NOCA National Office of Clinical Audit

MTA Major Trauma Audit

MAJOR TRAUMA AUDIT

NATIONAL REPORT 2019 AND 2020

REPORT PREPARED WITH ASSISTANCE FROM MEMBERS OF THE MTA GOVERNANCE COMMITTEE

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NATIONAL OFFICE OF CLINICAL AUDIT (NOCA)

NOCA was established in 2012 to create sustainable clinical audit programmes at national level. NOCA is funded by the Health Service Executive Office of the Chief Clinical Officer and operationally supported by the Royal College of Surgeons in Ireland. The National Clinical Effectiveness Committee (NCEC, 2015, p.2) defines national clinical audit as "a cyclical process that aims to improve patient care and outcomes by systematic, structured review and evaluation of clinical care against explicit clinical standards on a national basis". NOCA supports hospitals to learn from their audit cycles.

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NATIONAL CLINICAL EFFECTIVENESS COMMITTEE (NCEC)

NATIONAL CLINICAL EFFECTIVENESS COMMITTEE

Major Trauma Audit
NCEC National Clinical Audit No. 1

The National Clinical Effectiveness Committee (NCEC) is a Ministerial committee of key stakeholders in patient safety and clinical effectiveness. Its mission is to provide a framework for endorsement of guidelines and audit to optimise patient and service user care. The NCEC's remit is to establish and implement processes for the prioritisation and quality assurance of clinical guidelines and clinical audit and subsequently recommend them to the Minister for Health for endorsement and mandating for national implementation.

ACKNOWLEDGMENTS

This work uses data provided by patients and collected by their healthcare providers as part of their care. NOCA would like to thank the valuable contribution of all participating hospitals, in particular the Major Trauma Audit coordinators and clinical leads. Without their continued support and input, this audit could not continue to produce meaningful analysis of trauma care in Ireland. We would like to thank Philip Dunne, IT Systems Support from the Healthcare Pricing Office, who provides ongoing support for the HIPE portal.

TARN
THE TRAUMA AUDIT & RESEARCH NETWORK

NOCA has engaged the internationally recognised Trauma Audit and Research Network (TARN) to provide its methodological approach for MTA in Ireland. TARN has been in operation in the UK since the 1990s and has been at the forefront of quality and research initiatives in trauma care. It is the largest trauma registry in Europe and is clinically led, academic and independent.

TARN use a standardised dataset for trauma patients, allowing review of care at both organisational and national level, thereby assuring the quality of and ultimately improving trauma care.

ACKNOWLEDGING SIGNIFICANT CONTRIBUTIONS FROM THE FOLLOWING:

HSE
RCSI
ROYAL COLLEGE OF PHYSICIANS OF IRELAND
Joint Faculty of Intensive Care Medicine of Ireland
Pre-Hospital Emergency Care Council

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National Office of Clinical Audit

Major Trauma Audit

National Report

2019 and 2020

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FOREWORD

DR COLM HENRY

This is the seventh year of the Major Trauma Audit (MTA). The National Report 2019 and 2020 highlights the continued excellent work of the National Office of Clinical Audit and the Major Trauma Audit governance committee. Since the last report, significant work has been undertaken to implement the recommendations of "A Trauma System for Ireland" with particular focus on the establishment of the two planned trauma networks to be named the South Trauma Network and Central Trauma Network.

The MTA data highlighted in this report shows an increase in the proportion of patients injured at home, from 48% in 2019 to 56% in 2020. The report also demonstrates an approximately 10% reduction in the volume of major trauma during 2020 compared to 2019. This finding reflects the impact of the COVID 19 restrictions introduced in March 2020, which had the indirect effect of reducing the number of accidents leading to trauma.

However, the findings also highlight the importance of learning from the unintended consequences of restricting the movement of people particularly for the older population. Maintaining good physical activity reduces the risk of increased frailty, falls, fracture and injuries.

The MTA has received data from all 26 hospitals currently providing trauma care. The contributions of all participating hospitals have led to continued improvements in the quality and depth of the data available from this report, hence improving our ability to interpret the findings with greater confidence.

Accurate and appropriate data collection is vital to facilitate evidence informed decision-making across our health system. The data from the MTA will aid decision-making in the areas of trauma prevention through to rehabilitation to ensure that all patients access the right care in the right place at the right time. The work of the team Major Trauma Audit is an exemplary example of how clinical audit can inform and influence improved outcomes for patients. Without their critical influence, planning for the establishment of an inclusive trauma system would be much more poorly informed. I would like to acknowledge and commend those who worked on collecting, collating and inputting the data used to produce this excellent report, both locally and nationally.

Dr Colm Henry
Chief Clinical Officer
Health Service Executive

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EXECUTIVE SUMMARY

The Major Trauma Audit (MTA) is a clinically led audit established by the National Office of Clinical Audit (NOCA) in 2013. This audit focuses on the care of the more severely injured trauma patients in Ireland's healthcare system. The methodological approach for the MTA is provided by the Trauma Audit and Research Network (TARN), based in the University of Manchester, United Kingdom (UK). In 2016, the MTA became the first national clinical audit endorsed by the National Clinical Effectiveness Committee (NCEC) and mandated by the Minister for Health.

Since 2016, 26 eligible hospitals have been participating in the MTA and data have been collected on more than 29,000 major trauma patients. The improved data quality and maturity of the audit has enabled hospital-level reporting since 2017.

This report focuses on a period of time when Ireland's health service underwent unprecedented challenges due to the global COVID-19 pandemic which began in 2020. It provides insights into how changes in the health system during this time affected the profile of major trauma and the standard of care for major trauma patients. The report also provides data on the volume and type of injuries sustained during the pandemic, the access to vital services for major trauma patients and outcomes. In addition, it provides insights into how the mechanism of injury changed during a period when most of the population's day-to-day activities were restricted during lockdowns.

The quick response to the pandemic, in order to deal with the potential surge in unwell COVID-19 patients, saw hospital services restructured almost overnight in March 2020. Emergency departments (EDs) were divided into COVID-19 and non-COVID-19 EDs. Elective work in many hospitals ceased; patients were discharged to facilities outside the acute hospitals, including to private hospitals, in order to create additional capacity in Ireland's hospitals, and especially in intensive care units. Many staff were redeployed and this directly affected the MTA, as many of the audit coordinators were moved into other, often clinical, roles to support frontline services. This report shows the data from 2019 and 2020, and captures the situation in the first 10 months of the pandemic. Unfortunately, no one could have foreseen that over 2 years on from that time, the world would still be dealing with such high numbers of cases of COVID-19 and sustained pressure on our health system.

On 11 March 2022, the Department of Health confirmed that there had been 1,341,826 cases of COVID-19 in Ireland and 6,611 deaths since the pandemic began (Department of Health, 2022). The data from the MTA can help to inform how future strategies are developed while the pandemic continues. This report shows that there was a significant increase in injuries at home during 2020, in particular injuries caused by falls from a low or high height. There was a reduction in road trauma injuries during this period, consistent with there being fewer vehicles on the roads.

The MTA has consistently shown that injuries in the home, especially low falls, are the most common cause of major injuries, and therefore more needs to be done to keep the population safe, especially when people are advised to stay at home. In this report, we have developed a short checklist highlighting the main areas in the home where people injured themselves, from the data in this audit. More importantly, however, the MTA is advocating that this information from the data is more widely used by the Health Service Executive (HSE) and the Department of Health as a means for healthcare workers, social workers, health and social care professionals (HSCPs), general practitioners, paramedics or anyone visiting a patient's home to consider that environment and recommend changes where appropriate in order to try and reduce the burden of injury due to falls.

Each hospital, through its MTA governance committee, is encouraged to use MTA reports for continuous quality improvement. Without the constant leadership provided by the hospital clinical leads for the MTA and the dedication and hard work of the audit coordinators, this audit would not be possible. The NOCA Executive Team and the MTA Governance Committee wish to thank the clinical leads, audit coordinators, and staff in the participating hospitals for their continued commitment to, and engagement with, this audit.

KEY FINDINGS

Major Trauma Audit (MTA) data coverage was 83% in 2019 and 73% in 2020.

The mean age of major trauma patients increased from 58 years in 2019 to 61 years in 2020.

The percentage of falls of less than 2 m increased from 58% in 2019 to 62% in 2020.

The proportion of patients injured at home increased from 48% in 2019 to 56% in 2020.

Based on extrapolation from the data available, there was an approximately 10% reduction in the number of major trauma admissions during 2020, compared with 2019.

Both 2019 and 2020 had a low-level pre-alert rate of 12%.

The overall percentage of major trauma patients received by a trauma team remains extremely low, at 8% in 2019 and 9% in 2020.

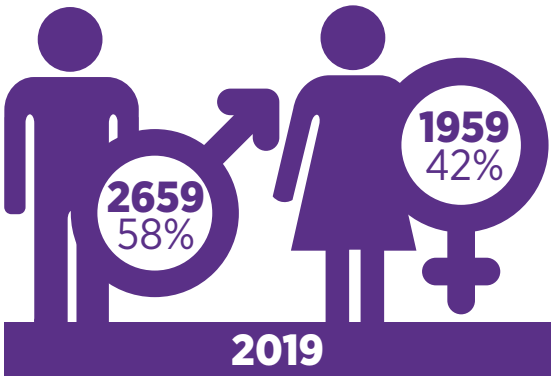
As patients get older they are less likely to be pre-alerted, met by a trauma team or received by a senior clinician.

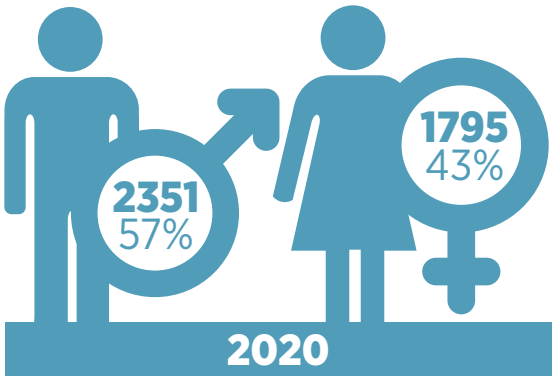
There was an increase in the proportion of major trauma patients who died from falls. The percentage of those who died from falls less than 2 m increased from 59% in 2019 to 64% in 2020, while the percentage of those who died from falls more than 2 m increased from 11% in 2019 to 16% in 2020.

KEY FINDINGS 2019 & 2020

DATA COVERAGE

2019	2020
83%	73%





8764 PATIENTS RECORDED 2019/2020

MEAN AGE

2019	2020
58 YEARS	61 YEARS

RECORDED ADMISSIONS DROPPED BY 10% IN 2020

MECHANISM OF INJURY

FALL LESS THAN 2M

2019	2020
58%	62%

ROAD TRAUMA

2019	2020
17%	15%

FROM A BLOW

2019	2020
9%	6%

FALL MORE THAN 2M

2019	2020
10%	11%

LOCATION OF INJURY

HOME

2019 48%

2020 56%

PUBLIC AREA OR ROAD

2019 38%

2020 27%

INSTITUTION

2019 5%

2020 5%

FARM

2019 3%

2020 4%

INDUSTRIAL

2019 2%

2020 3%

34% ISS>15 IN 2019

35% ISS>15 IN 2020

RECEIVED BY A TRAUMA TEAM

2019 8%

2020 9%

12% PRE-ALERT RATE IN 2019 AND 2020

9 MEDIAN LOS 9 DAYS IN 2019 AND 2020

% of patients with a Glasgow Coma Scale score <13 to receive a CT scan within 1 hour

2019 42%

2020 43%

60% DISCHARGED HOME IN 2019 AND 2020

10% DISCHARGED TO REHAB IN 2019 AND 2020

KEY RECOMMENDATIONS

RECOMMENDATIONS TO THE NATIONAL OFFICE FOR TRAUMA SERVICES, HSE

- The National Office for Trauma Services, HSE should continue to work closely with, and support, the MTA by:
  - providing clarity about key definitions for trauma teams and trauma team activation criteria
  - using the data from the MTA to identify injury prevention opportunities for the new trauma system.
  - using the data from the MTA to support trauma care re-organisation and monitor the effect of changes

RECOMMENDATIONS TO HOSPITAL MANAGERS, CLINICIANS AND AUDIT COORDINATORS

- Each hospital should establish a local MTA governance committee to ensure their local audit findings are acted on; this is in line with the guidance issued by the MTA.

RECOMMENDATIONS TO THE NATIONAL OFFICE OF CLINICAL AUDIT

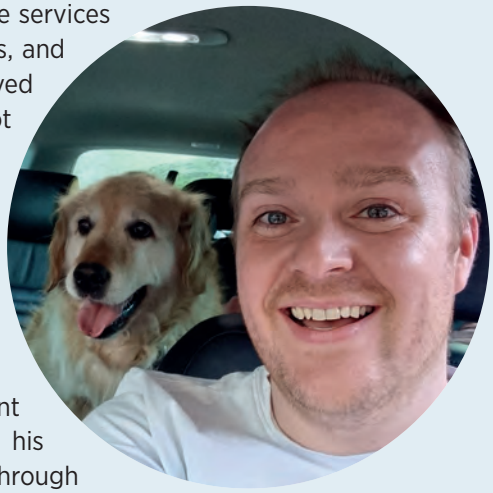
- The National Office of Clinical Audit (NOCA) will work with the Health Service Executive to develop a strategy for sustainable support for clinical audit in the hospitals.

- NOCA should continue to support each hospital to:
  - establish a local MTA governance committee
  - achieve high standards of data quality and data completeness
  - improve quarterly reports to support hospitals with quality improvement and facilitate training in the use of the Trauma Audit and Research Network (TARN) analytics portal.

- NOCA will continue to highlight opportunities for this data to be used for public health messaging by organisations and departments such as, the HSE Health and Wellbeing Division and AFFINITY National Falls and Bone Health Project, DOH Healthy Ireland Programme, Road Safety Authority and Age Friendly Homes Ireland.

- NOCA should also:
  - work with relevant organisations to carry out research on how to better identify patients with major trauma injuries at the earliest possible time
  - work with Public and Patient Interest (PPI) representatives and groups to utilise and disseminate public health messages from the MTA.

