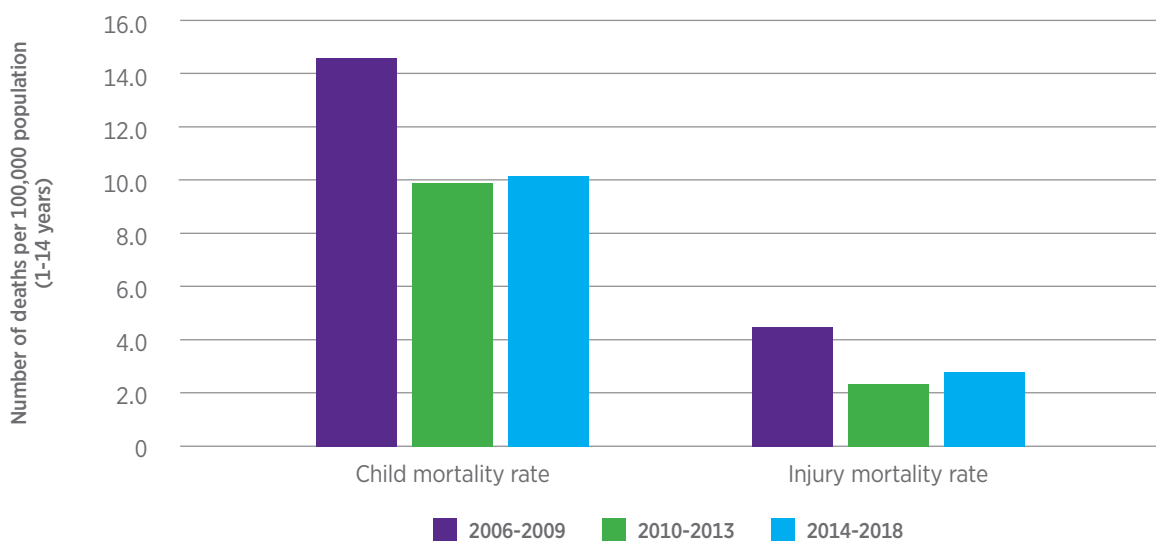
The NPMR is a centralised system for collection, analysis and reporting of data relating to child deaths in Ireland. The NPMR, previously known as the National Sudden Infant Death Registry, extended its remit of data collection from deaths in children aged under 2 years to include all children aged under 18 years and transferred to the governance of NOCA in October 2020. A reliable national dataset of information on the circumstances and causes of infant and child deaths that is timely and complete for the population is necessary in order to identify issues and trends in child mortality and inform national policies. [The first report of the NPMR under NOCA's governance will be published in 2023.](#)

National

The figures below show how infant and child mortality has changed over time depending on the category/type of death recorded.



NUMBER OF DEATHS PER 1000 LIVEBIRTHS AMONG INFANTS



NUMBER OF DEATHS PER 100,000 POPULATION AMONG CHILDREN AGED 1-14 YEARS

Local

- In 2019, the NPMR Child Death Notification system was successfully implemented in one PCCU, demonstrating the feasibility of collecting accurate, reliable and timely data on infant and child mortality from a large paediatric hospital. This will be expanded to all PCCUs in 2023–2024.
- Assessment of parental awareness of recommended safe sleep guidelines in one large Dublin maternity hospital in 2019 highlighted the need to further engage with healthcare professionals in order to ensure that safe sleep is discussed and modelled with parents in hospitals prior to discharge and to identify improved methods to target the highest risk groups (e.g. improve access to education materials for non-Irish mothers).
- Advice on specific issues relating to infant sleeping arrangements is routinely provided to the HSE, childcare settings and nursing colleges.
- A collaborative study ([Gunne et al., 2021](#)) provided accurate information on live-born infant survival after diagnosis of fatal foetal anomaly (FFA). The study, published in the *Journal of Community Genetics* in 2021, provided objective information to aid obstetric counselling of couples upon diagnosis of an FFA.

Policy

- The NPMR dataset provided the evidence base for the formulation of guidelines for parents and professionals on how to reduce an infant's risk of sudden infant death syndrome. These guidelines, titled *Safe sleep for Your Baby. Reduce the Risk of Cot Death*, were implemented nationally in collaboration with the HSE Departments of Public Health, and are reviewed and updated routinely as a component of the *National Healthy Childhood Programme* ([HSE, n.d.](#)) and incorporated into the HSE [mychild.ie](#) website.
- The NPMR works with Tusla's Early Years Inspectorate to inform standards for childcare settings in relation to safe sleep and injury prevention.
- The NPMR produced and published guidelines ([McDonnell et al., 1999](#)) for healthcare professionals in the event of the death of a child: (*When a Child Dies: A National Model of Care for Professionals*) following which improvements were observed in the quality of service provided to parents in the event of the death of child.
- An audit of the quality of the post-mortem procedure in sudden unexpected deaths in infancy and childhood ([Treacy et al., 2013](#)) highlighted improvement in the quality of autopsies when they were conducted by specialist paediatric pathologists. The study also emphasised the importance of standardisation of the autopsy procedure in aiding understanding of sudden unexpected death in children as well as providing important information for future ancillary and genetic testing.
- An interrogation of the NPMR dataset ([Gunne et al., 2020](#)) to determine the number of paediatric deaths in Ireland with an underlying rare disease highlighted the need for additional routine rare disease coding to identify such cases within the Irish healthcare system in order to enable better healthcare planning.