A PATIENT'S PERSPECTIVE: RICHARD'S STORY



The MTA presents data in order to quality assure services looking after patients with major trauma injuries, and also to facilitate quality improvement and improved patient outcomes. Unfortunately, the data do not capture the individual patient experience. To fully understand the needs of major trauma patients it is important to capture the patient voice.

This report includes a description of a patient experience by Richard, who suffered a major trauma.

Richard was 34 years old when his accident occurred on 5 July 2021. This story describes his journey from the time of the accident to his care through the trauma system to being discharged home.

He was on the first day of a boat trip on the Shannon that he took with friends each year. They had moored and disembarked beside a picturesque woodlands area when, while sitting on a wall, Richard fell backwards. The wall was 2 m high and he landed on the backpack he was carrying on his back. Richard says, "I instantly knew something was wrong." He immediately had no feeling in his legs and was unable to move them.

ACCESS TO CARE FOR RICHARD

Richard's friends called the emergency services and notified his family and his girlfriend about the accident. The emergency services brought Richard to University Hospital Limerick (UHL), which was the closest hospital. While in UHL he was told of the suspected severity of his injury and that he would need to be transferred to the Mater Misericordiae University Hospital in Dublin for specialist care. Early the following morning he was transferred to the Mater Misericordiae University Hospital, where he underwent surgery later that evening for an incomplete spinal cord injury at T11. This injury meant that he was paralysed from the waist down.

During this time, there was a slight ease in the COVID-19 pandemic and, fortunately, Richard's girlfriend was allowed to visit him in hospital. After a few days in the Mater Misericordiae University Hospital, the team informed Richard that they were working to get him admitted back to UHL, as this was the hospital he was transferred from. Richard lives in Cork and assumed he would be transferred to a hospital close to home. However, this was not the procedure that the hospitals followed. Instead of sending him to the hospital nearest to his home and the family who would be caring for him, the process dictated that he should go back to UHL directly. According to Richard, "This caused me a lot of distress as I wanted to be close to my family and my girlfriend." Due to some fortunate events and efforts by Richard's family to get him admitted to Cork University Hospital (CUH) directly, 8 days after his accident, much to Richard's and his family's relief, he was transferred to the care of an orthopaedic team in CUH.

WAITING FOR REHABILITATION

Due to the nature of Richard's injury, he required specialist rehabilitation which could only be provided in the National Rehabilitation Hospital (NRH) in Dublin. Until a bed became available in the NRH, he would have to remain an inpatient in CUH. Although Richard is very appreciative of the care provided by staff in CUH, and the fact that he was near his home, friends and family, he noticed differences between the care he had received in the National Spinal Injuries Unit at the Mater Misericordiae University Hospital, and the care he received in CUH. In the National Spinal Injuries Unit at the Mater Misericordiae University Hospital, he felt "very secure" due to the expertise and equipment available for caring for patients with complex spinal injuries. In contrast, he felt the Orthopaedic ward in CUH had fewer facilities and specialist staff to cater for patients with his type of injury.

A particular issue of concern for Richard was his bowel care. He felt the team in the National Spinal Injuries Unit at the Mater Misericordiae University Hospital were expert in providing bowel care for spinal injury patients, whereas the same level of expertise was not apparent to him during the 10 weeks he spent in CUH. For example, in CUH he was given laxatives regularly and he frequently worried about soiling himself. In addition, he was obliged to wear adult diapers, whereas in the National Spinal Injuries Unit this did not happen. The different approach to bowel care in CUH left Richard feeling constantly anxious about potential accidents. It compounded his concerns about self-determination and self-control associated with his injury, and it affected his self-image. On the positive side, however, he also emphasised that while in CUH he was able to work remotely, which gave him something else to focus on the CUH physio team really gave him a great start on his rehabilitation journey. He was seen by the physiotherapists five days a week and they gave him much more than just basic attention, they got him started on essential skills such as car transfers and other functional skills and were extremely friendly and supportive which he felt tangibly improved his welfare in the important early days. Moreover, he was able to meet his family which kept his spirits up.

ROAD TO INDEPENDENCE

Two and a half months after his accident, Richard was transferred to the NRH. Describing the transfer, Richard says, "It was a Friday evening at 5pm and I was surprised how instantly all staff were tuned into the importance of bowel care. Within days, having cleared the laxatives out of my system, I was brought into a bathroom for the first time to use the toilet". This was a massive relief for Richard, as it meant he could get back

to wearing his normal clothes. The team gave him the skills to care for his own bowel regime, initially using suppositories. On day 19 in the NRH he no longer needed any further suppositories and he no longer worried about potential accidents. Richard says, "This gave me a huge sense of relief, confidence and positivity."

During his stay in the NRH he felt an overwhelming sense of support from the ward staff and physiotherapy team and also from his fellow patients. His time in the NRH gave him the skills and confidence to care for himself and learn how to live with the consequences of his injuries.

Richard and his girlfriend had put a deposit on a house just before the accident. Fortunately, the builders were able to change the original plan into a better layout to accommodate Richard's wheelchair. They widened the doorframes, made all the floors level and even fitted a lift so that he could get upstairs easily. His car was also adapted; as a result, he was able to drive as soon as he got home.

REFLECTING ON HIS JOURNEY

Richard's journey from accident to returning home provides some key learnings that could benefit other patients in a similar situation.

First, hospitals' repatriation procedures, although essential in order to manage bed availability in services such as the National Spinal Injuries Unit, need to ensure that the patient is repatriated to the hospital that can best serve their needs while also being close to their family and home, thus avoiding unnecessary stress and worry for the patient and their family members.

Second, the expertise in units such as the National Spinal Injuries Unit and the NRH for caring for patients with complex spinal injuries should be shared, in order to ensure equity of access to the best evidence-based care for patients in Ireland.

Third, virtual outreach multidisciplinary team meetings and nationally agreed guidelines to support standardisation of care in Ireland should be further developed.

LIFE NOW

Richard has returned to work full time. He is back driving, he received the keys to his new home in April 2022 and he is looking forward to moving in soon with his girlfriend. He attends a gym in Cork that has specialist equipment for supporting people in wheelchairs. His outlook on living with his injury is extremely positive and he will continue to work on his health and recovery. Reflecting on his journey through the health system and various hospitals, he says he is very grateful for the care he received. He recently received a message from his physiotherapist in CUH, who congratulated him on his upcoming house move. In addition, one of the friends he made in the NRH, who plays in a band, recently performed in Richard's local pub, an occasion that everyone in attendance greatly enjoyed. Richard is grateful to his family, his girlfriend and his friends for all their support.

PATIENT AND PUBLIC SAFETY MESSAGE

The National Office of Clinical Audit (NOCA) works directly with Public and Patient Interest (PPI) representatives and each of the audit committees has PPI representatives. This report aims to continue to promote injury prevention messages in order to build on the previous messages published in the last two reports, the *Major Trauma Audit National Report 2018,* (NOCA, 2020*)* which featured a home safety infographic, and the *Major Trauma Audit Paediatric Report 2014–2019*, (NOCA, 2021) which featured an injury prevention infographic. Falls in the home are still the leading cause of major trauma. One consequence of the COVID-19 pandemic is that the public has spent more time in the home than ever before; therefore, we need to be more vigilant than ever about keeping people safe in the home. This checklist, based on the data in this audit, can be used as a guide to checking the home environment and completed by healthcare staff visiting a patient's home, or by a member of the public in their own home, to help identify risks for falls and injuries.

HOME SAFETY CHECKLIST FOR FALLS PREVENTION

IS THE ENTRANCE TO THE HOME SAFE?

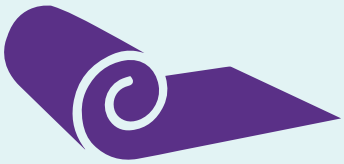
✔ **YES:** NO ACTION.

✗ **NO:** If the footpath is uneven or slippery, or has loose paving stones or trip hazards, it should be fixed or removed.

CAN YOU WALK AROUND THE HOME EASILY?

✔ **YES:** NO ACTION.

✗ **NO:** Ask someone to move furniture or clutter in order to make the rooms/walkways accessible and safe.



ARE THERE RUGS OR TRIP HAZARDS?

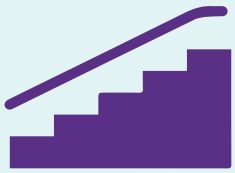
✗ **NO:** NO ACTION.

✔ **YES:** Remove rugs or use double-sided tape to make them safe; remove trip hazards.

IS THERE ADEQUATE LIGHTING IN THE WALKWAYS AND ROOMS?

✔ **YES:** NO ACTION.

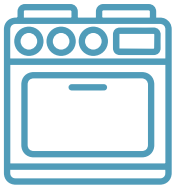
✗ **NO:** Replace bulbs; suggest placing a lamp in darker areas in order to increase brightness.



ARE THE STAIRS OR STEPS SAFE?

✔ **YES:** NO ACTION.

✗ **NO:** Remove any items on stairs/steps; make sure handrails are safe; fix any loose steps or loose carpet; and make sure lighting is adequate on the stairs.



IS THE KITCHEN SAFE?

✔ **YES:** NO ACTION.

✗ **NO:** Make sure key items are within easy reach; if using a step, make sure that it is in good working order.

IS THE BATHROOM SAFE?

✔ **YES:** NO ACTION.

✗ **NO:** Make sure non-slip mats are available in the bath or shower. If there is difficulty getting into the bath/shower, ensure that grab rails are placed where appropriate.

IS THE BEDROOM SAFE?

✔ **YES:** NO ACTION.

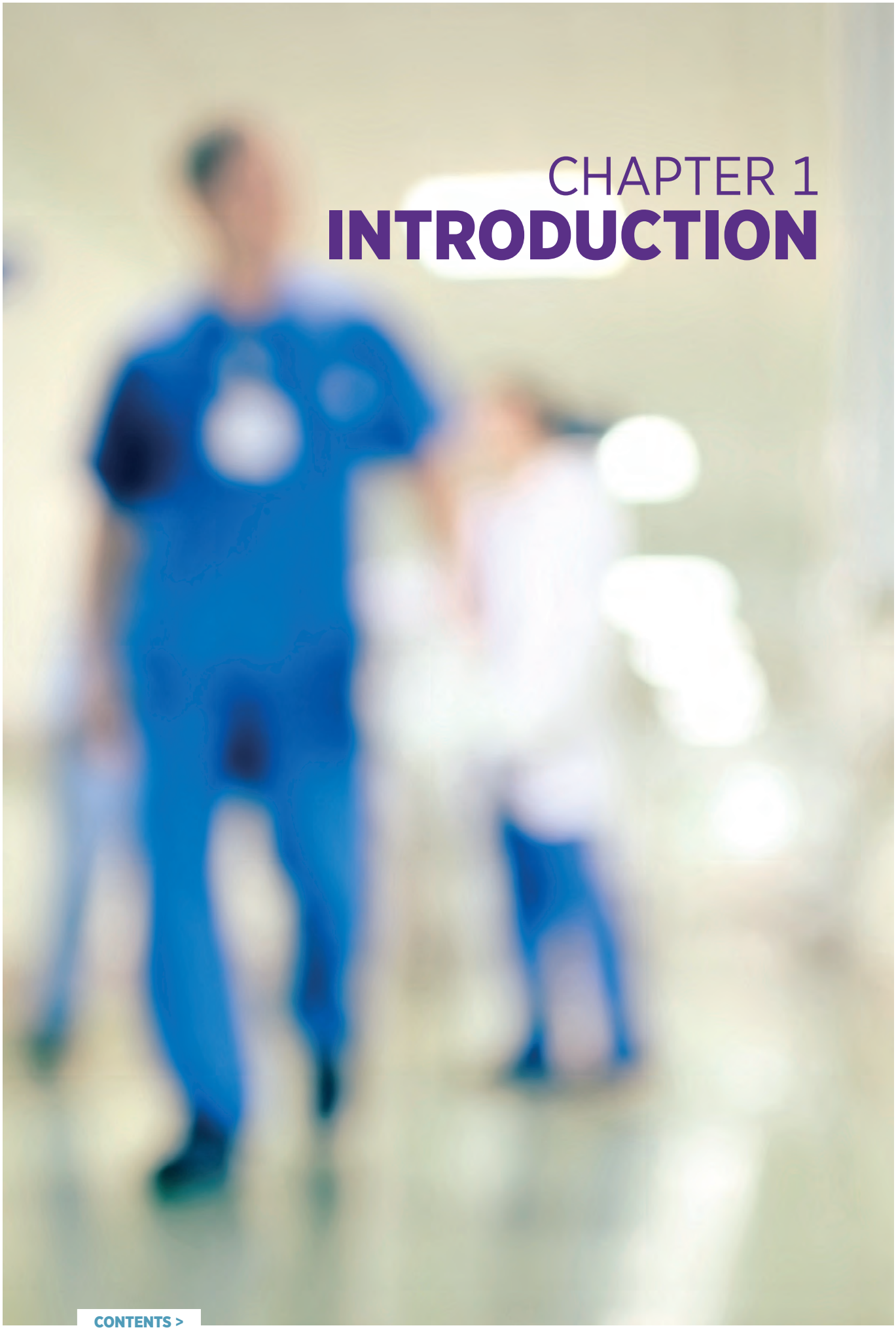
✗ **NO:** Ensure that a lamp or light is within easy reach of the bed. Ensure that the route to the bathroom is clear and easily visible. Remove clutter. Ensure that a walking aid is within easy reach if required.

ARE THERE PETS IN THE HOUSE?

✗ **NO:** NO ACTION.

✔ **YES:** Make sure the pet has a bell on its collar, so as to ensure that its whereabouts are known at all times.

FIGURE 1: HOME SAFETY CHECKLIST FOR FALLS PREVENTION AT A GLANCE



CHAPTER 1
INTRODUCTION

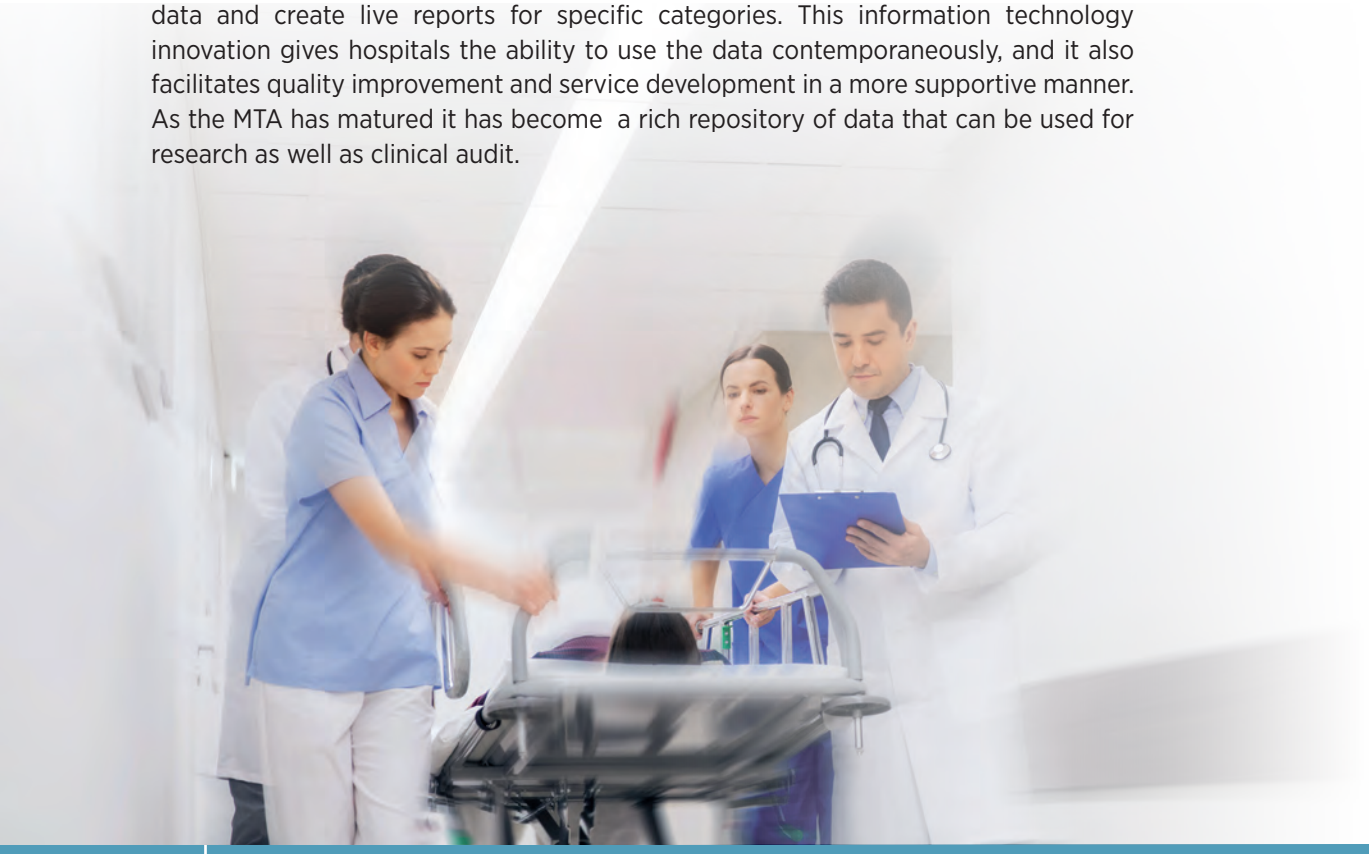
CHAPTER 1

INTRODUCTION

Major trauma is defined as an accident resulting in life-threatening or life-changing injuries. Major trauma is any injury that has the potential to cause prolonged disability or death. There are many causes of major trauma. Such injuries can be caused by blunt or penetrating mechanisms such as falls, motor vehicle collisions, stab wounds, and gunshot wounds (World Health Organization, 2014). Worldwide, more than 5 million people die each year as a result of injuries. This accounts for 9% of the world's deaths (World Health Organization, 2014). The World Health Organization Global Health Estimates show that in 2016, nearly half a million (493,471) deaths occurred in the World Health Organization European Region due to violence and injuries. Injuries account for 5.3% of all deaths and 9.6 years of life lost. The three leading causes of injury deaths are self-directed violence (141,089), falls (83,325) and road traffic injuries (78,198) (WHO Regional Office for Europe, 2020).

This is the seventh Major Trauma Audit National Report published by the National Office of Clinical Audit (NOCA). The Major Trauma Audit (MTA) was developed using the Trauma Audit and Research Network (TARN) methodology. TARN has been in operation in the United Kingdom (UK) since the 1980s, and has been at the forefront of quality and research initiatives in trauma care. It is the largest trauma registry in Europe and is clinically led, academic and independent. TARN has been integral to the reconfiguration of trauma care delivery in the UK and it monitors the effects of the changes implemented. TARN receives and analyses anonymised MTA submissions from participating Irish hospitals and reports back to these hospitals. This feedback from TARN and NOCA supports hospitals and clinicians to monitor care and use the data to improve.

In addition to standardised clinical reports and dashboard reports, TARN has now developed an interactive data analytics portal where hospitals can access their own data and create live reports for specific categories. This information technology innovation gives hospitals the ability to use the data contemporaneously, and it also facilitates quality improvement and service development in a more supportive manner. As the MTA has matured it has become a rich repository of data that can be used for research as well as clinical audit.



UPDATE ON DEVELOPMENT OF THE TRAUMA SYSTEM

The data from the MTA continues to inform key system changes, such as the reconfiguration of the trauma system and the designation of major trauma centres (MTCs) and trauma units (TUs) advocated for the National Trauma Strategy, *A Trauma System for Ireland: Report of the Trauma Steering Group* (Department of Health, 2018). The strategy recommends that an integrated trauma system be established, where trauma-relevant facilities and services are networked, and to coordinate the care of injured patients along standardised pathways. *A Trauma System for Ireland: Report of the Trauma Steering Group* recommends that trauma services in the future trauma system will be delivered by two regional hub-and-spoke networks, a Central Trauma Network and a South Trauma Network, each with an MTC with a number of supporting TUs.

MTCs will provide the highest level of specialist trauma care to the most severely injured patients on a single hospital site. TUs, on the other hand, will deliver more general trauma care to the majority of patients who do not need the specialist expertise of an MTC; such care will usually be provided at a location closer to the patient's home. TUs will be able to refer patients to MTCs if this is deemed necessary seamlessly. In this way, MTCs will support TUs across Ireland.

The fully established trauma system will take between 5 and 7 years to develop. The first development phase will be completed by end 2022, with the delivery of major trauma services at the two MTCs: one at the Mater Misericordiae University Hospital for the Central Trauma Network, and the other at Cork University Hospital for the South Trauma Network.

To enable the establishment of the MTCs, the National Office for Trauma Services (NOTS), in collaboration with the National Ambulance Service (NAS), has developed a trauma triage tool that will be used by pre-hospital professionals healthcare to identify patients who should receive their trauma care at an MTC. This will ensure that patients suffering major trauma will receive their care in the most appropriate setting in a timely way.

The establishment of the MTCs will represent a major milestone in the development of the trauma system and will see major trauma care coordinated by a dedicated receiving and inpatient trauma team. Patients suffering major trauma will have their medical, surgical and rehabilitation care coordinated by the trauma team. Each trauma patient will have their rehabilitation needs assessed within 48 hours of injury, and where required, a rehabilitation prescription will be completed and will be used by all rehabilitation providers involved in the patient's ongoing care. This will assist in the development of trauma and rehabilitation outcome measures that can be included in future audits.

The MTA enables hospitals to measure their care against defined clinical standards in a transparent way; in addition, it supports active engagement in quality improvement. It also demonstrates how responsive the trauma system is to the changes that are under way. International evidence has shown us that the synergy between care standards,

audit, and feedback drive measurable improvement outcomes for patients, including a reduction in mortality (Royal College of Physicians, 2015).

The MTA Governance Committee has welcomed the *Major Trauma Audit National Report 2019 and 2020*, and continues to support the reconfiguration of the trauma system for all patients. The MTA focus now is on the impact of the COVID-19 pandemic, opportunities for injury prevention, and measurement of the changes as the new trauma system begins to take shape.

This report has been designed in two parts: the *Major Trauma Audit National Report 2019 and 2020* and the *Major Trauma Audit Summary Report 2019 and 2020*. The work reported here is intended for use by a wide range of individuals and organisations, including patients and carers, patient organisations, healthcare professionals, hospital managers, Hospital Groups, and policy-makers.

CHAPTER 2
METHODOLOGY

CONTENTS >

CHAPTER 2

MTA METHODOLOGY

The MTA collects data on all major trauma patients who meet the inclusion criteria specified in Appendix 2. The MTA uses the TARN methodology.

DATA COLLECTION

The data are collected in the local hospitals by audit coordinators who enter the data retrospectively from patient medical records or information technology systems. Each hospital has an audit coordinator and a clinical lead, and should have an MTA governance committee. A list of cases eligible for inclusion is identified by creating an MTA report through the Hospital In-Patient Enquiry (HIPE) system. Each audit coordinator has access to the HIPE portal to create these reports. The cases identified in these reports are reviewed and, where eligible, are entered into TARN. Where deemed ineligible, they are recorded as such within the HIPE system, along with a reason for not being included. The ineligible cases are removed from each hospital's denominator at the end of each reporting year, so as to ensure that the data coverage is accurate.

The audit coordinator and clinical lead can generate local reports. TARN issues clinical reports three times a year and dashboard reports twice a year. In addition, NOCA sends quarterly reports to the Hospital Groups. Most data are entered retrospectively and in accordance with the data collection targets set out in the data collection calendar (Table 2.1). The TARN coders and analytical team provide analysis of the data in order to create key variables in advance of sharing the data with NOCA. Examples of these key measures are the Injury Severity Score (ISS) and the Abbreviated Injury Scale (AIS) in Appendix 3.

TARN has also recently developed a TARN analytics dashboard which allows hospitals to look at their data more prospectively using Microsoft Power BI (a data visualisation tool). Microsoft Power BI contains a number of report templates (for example TARN have created reports for data quality, body regions injured, case mix, and pathways and outcomes), and the data can be further analysed by selecting options on the screen. The reports can be exported into Portable Document Format (PDF) or PowerPoint to make them easy to share with relevant stakeholders, or to use them for service development and quality improvement.

The collection of 2020 data was severely affected because many MTA audit coordinators were redeployed to support frontline services in hospitals for quite prolonged periods. The Health Service Executive (HSE) cyberattack in 2021 caused another major delay, as the majority of hospitals were left unable to access the Internet for several months and therefore the audit coordinators were unable to enter data through the TARN website. As a result, the data presented in this report will be shown at an aggregated level and not at individual hospital level.

DATA ENTRY

TABLE 2.1: DATA COLLECTION CALENDAR 2019 AND 2020

Data collection period	Data entry target	Data reporting date
01/01/2019–31/03/2019	30/09/2019	18/10/2019
01/04/2019–30/06/2019	31/12/2019	30/01/2020
01/07/2019–30/09/2019	31/03/2020	18/04/2020
01/10/2019–31/12/2019	31/07/2020*	23/08/2020*
01/01/2020–31/03/2020	30/09/2020	18/10/2020
01/04/2020–30/06/2020	31/12/2020	30/01/2021
01/07/2020–30/09/2020	31/03/2021	18/04/2021
01/10/2020–31/12/2020	31/10/2021*	06/01/2022*

*The target date was extended multiple times due to the COVID-19 pandemic and the 2021 HSE cyberattack.

DATA ANALYSIS

NOCA received the data extract from TARN on 6 January 2022. This was later than anticipated due to the COVID-19 pandemic and the 2021 HSE cyberattack. Analysis for the national report was completed by the NOCA data analytics team following data checks with TARN. The analysis was conducted using Statistical Package for the Social Sciences (SPSS) V25. This report focuses on the impact from the COVID-19 pandemic, and as such, will use the time points shown in Figure 2.1 to highlight the impact of the different waves of the pandemic during 2020.