Public

- Summary reports are created annually with the NOCA PPI representatives to create a user-friendly document for the public to access.
-
- The NPMR dataset is used to inform public messages/advice to parents, caregivers and healthcare professionals on safe sleep and childcare practices, including in relation to the following:
 - > bed sharing and breastfeeding (based on contributing data to international studies ([Carpenter *et al.*, 2013](#)) to provide evidence for development of recommendations)
 - > use of apnoea monitors, soothers, sleep positioners, requirements for cot mattresses, swaddling, co-bedding of twins, etc. ([HSE, The National Healthy Childhood Programme, n.d.](#)).
 - > recommendations ([HSE, The National Healthy Childhood Programme, n.d.](#)) for babies with specific needs (e.g. plagiocephaly, torticollis, spina bifida).
-
- NPMR data ([McGarvey *et al.*, 2019](#)) support accurate estimates for the rates of both intentional and unintentional injuries in children and young people. These data highlighted the most commonly occurring injuries leading to mortality in children and the variation across age and sex, and were used to inform statistics provided to the public on paediatric mortality attributable to road traffic accidents.
-
- NPMR data enabled a population-based study of paediatric asthma-related deaths in 2019, which has raised awareness of the potential for children to develop sudden severe acute asthma episodes which can be fatal. The study ([Richardson *et al.*, 2020](#)) described the patients most at risk and emphasised the critical importance of education on early recognition of symptoms, along with access to personalised action plans and medication.
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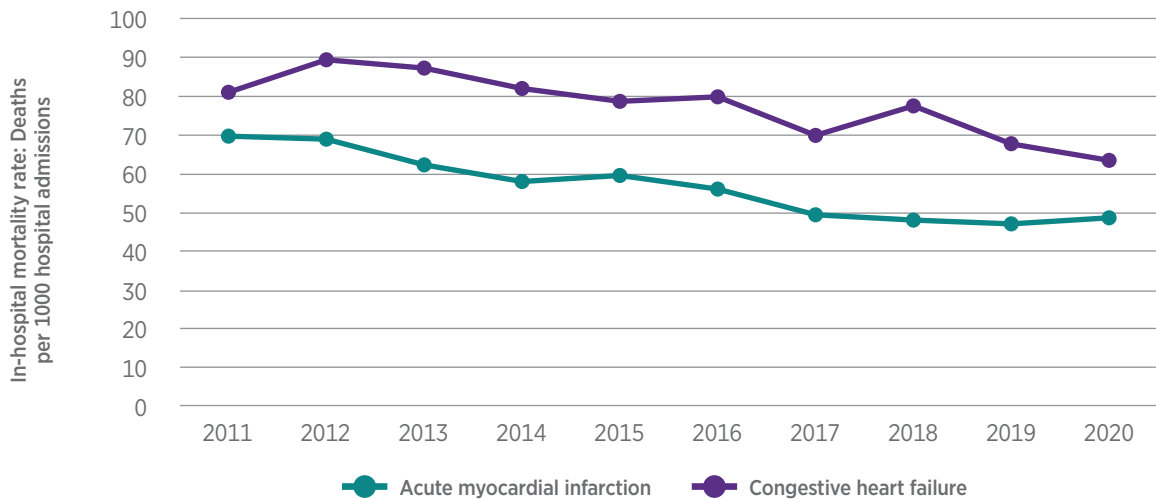
National Audit of Hospital Mortality (NAHM)

NAHM analyses HIPE data for the purpose of identifying and trending mortality in acute hospitals in Ireland. The main objective of NAHM is to analyse and display mortality patterns across Ireland’s hospitals in order to guide improvement measures. Through NAHM, hospitals can:

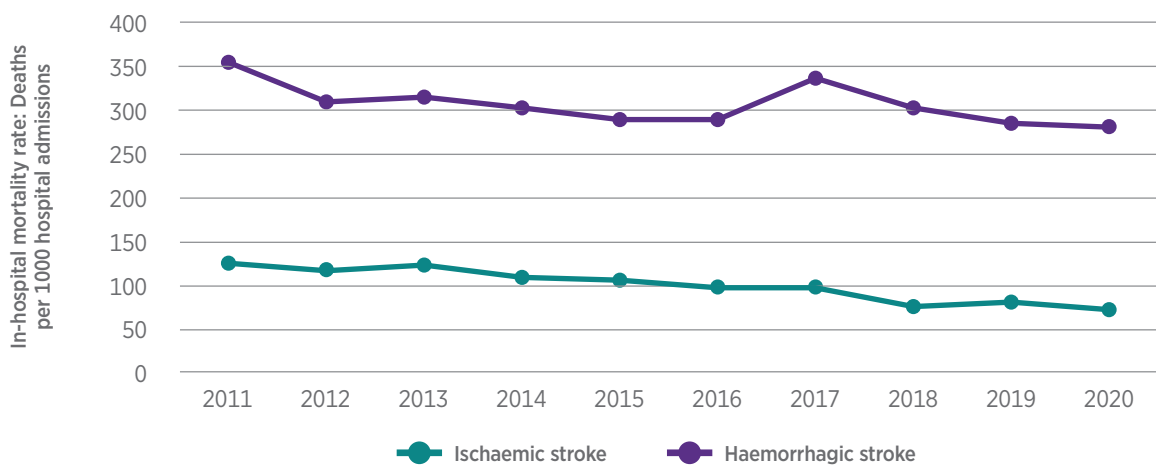
- understand and improve the quality of hospital-based mortality data
- stimulate reflection on the quality of overall patient care
- identify potential areas for improvement.

National

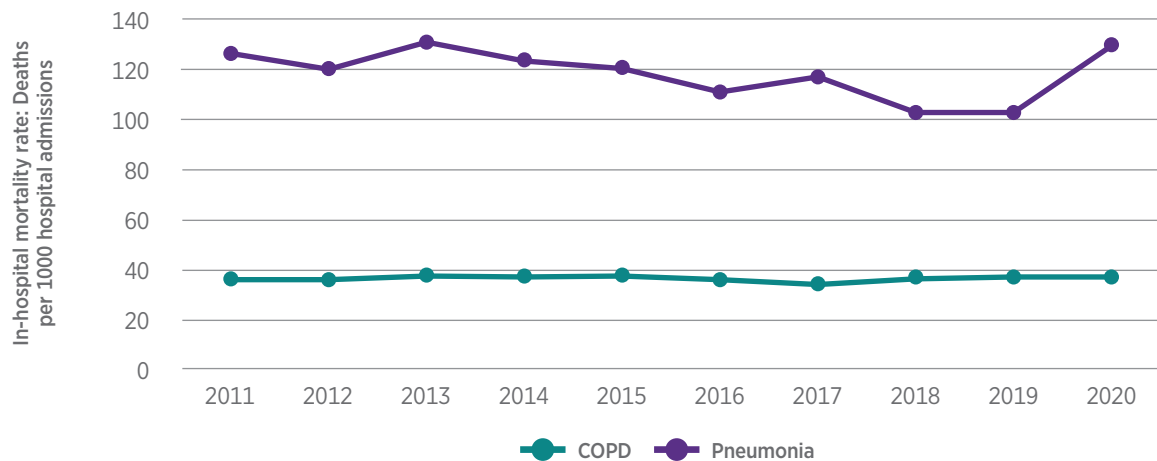
NAHM data are used to monitor in-hospital mortality. Crude mortality for the six key diagnoses is presented in the figures below. The crude in-hospital mortality rate has decreased over the 10-year period from 2011 to 2020 for most of the diagnoses, however, acute myocardial infarction (AMI) and chronic obstructive pulmonary disease (COPD) have seen a slight increase from 2019 to 2020, while pneumonia has seen a significant increase in this 2-year period, most likely as a consequence of COVID-19.



NATIONAL IN-HOSPITAL MORTALITY FOLLOWING ADMISSION WITH A PRINCIPAL DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION AND CONGESTIVE HEART FAILURE, 2011-2020



NATIONAL IN-HOSPITAL MORTALITY FOLLOWING ADMISSION WITH A PRINCIPAL DIAGNOSIS OF ISCHAEMIC AND HAEMORRHAGIC STROKE, 2011-2020



NATIONAL IN-HOSPITAL MORTALITY FOLLOWING ADMISSION WITH A PRINCIPAL DIAGNOSIS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND PNEUMONIA, 2011-2020

Local

- Each hospital can compare its mortality rate for a particular diagnosis with the national average.
- All 44 participating acute hospitals can monitor in-hospital mortality rates throughout the year.
- Where a hospital is an outlier for its mortality rate for a particular diagnosis, a review is carried out by the hospital with support from NOCA, and the findings and learnings are shared in the NAHM Annual Report.

Policy

- Changes were made to the NAHM tool to include a COVID-19 flag to allow users to identify when a patient had a positive laboratory test for COVID-19 and adjust for this when reviewing outliers.

Public

- Summary reports are created annually with the NOCA PPI representatives to create a user-friendly document for the public to access.
- NAHM was the first NOCA audit to publish hospital identifiable data in its annual reports, in 2013. Previously, it was common practice to anonymise site-specific data.
- NAHM provides information on mortality rates for inclusion in the monthly HSE Hospital Patient Safety Indicator Reports issued by hospitals.

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