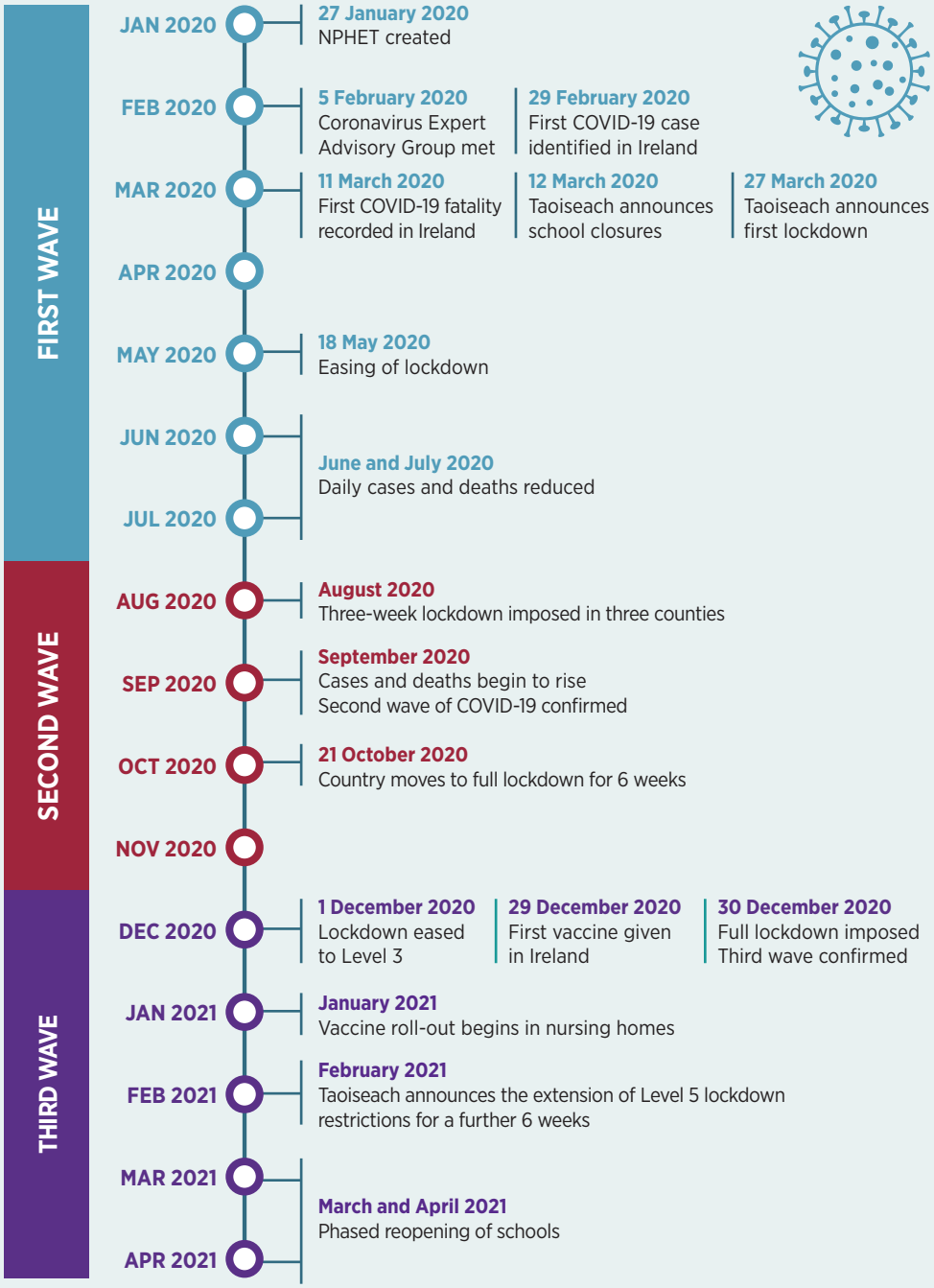


FIGURE 2.1: TIMELINE OF THE COVID-19 PANDEMIC IN IRELAND

TABLE 2.2: HOSPITALS WE WORK WITH

HOSPITAL	CLINICAL LEAD	AUDIT COORDINATOR
Beaumont Hospital	Dr Michael Quirke	Anna Duffy Ruth Kavanagh Anthony O'Loughlin
Cavan General Hospital	Mr Ashraf Butt	Eilish Sweeney
Cork University Hospital	Mr James Clover	Ann Deasy Karina Caine
Children's Health Ireland at Temple Street	Dr Nuala Quinn	Jennifer Doyle
Connolly Hospital	Dr Philip Darcy	Marguerite Accereta
University Hospital Kerry	Dr Niamh Feely	Esther O'Mahony
Letterkenny University Hospital	Dr Sinead O'Gorman	Patrick McGonagle Sarah Meagher
Mayo University Hospital	Dr Ciara Canavan Dr Ann Shortt	Paul Crisham
Mater Misericordiae University Hospital	Dr Francis O'Keeffe Dr Tomás Breslin	Marion Lynders
Mercy University Hospital	Dr Darren McLoughlin	Ann Deasy
Regional Hospital Mullingar	Dr Sam Kuan	Maura McGuire
Midland Regional Hospital Portlaoise	Dr Suvarna Maharaj	Tracy Kelly
Midland Regional Hospital Tullamore	Dr Anna Moore	Anita Sawyer AnneMarie Barnes
Naas General Hospital	Mr George Little	Jennifer Kehoe
Children's Health Ireland at Crumlin	Dr Carol Blackburn Mr Brian Sweeney Dr Laura Melody	Trisha Hynds
Our Lady of Lourdes Hospital Drogheda	Mr Niall O'Connor	Deborah McDaniel
Sligo University Hospital	Dr Kieran Cunningham	Erin Lyons
Tipperary University Hospital	Dr Oisin Powell	Susan Ryan
St Luke's General Hospital, Kilkenny	Dr David Maritz	Frances Walsh
St James's Hospital	Mr Niall Hogan Dr Geraldine McMahon	Ricardo Paco Genevieve Wynne
St Vincent's University Hospital	Dr John Cronin	Jennifer Beatty Emma Morake
Tallaght University Hospital	Dr Jean O'Sullivan Dr Aileen McCabe Dr Ciara Martin	Noel Redmond
University Hospital Galway	Mr Alan Hussey	Paul Crisham
University Hospital Limerick	Dr Cormac Mehigan	Michael Fitzpatrick
University Hospital Waterford	Mr Morgan McMonagle	Margaret Mulcahy
Wexford General Hospital	Dr Paul Kelly Dr Michael Molloy	Roisin O'Neill

CHAPTER 3
DATA QUALITY

Relevance

Accuracy and reliability

Timeliness and punctuality

Coherence and comparability

Accessibility and clarity

CONTENTS >

CHAPTER 3

DATA QUALITY

DATA FOR THIS MTA REPORT

This report includes all patients who arrived for trauma care between 1 January 2019 and 31 December 2020, and who fulfilled the TARN eligibility criteria for inclusion Table 3.1 (see Appendix 2).

TABLE 3.1: DATA ANALYSIS FOR MAJOR TRAUMA AUDIT REPORT 2019 AND 2020

	2019	2020
Number of participating hospitals	25*	25*
All TARN submissions	5217	4504
Individual patients	4618	4146
Not transferred (into or out of first hospital)	3649	3398
Direct admissions	4238	3792

*Naas General Hospital did not enter any cases during 2019 and 2020

DATA QUALITY STATEMENT

The purpose of the data quality statement (Table 3.2) is to highlight the assessment of the quality of the MTA data using internationally agreed dimensions of data quality as laid out in *Guidance on a data quality framework for health and social care* (Health Information and Quality Authority, 2018). An overview of the aim and objectives of the MTA can be found in Appendix 1 (available via link). The data quality statement identifies strengths in the data quality, including information to allow for subgroup analysis and areas for further improvement, such as matching of cases, etc. An overview of the assessment of the MTA against the dimensions of data quality is presented in Table 3.2.

TABLE 3.2: OVERVIEW OF DATA QUALITY FOR MAJOR TRAUMA AUDIT 2019 AND 2020

Dimensions of data quality	Definition (HIQA, 2018)	Assessment of Data Quality Dimensions for the MTA
Relevance 	**Data meets the current and potential future needs of users.**	The MTA dataset is reviewed continuously as part of the TARN and MTA governance structures, in order to ensure that all data fields are relevant. Monthly teleconferences with the audit coordinators enable any new data fields or definitions to be discussed and feedback given to TARN. Each year, TARN holds two workshops for audit coordinators and clinical leads to support the use of the database and ensure that the data collected are meaningful and relevant. In 2021, the MTA Governance Committee identified a need to highlight the impact of the COVID-19 pandemic on major trauma patients and care. TARN introduced new variables in 2020 to allow data to be collected on patients with a COVID-19 diagnosis.
Accuracy and reliability 	**Data correctly and consistently describes what it was designed to measure.**	The MTA collects data on trauma patients through a secure portal on the TARN website. The reference population for the national report for 2019 and 2020 was: All patients admitted in 2019 and 2020 with major trauma who fulfilled the TARN criteria for inclusion (see Appendix 2). The expected standard for reporting at a hospital level is a minimum of 80% coverage. In 2019 and 2020, only 50% of the participating hospitals achieved this minimum standard of coverage. Due to the impact of the COVID-19 pandemic and the 2021 HSE cyberattack, clinical audit data collection suffered considerably. Therefore, the majority of the data in this report will be reported at an aggregated level for each year.

TABLE 3.2: OVERVIEW OF DATA QUALITY FOR MTA 2019 AND 2020 (CONTINUED)

Dimensions of data quality	Definition (HIQA, 2018)	Assessment of Data Quality Dimensions for the MTA
Timeliness and punctuality 	**Data is collected within a reasonable agreed time period and is delivered on the dates promised.**	NOCA issues a data collection and reporting calendar each year with quarterly targets. These targets are adjusted when appropriate. During the data collection period for this report, the data collection process faced significant challenges due to staff redeployment in the course of the COVID-19 pandemic and also due to the 2021 HSE cyberattack. As a result of these two unprecedented events, the data collection calendar was adjusted several times and final data entry was closed on 31 October 2021.
Coherence and comparability 	**Data is consistent over time and across providers and can be easily combined with other sources.**	The MTA uses validated and comparable metrics to allow benchmarking, e.g. the International Classification of Diseases, Tenth Revision (ICD-10) codes used in the HIPE system. TARN and NOCA provide data entry guides, and procedure manuals are available from their respective websites. In 2018, a more detailed MTA data dictionary was completed, in line with the Health Information and Quality Authority's *Guidance on a data quality framework for health and social care* (Health Information and Quality Authority, 2018). This is updated regularly. MTA data can be compared directly with data in the UK through the TARN audit. Some definitions vary slightly, but overall, the TARN audit acts as an appropriate international comparator. Any changes to the dataset, definitions and methodology are documented on the TARN website (www.tarn.ac.uk), and any relevant changes are noted in the MTA National Report.

TABLE 3.2: OVERVIEW OF DATA QUALITY FOR MTA 2019 AND 2020 (CONTINUED)

Dimensions of data quality	Definition (HIQA, 2018)	Assessment of Data Quality Dimensions for the MTA
Accessibility and clarity 	**Data is easily obtainable and clearly presented in a way that can be understood.**	A list of publications related to the MTA are available on the NOCA website under Reports and Research (www.noca.ie). Hospitals and Hospital Groups (if requested) can access their TARN data via a secure portal on the TARN website. This includes three clinical working reports, two dashboard reports, and reports through the TARN analytics portal. Access to TARN data for Ireland is managed and governed by NOCA. Data access requests can be made directly through the NOCA website for a number of purposes, including research (in collaboration with the TARN research committee), service improvement, freedom of information, and media queries. Ad hoc requests for data or audit reports must receive approval from the MTA Governance Committee.

DATA COVERAGE

The data coverage refers to the number of major trauma cases entered against the overall expected number of cases (this is also referred to as case ascertainment). The expected number of cases is estimated based on the HIPE codes related to trauma for the reporting year. The TARN eligibility criteria for inclusion (see Appendix 2) are applied to the national HIPE codes in order to estimate how many patients in each hospital potentially meet the inclusion criteria for the audit. The limitations to this process were identified in the *Major Trauma Audit National Report 2016*, and during 2017 and 2018 NOCA worked with the Healthcare Pricing Office (HPO) and TARN to enable the audit coordinators from the hospitals to identify cases that did not meet the inclusion criteria for the audit, and then exclude these from the hospital denominators. During 2020, a report was developed on the HIPE system that allowed the data for 2019 to be retrospectively entered and an accurate coverage report provided to NOCA.

The national coverage for this report is described for the years 2019 and 2020:

1) MTA total coverage was 83% for 2019, and 73% for 2020 (Figure 3.1). This includes patients of all ages who met the inclusion criteria and had data entered on TARN.

The coverage is the direct result of the hard work and commitment of the hospital audit coordinators and clinical leads. In both years, one-half (n=13) of participating hospitals achieved the TARN coverage (case ascertainment) target of 80%, and one-half (n=13) did not. In 2019, six hospitals had a coverage of less than 50%. This increased to 10 hospitals in 2020. The data collection in the majority of the hospitals was severely affected from March 2020 onwards due to the COVID-19 pandemic, as many audit coordinators were redeployed to support frontline services in hospitals. This disruption to data collection was further compounded in May 2021 when the HSE cyberattack prevented any data entry to the MTA for a very prolonged period, as the majority of hospitals had no access to the Internet and therefore access to the TARN website was not possible. In an effort to make the data for 2019 and 2020 as complete as possible, the deadline for data entry was extended by 1 month until 31 October 2021.

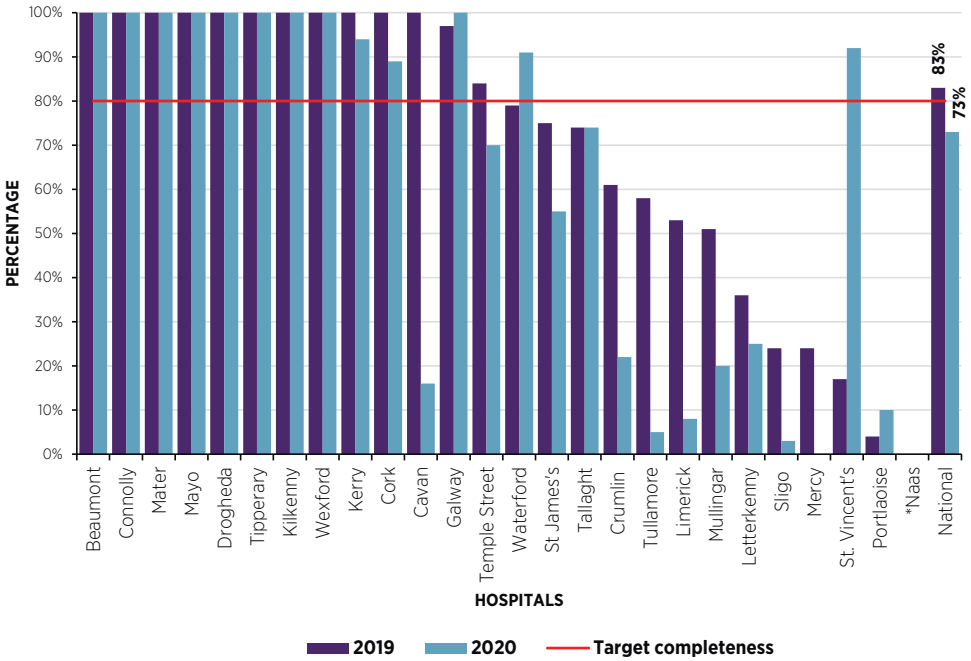


FIGURE 3.1: DATA COVERAGE PERCENTAGES BY HOSPITAL AND YEAR, 2019 AND 2020

*Naas General Hospital did not enter data during either 2019 or 2020.

DATA ACCREDITATION

The completion of key data fields for each submission recorded is used as the second measure of data quality (Figure 3.2). This is called data accreditation. TARN applies a standard of 95% for this measure. Figure 3.3 shows data accreditation by key data fields.

The national accreditation for this report is described for both 2019 and 2020:

1. The MTA accreditation is 95% for both 2019 and 2020 (Figure 3.2).
2. The data accreditation is for key data fields for both 2019 and 2020 (Figure 3.3).

Despite the reduction in data capture for 2020, the data accreditation still remains at the desired standard of 95%, thus providing reassurance that NOCA has collected are of a very high quality (Figure 3.2). Figure 3.3 shows the individual data points that are essential in each case to assure the audit of good data quality. As highlighted in previous National Reports, there remains some difficulty in capturing pre-hospital information about 999 call details and incident details. Ongoing work with the NAS and Dublin Fire Brigade (DFB) is under way to improve this, and currently the electronic patient care record (ePCR) used by the NAS is supporting hospitals to improve the capture of this information.

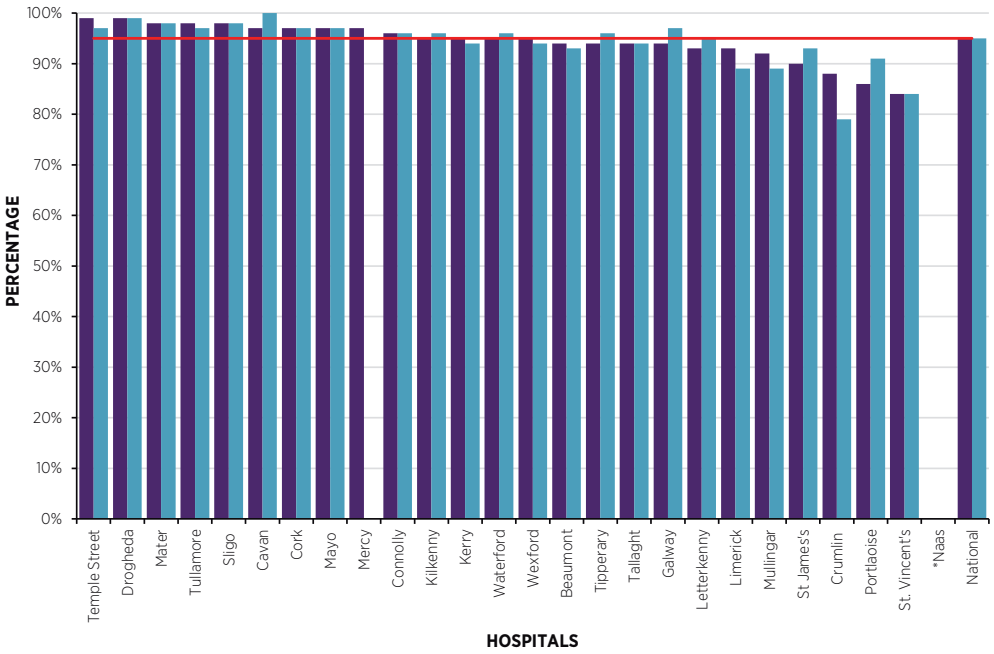


FIGURE 3.2: DATA ACCREDITATION PERCENTAGES BY HOSPITAL AND YEAR, 2019 AND 2020

*Naas General Hospital did not enter data during either 2019 or 2020.

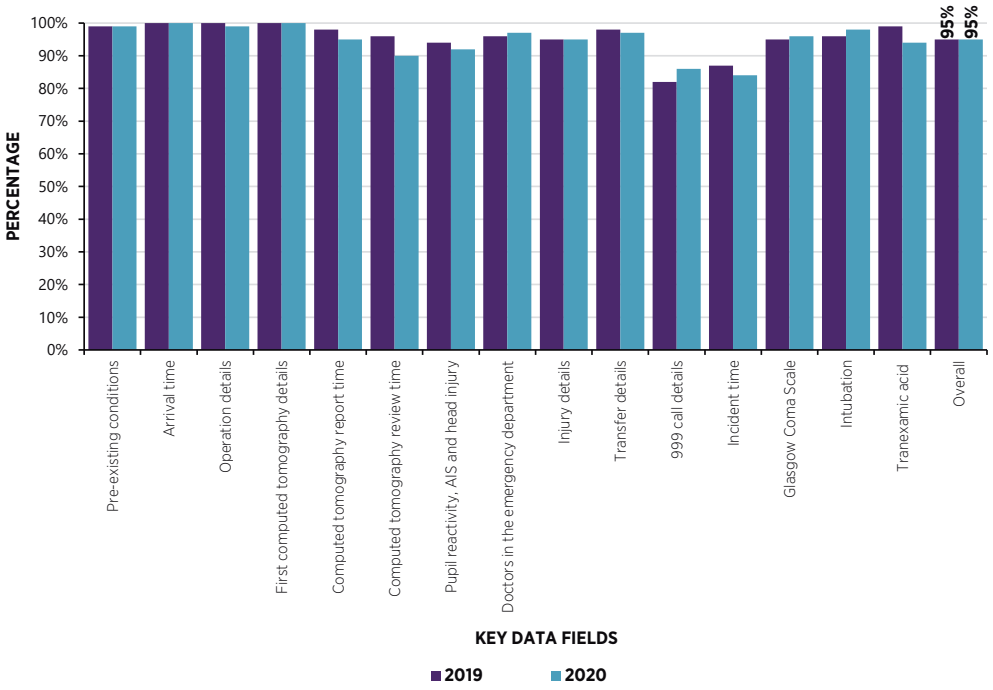


FIGURE 3.3: DATA ACCREDITATION BY KEY DATA FIELDS

CHAPTER 4
WHO WAS INJURED AND HOW WERE THEY INJURED

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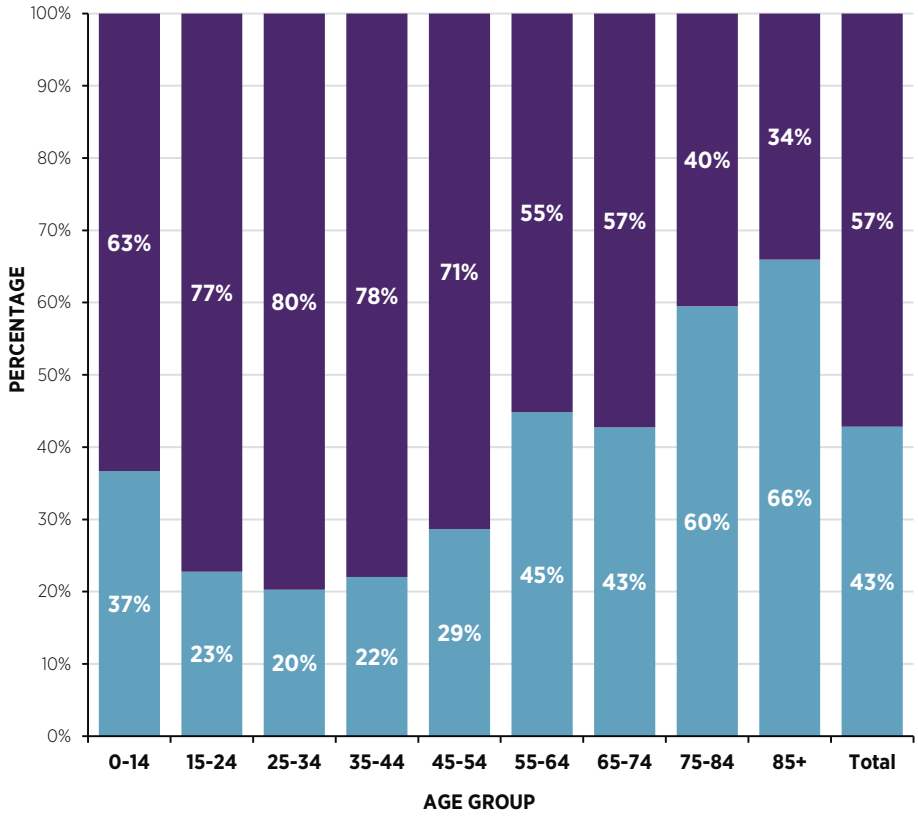
CHAPTER 4

WHO WAS INJURED AND HOW WERE THEY INJURED?

This chapter describes the case mix characteristics of major trauma patients. The data have been presented for 2 years (2019 and 2020). In 2020, TARN added two new datafields to capture patients admitted with COVID-19 as a pre-existing condition or those who developed COVID-19 as a complication. During the reporting period of 2020, 174 MTA patients had a COVID-19 diagnosis, 110 documented as a pre-existing condition and 64 as a complication.

GENDER AND AGE GROUP

The mean age of patients in this report is 60 years, and the median age is 64 years. Major trauma predominantly affects younger men and older women. While overall, 57% (n=5010) of patients were male, among those aged over 75 years, females were the predominant gender (n=1739, 62%). Figure 4.1 shows the distribution of age groups by gender for 2019 and 2020 combined. There was a similar age and gender distribution in both years.



		0–14	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	Total
2019	MALE	120	285	292	300	354	389	395	319	205	2659
	FEMALE	86	80	70	82	135	318	316	488	384	1959
2020	MALE	89	190	207	259	328	375	374	324	205	2351
	FEMALE	35	60	57	76	139	303	258	457	410	1795

FIGURE 4.1: PERCENTAGE OF MAJOR TRAUMA AUDIT PATIENTS BY SEX AND AGE GROUP, 2019 AND 2020 (N=8764)

PRE-EXISTING MEDICAL CONDITIONS

The Charslon Comorbidity Index (CCI) has been adapted and validated for predicting the outcome and risk of death for many comorbid diseases (Charlson *et al.*, 1987). The CCI is used in statistical adjustment for comorbidities in TARN.

A larger proportion of people had some degree of pre-existing condition(s) in 2020 (n=2465, 60%), compared with 2019 (n=2478, 54%). This represents a statistically significant difference (p<0.001). In both years, the comorbidity score increased with age (Figure 4.2).

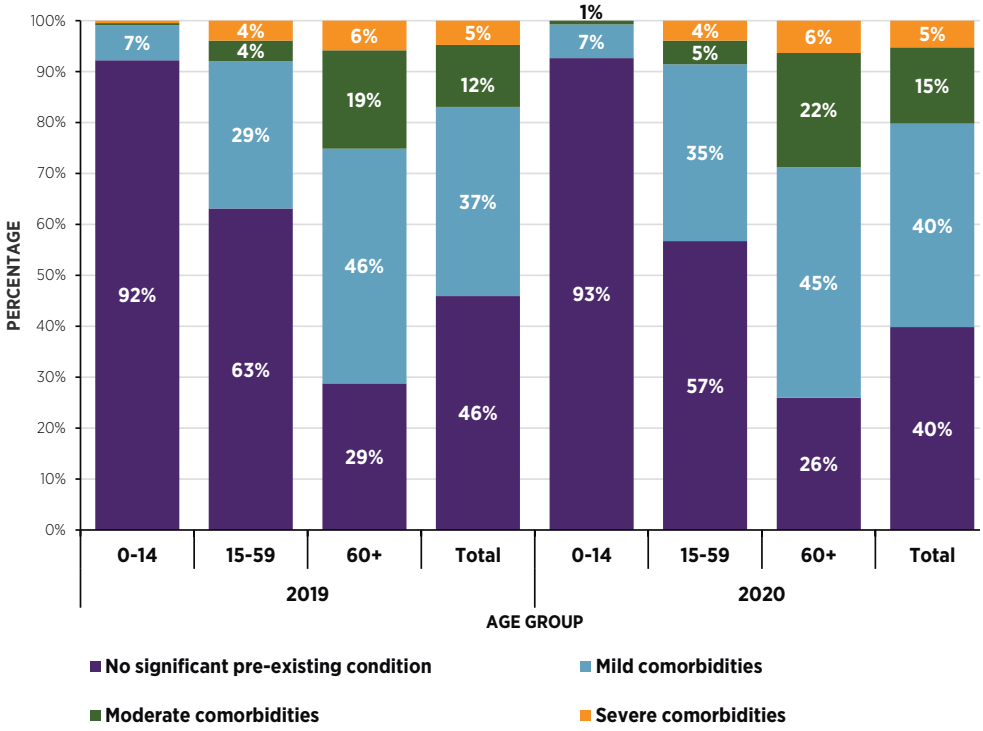


FIGURE 4.2: CHARLSON COMORBIDITY INDEX SCORE OF MAJOR TRAUMA AUDIT PATIENTS BY AGE GROUP AND YEAR, 2019 AND 2020 (n=8678)[1]

[1] Patients who did not have a CCI score recorded were excluded from Figure 4.2 (n=86).

MECHANISM OF INJURY

Falls of less than 2 m, termed 'low falls', continue to be the most frequent cause of injury. There was an increase in the proportion of falls of less than 2 m, from 58% (n=2684) in 2019 to 62% (n=2559) in 2020. This was a statistically significant difference (p<0.001). The greatest number of cases resulting from low falls was observed in December 2020 (n=246, 69%), at the beginning of Wave 3 of the COVID-19 pandemic. It is unsurprising that the number of falls increased, as the pandemic restricted people's ability to keep active, which can lead to deconditioning and increase the risk of falls, in particular for older adults.

The second most frequent cause of major trauma is road trauma. There was a decrease in the proportion of patients with this mechanism of injury, from 17% (n=780) in 2019 to 15% (n=631) in 2020. This represents a statistically significant difference (p=0.034). Furthermore, there was a decrease in the proportion of patients who received a blow, from 9% (n=438) in 2019 to 6% (n=245) in 2020. This again represents a statistically significant difference (p<0.001). In 2020, 36 patients presented with a major trauma caused by a blow(s) with a weapon. There were no patients with this mechanism of injury recorded in 2019.

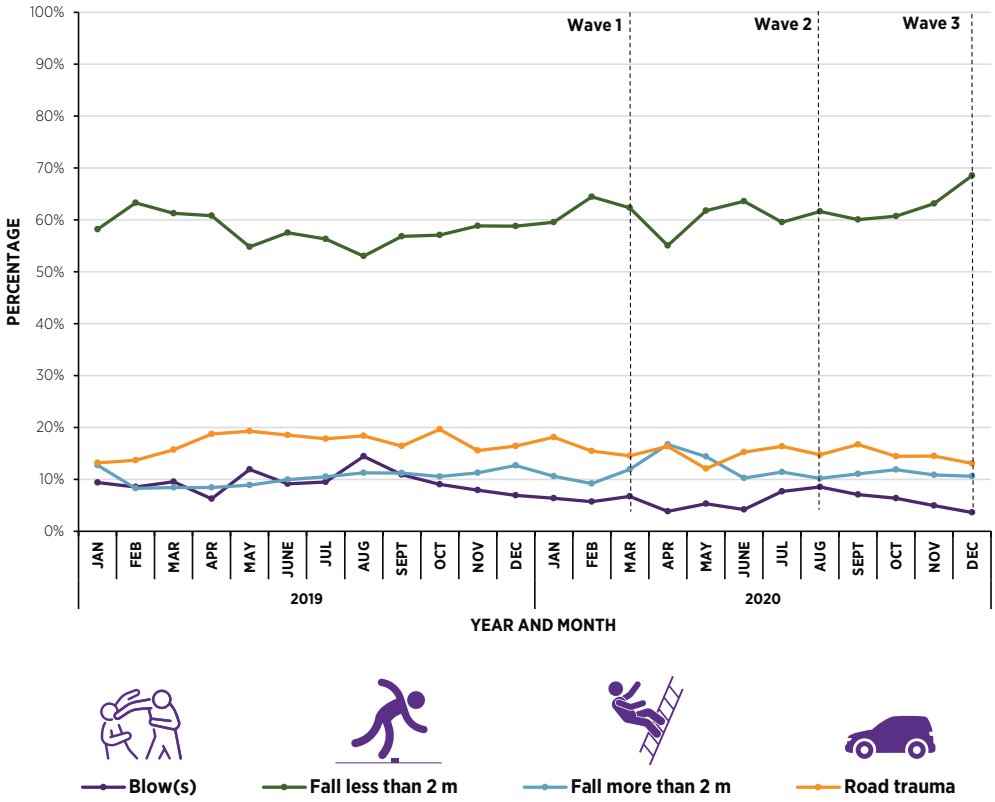


FIGURE 4.3: MECHANISM OF INJURY, BY MONTH AND YEAR, 2019 AND 2020 (N=8764)

INJURY SEVERITY SCORE

A breakdown of the Injury Severity Score (ISS) by year is presented in Figure 4.4. There was a similar proportion of patients in all three categories (i.e. low-severity injury, moderate-severity injury, severe injury) in both 2019 and 2020. When auditing the management of major trauma, it is important to have a method for grading the severity of trauma sustained by a patient. Each injury is scored between 1 and 6 based on its severity using the Abbreviated Injury Scale (AIS) (see Appendix 3). An Abbreviated Injury Scale (AIS) score of 1 represents a minor injury, whereas an AIS score of 6 represents an injury that is not survivable. This contributes to the overall ISS for that patient, which is rated on a scale from 0 to 75 (Baker *et al*., 1974) (Table 4.1).

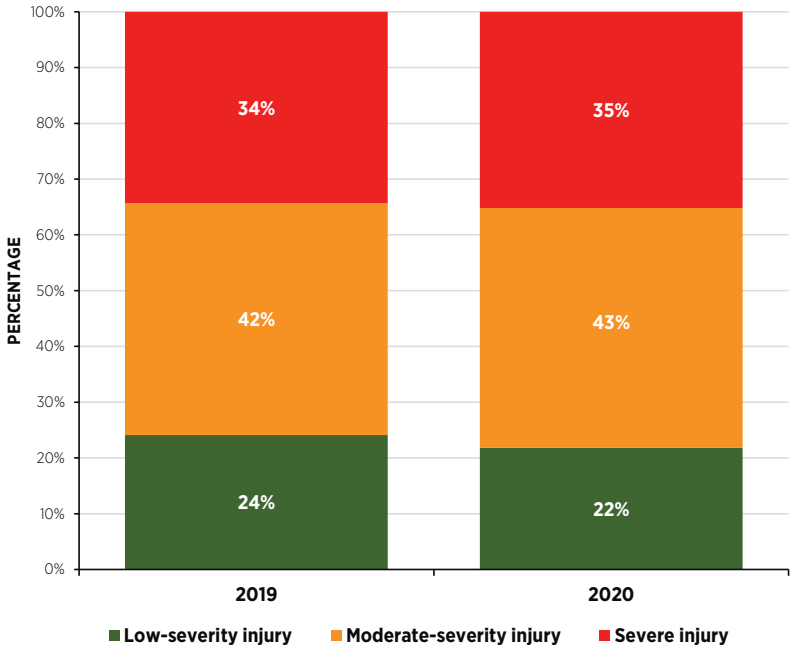


FIGURE 4.4: INJURY SEVERITY SCORE OF MAJOR TRAUMA AUDIT PATIENTS, 2019 AND 2020 (N=8764)[2]

TABLE 4.1: INJURY SEVERITY SCORE CLASSIFICATION

ISS CLASSIFICATION	ISS SCORE	EXAMPLES OF INJURIES
Low-severity injury	1-8	Fractured wrist and ankle Simple skull fracture Small bleed in liver
Moderate-severity injury	9-15	Fractured femur Small brain contusion (bruising)
Severe injury	> 15	Large subdural haematoma (bleed between skull and brain) Fracture of the pelvis with significant blood loss Severe injuries to multiple body regions

[2] Figure 4.4 represents patients whose data were captured at either their admitting hospital or the receiving hospital

PLACE OF INJURY

There was a statistically significant increase (p<0.001) in the proportion of patients injured at home, from 48% (n=2225) in 2019 to 56% (n=2333) in 2020. Furthermore, there was a statistically significant decrease (p<0.001) in the proportion of patients injured in a public area or road, from 38% (n=1767) in 2019 to 27% (n=1116) in 2020 (Figure 4.5).

Each year, the MTA has shown that home is the main location of injury for major trauma. In 2020, people spent more time at home than ever before, as mandated by the Department of Health, in order to keep people safe during the COVID-19 pandemic. Now, as the protracted impact of the pandemic is felt by all, it is critical to ensure that the unintended consequences of restricting the movements of the population are considered in the future implementation of non-pharmacological measures to control COVID-19 transmission. In particular, while it may be appropriate for people to restrict their movements at times, it is also important for older adults to maintain regular physical activity in order to reduce the risk of increased frailty, sarcopenia, falls, fractures, and injuries.

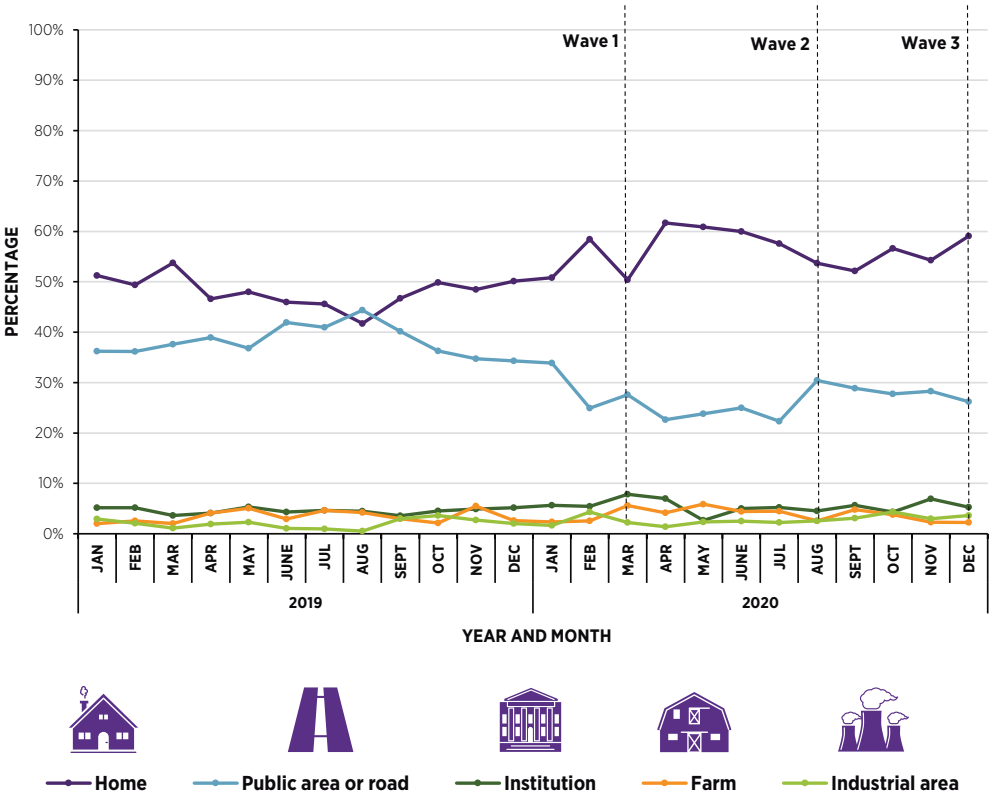


FIGURE 4.5: PLACE OF INJURY FOR MAJOR TRAUMA AUDIT PATIENTS, BY MONTH AND YEAR, 2019 AND 2020 (N=8764)

Figure 4.5A shows a further breakdown of the type of road trauma by year. There was a statistically significant decrease ($p<0.001$) in the proportion of people who suffered road trauma who were injured in car accidents, from 45% (n=349) in 2019 to 35% (n=221) in 2020. In addition, there was an increase in the proportion of cyclists injured, from 20% (n=154) in 2019 to 31% (n=193) in 2020, which again represents a statistically significant increase ($p<0.001$). The same data are described in Figure 4.5B by year and month for each type of road trauma. There is a noticeable trend upwards in accidents involving cyclists from Wave 1 of the pandemic onwards, and a reduction in accidents involving cars during Wave 1. The MTA will be working closely with the Road Safety Authority (RSA) to further explore these road trauma data.

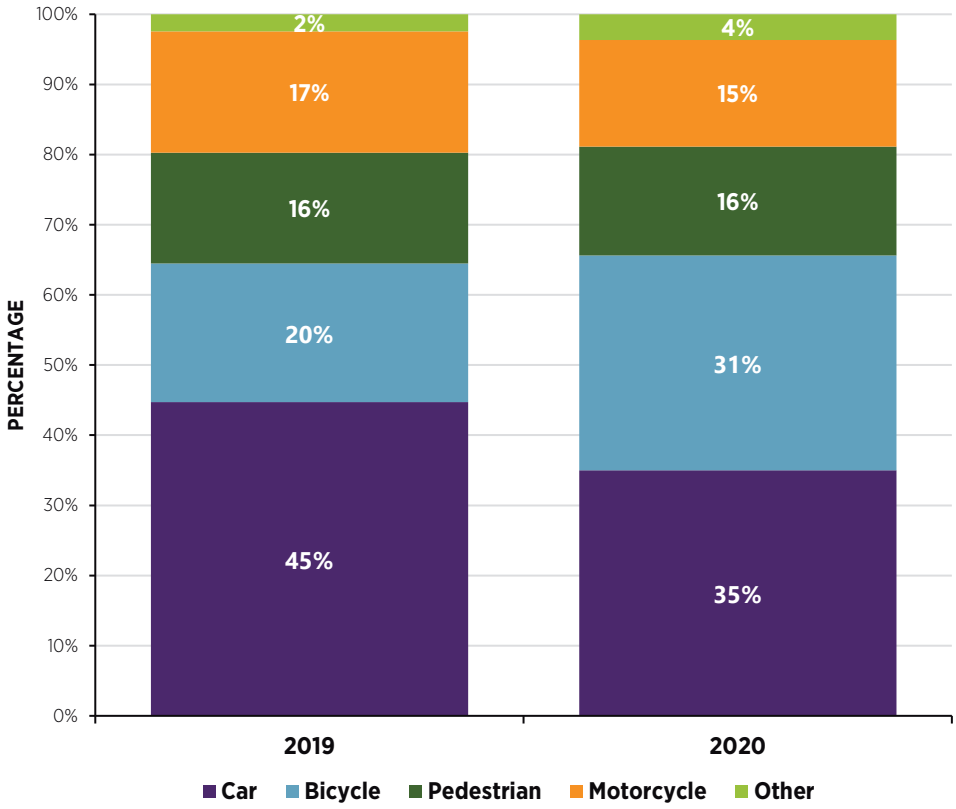


FIGURE 4.5A: TYPE OF ROAD TRAUMA, BY YEAR, 2019 AND 2020 (n=1411)[3]

	CAR	CYCLIST	PEDESTRIAN	MOTORCYCLE	OTHER
2019	45%	20%	16%	17%	2%
2020	35%	31%	16%	15%	4%

[3] The category 'Other' includes information that was not recorded.

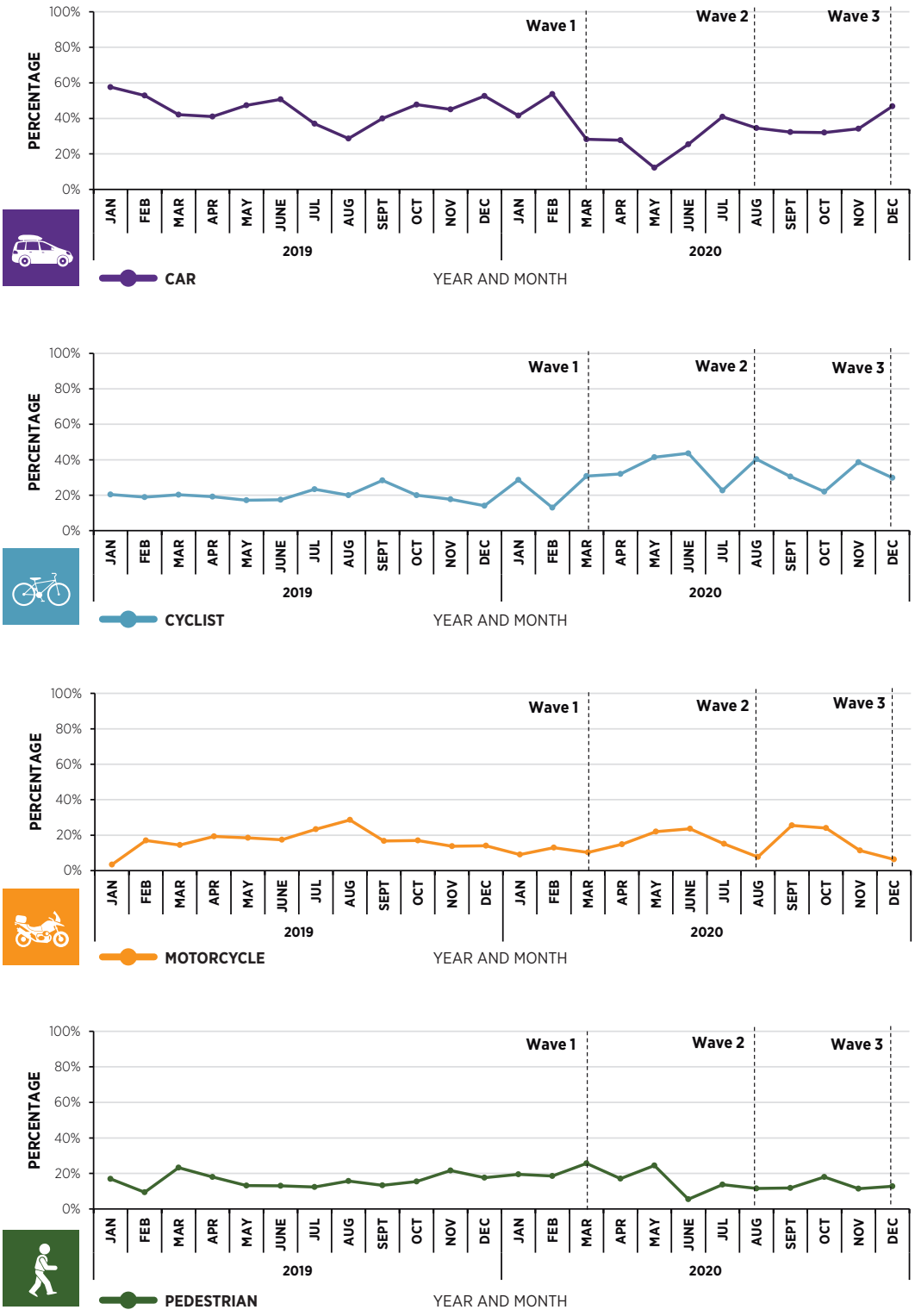


FIGURE 4.5B: TYPE OF ROAD TRAUMA, BY MONTH AND YEAR, 2019 AND 2020 (n=1411)

BODY REGIONS INJURED

Overall, the limbs and head remain the most common body regions injured (n=4461, 51%). The type and proportion of injuries reported was similar in both 2019 and 2020 (Figure 4.6).

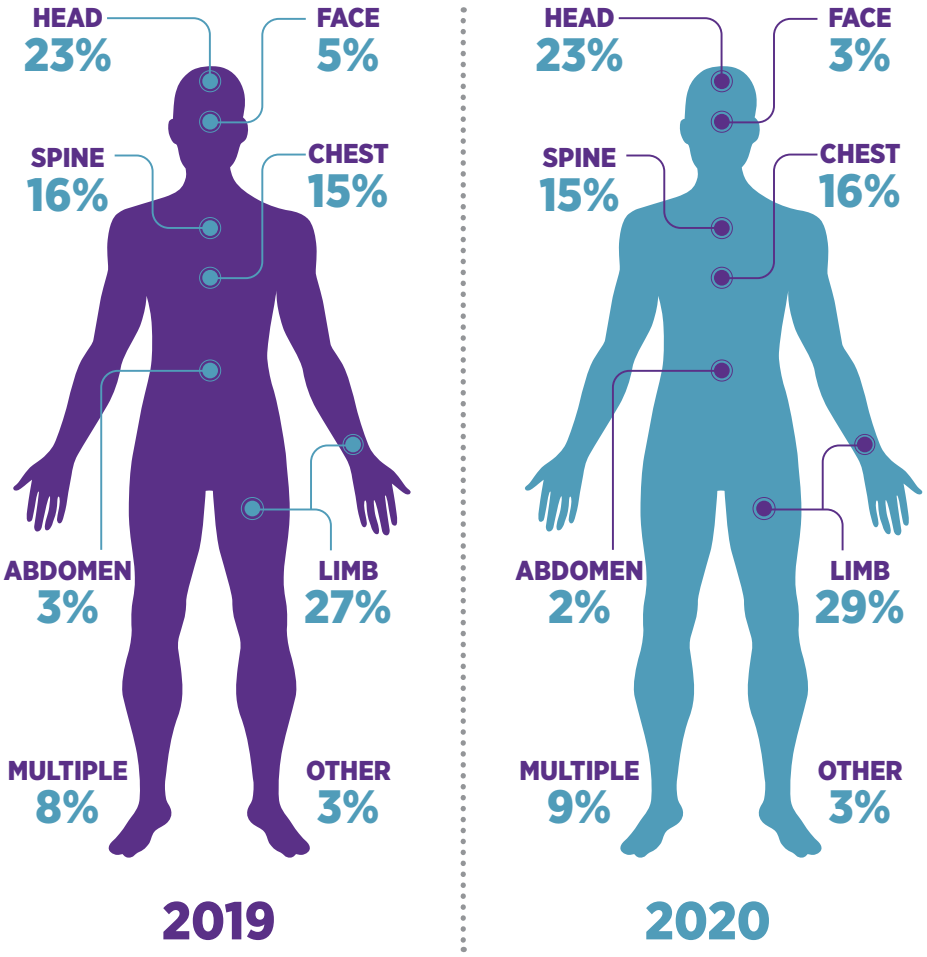


FIGURE 4.6: TYPE OF BODY REGION INJURED, BY YEAR, 2019 AND 2020 (N=8764)

ISS BY BODY REGION INJURED

Figure 4.7 shows the distribution of ISS by most severely injured body region for 2019 and 2020 combined. The distribution was similar in both years, with the majority of patients who sustained a head injury having a severe injury (n=1791, 88%).

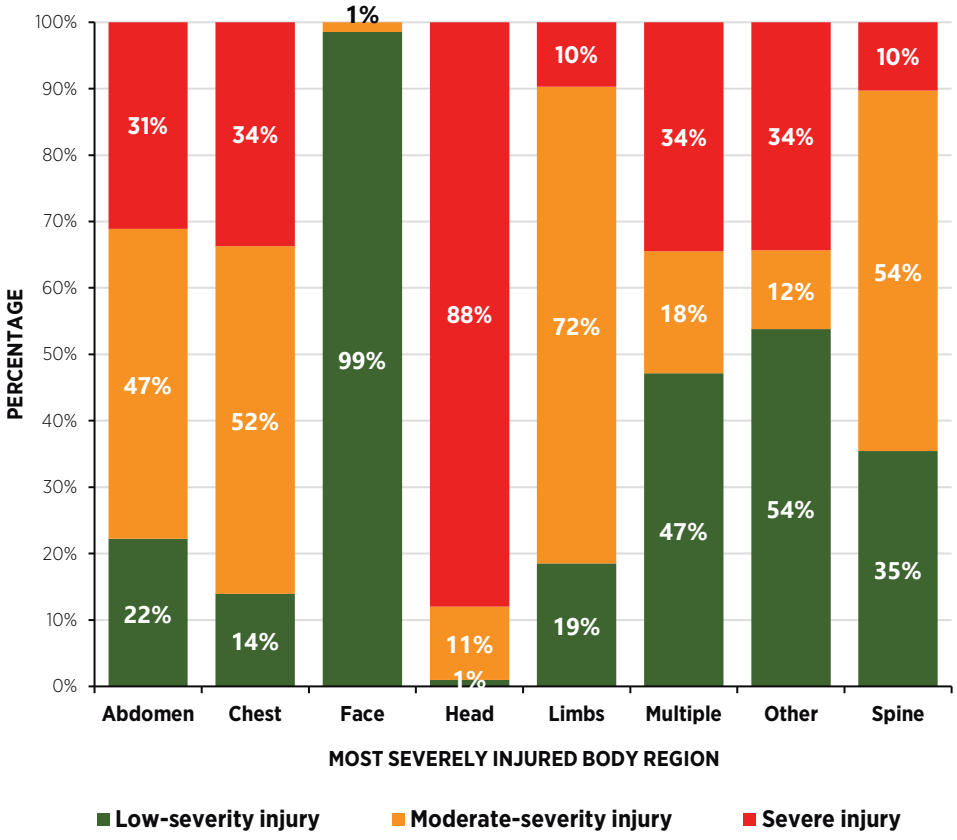


FIGURE 4.7: INJURY SEVERITY SCORE BY BODY REGION INJURED, BY YEAR, 2019 AND 2020 (N=8764)

KEY FINDINGS FROM CHAPTER 4

- Age and gender distribution did not differ significantly between 2019 and 2020.
- The mean age of patients in this report is 60 years, and the median age is 64 years.
- There was an increase in the proportion of falls of less than 2 m, from 58% (n=2684) in 2019 to 62% (n=2559) in 2020.
- There was an increase in the proportion of patients injured at home, from 48% (n=2225) in 2019 to 56% (n=2333) in 2020.

CHAPTER 5
THE PATIENT JOURNEY

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THE PATIENT JOURNEY

Currently, no hospital in Ireland meets major trauma centre (MTC) designation status. However, by end 2022, two MTCs will open their doors and this report sets a baseline from which to measure the impact these MTCs will have on the trauma system. The provision of a seamless, safe, optimal care pathway for patients with multiple injuries is very challenging in the current configuration of trauma care delivery.

This chapter describes the major trauma patients' through the hospital system in 2019 and 2020.

PRESENTATION

Figure 5.1 shows the number of admissions per month. There was a decrease in the number of admissions recorded over the reporting period, from an average of 385 admissions per month between January 2019 and February 2020 to an average of 337 admissions per month between March 2020 and December 2020. There was an approximately 10% reduction in the number of major trauma admissions recorded during 2020, compared with 2019. The lowest number of admissions occurred during March 2020 (n=268).These results should, however, be interpreted with caution as there were fewer data entered during 2020 due to the COVID-19 pandemic, and in 2021 due to the HSE cyberattack. Despite the slight reduction in the number of admissions over the reporting period, these data show that the participating hospitals continued to receive high numbers of patients with major trauma injuries throughout the pandemic.

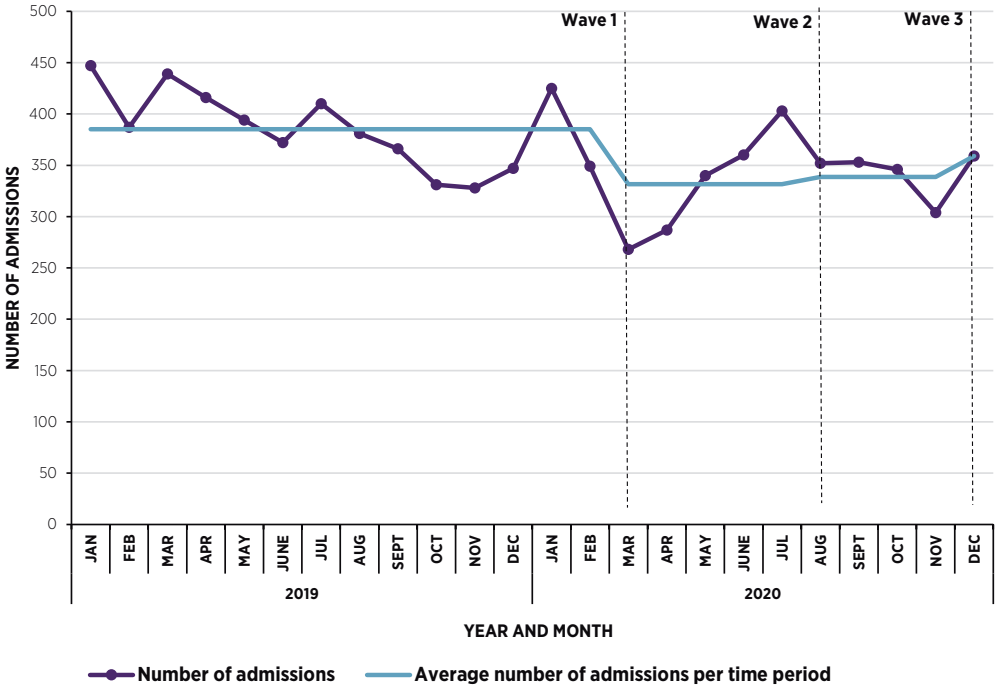


FIGURE 5.1: NUMBER OF ADMISSIONS, BY MONTH AND YEAR (N=8764)[4]

[4] Time period refer to: Pre-COVID: January 2019 to February 2020; Wave 1: March 2020 to July 2020; Wave 2: August 2020 to November 2020; Wave 3: December 2020.

IMPACT ON TRAUMA PRESENTATIONS DURING COVID-19 PANDEMIC LOCKDOWNS

During 2020, the Government imposed a number of lockdowns on the majority of the population in order to reduce the spread of COVID-19, reduce the burden on the acute hospitals, and ensure that there was enough capacity in the system to deal with patients presenting with COVID-19. A report provided by the HPO from HIPE using International Classification of Diseases, Tenth Revision (ICD-10) S and T codes (trauma codes) indicating traumatic injuries was used to estimate the number of cases that could fulfill the MTA criteria for inclusion. The report was used to determine the number of cases per week throughout 2019 and 2020 to determine whether there was a decrease in the number of major trauma patients presenting during the imposed lockdowns. Figure 5.2 shows a noticeable reduction in cases during both Lockdown 1 and Lockdown 2. Interestingly, Lockdown 1 was the most effective in terms of its impact on trauma admissions, when compared with the subsequent lockdown.

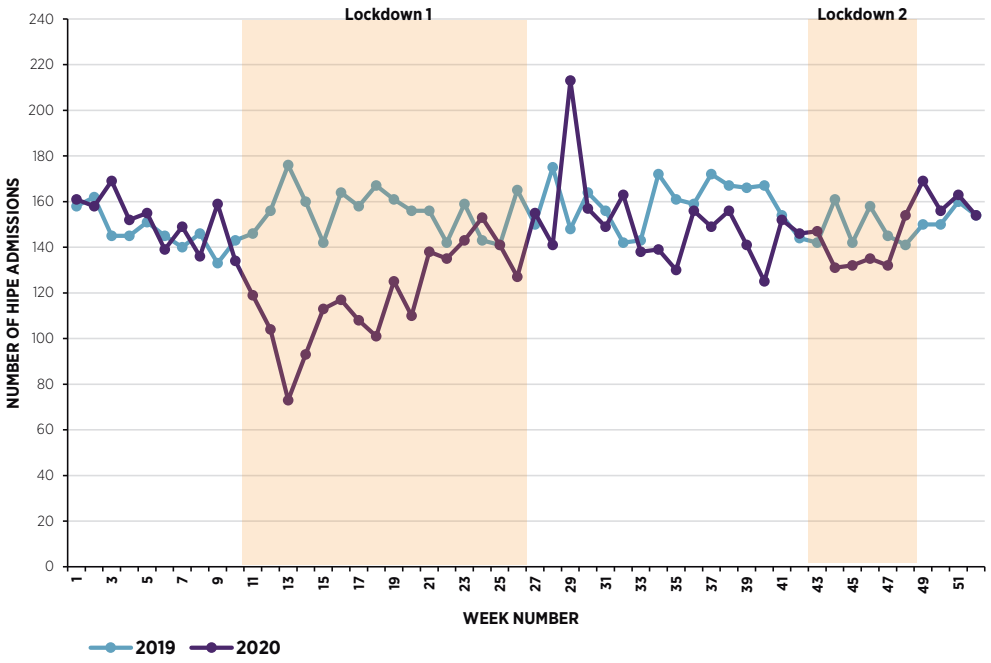


FIGURE 5.2: NUMBER OF POTENTIAL MAJOR TRAUMA AUDIT CASES ADMITTED PER WEEK, BY YEAR, 2019 AND 2020 (N=15298)

MODE OF ARRIVAL

Road ambulance remains the most common mode of transportation to hospital for major trauma patients. However, in 2020, a higher proportion of patients arrived by ambulance or helicopter (n=2934, 80%), compared with 2019 (n=3075, 76%). This was a statistically significant difference (p<0.001). There was a similar proportion of patients arriving by other modes of arrival in 2019 and 2020 (Figure 5.3).

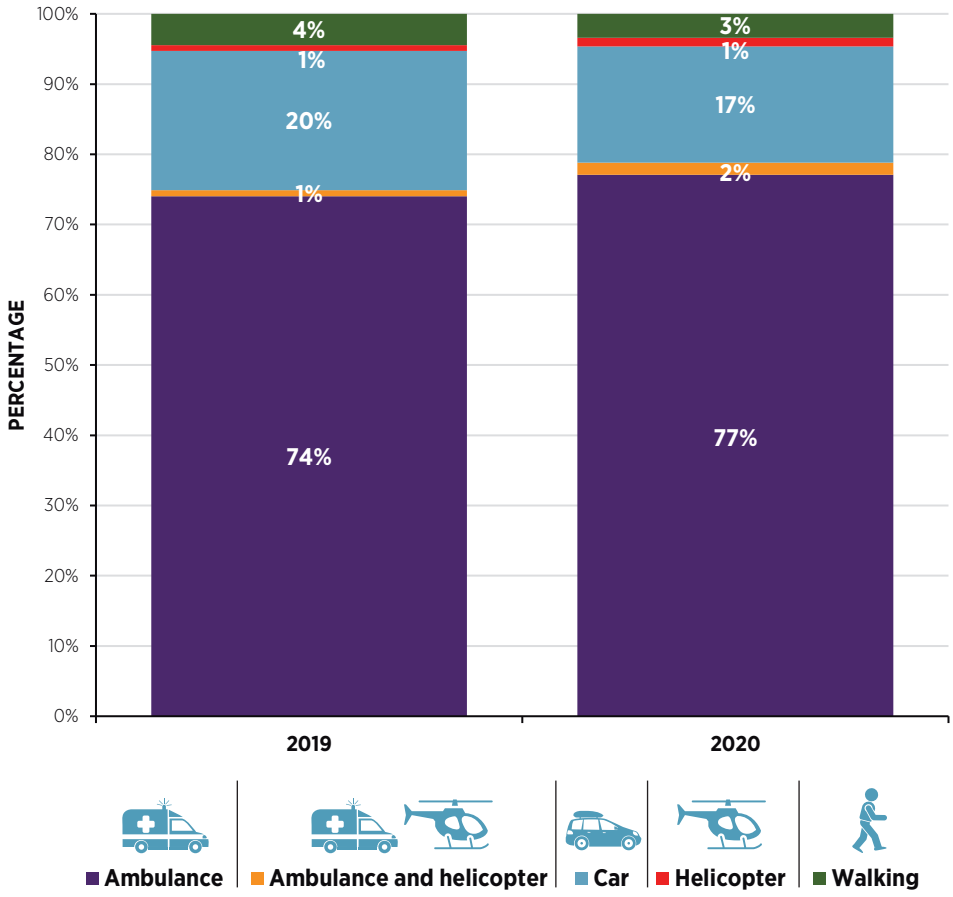


FIGURE 5.3: MODE OF ARRIVAL TO HOSPITAL, BY YEAR, 2019 AND 2020 (n=7726)[5]

[5] Patients who were transferred to another hospital have been excluded. Data on patients whose mode of transport to hospital was 'Other' (n=379) have not been presented in Figure 5.3.

MOST SENIOR HEALTHCARE PROFESSIONAL

Of the patients brought to hospital by ambulance and/or helicopter (n=6009, Figure 5.3), one-half were attended to by a paramedic (n=2957, 49%). There was a similar distribution of pre-hospital healthcare professionals in 2019 and 2020 (Figure 5.4).

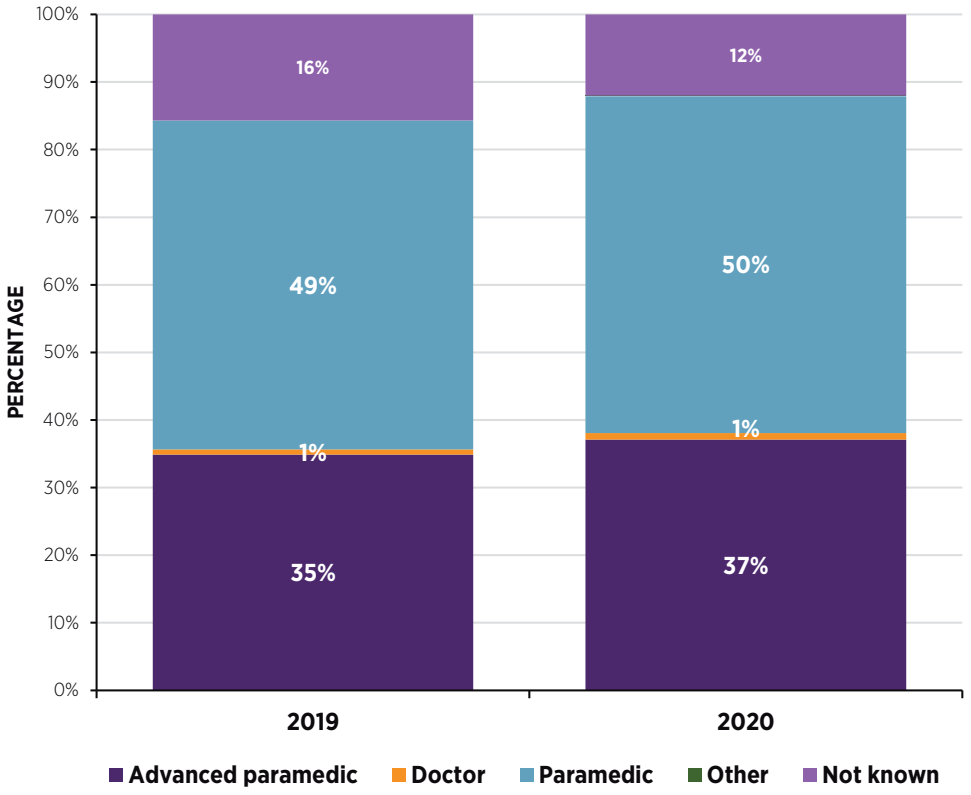


FIGURE 5.4: MOST SENIOR PRE-HOSPITAL HEALTHCARE PROFESSIONAL, BY YEAR, 2019 AND 2020 (n=6009)[6]

[6] Only direct admissions by ambulance and/or helicopter are included in Figure 5.4.

TRANSFERS

The decision to transfer a patient for management of their injuries and the timeliness of the transfer should be based on medical need and best practice; however, it may also relate to the availability of a bed and other resources at the receiving hospital. The transfer process is cumbersome, requiring multiple phone calls, a transfer team and an ambulance, and this often denudes smaller hospitals of staff for the duration of the time-critical transfer.

There was a statistically significant increase (p<0.001) in the proportion of major trauma patients not transferred to a subsequent hospital in 2020 (n=3398, 82%) when compared with 2019 (n=3649, 79%) (Figure 5.5).

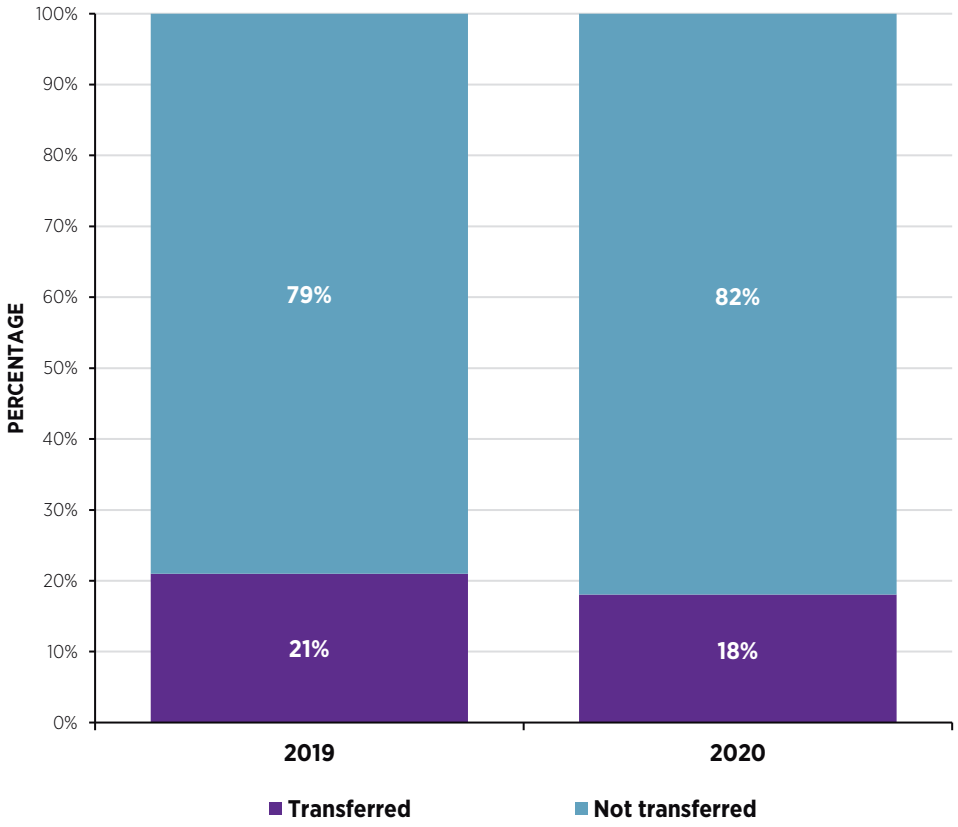


FIGURE 5.5: PROPORTION OF PATIENTS WHO WERE TRANSFERRED, BY YEAR, 2019 AND 2020 (N=8764)

TRAUMATIC BRAIN INJURY AND ADMISSIONS TO A NEUROSURGICAL UNIT

In 2019, there were 1,144 patients with traumatic brain injury (TBI) with an AIS score of 3 or higher; the comparable figure for 2020 was 1,037 patients. The majority of these patients were not transferred to a neurosurgical unit (n=1258, 58%) (Figure 5.6).

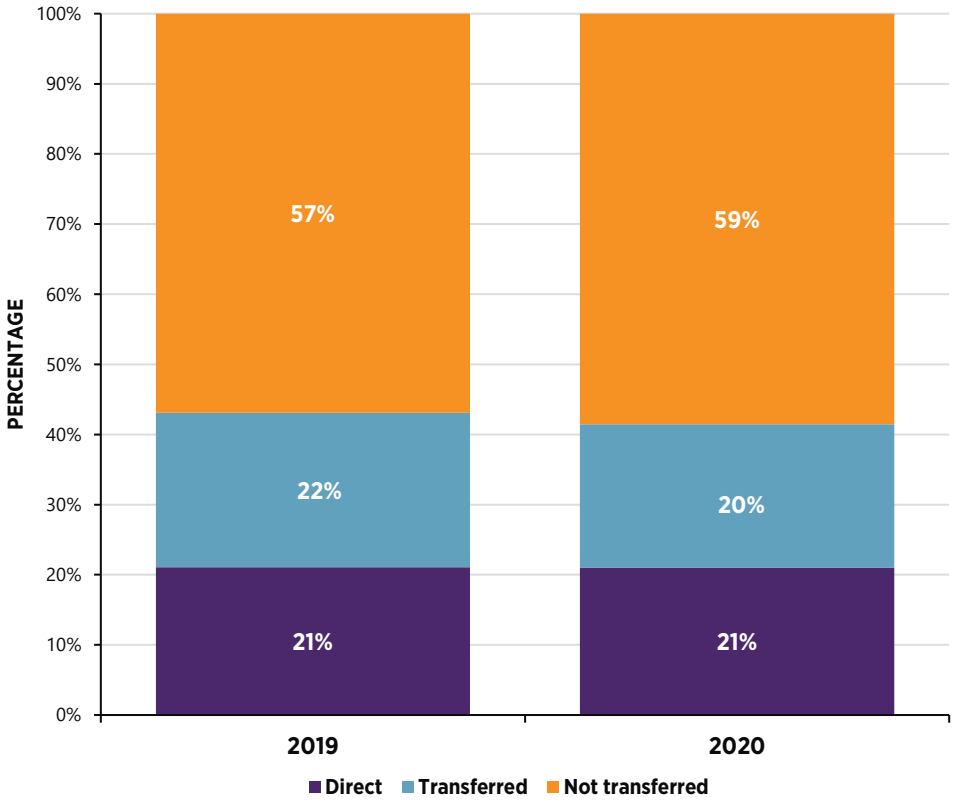


FIGURE 5.6: PROPORTION OF PATIENTS WITH A SEVERE TRAUMATIC BRAIN INJURY WHO WERE ADMITTED TO A NEUROSURGICAL UNIT (ABBREVIATED INJURY SCALE ≥3) (n=2181)

In 2019, the number of patients with a severe TBI (AIS ≥3, Glasgow Coma Scale (GCS) <9) was 135; the comparable number of patients in 2020 was 131. Of these, 16% (n=22) in 2019 and 28% (n=37) in 2020 were admitted directly to a neurosurgical unit. Directly indicates patients who attended an Emergency Department with onsite neurosurgical services for example at Beaumont Hospital and Cork University Hospital. This difference between the years was statistically significant (p=0.02). In both years, 35% of MTA patients (2019: n=47; 2020: n=46) were transferred to a neurosurgical unit from another hospital. Forty-nine percent of MTA patients (n=66) in 2019 and 37% (n=48) in 2020 were not transferred to a neurosurgical unit, yielding a statistically significant difference (p=0.04) (Figure 5.6A).

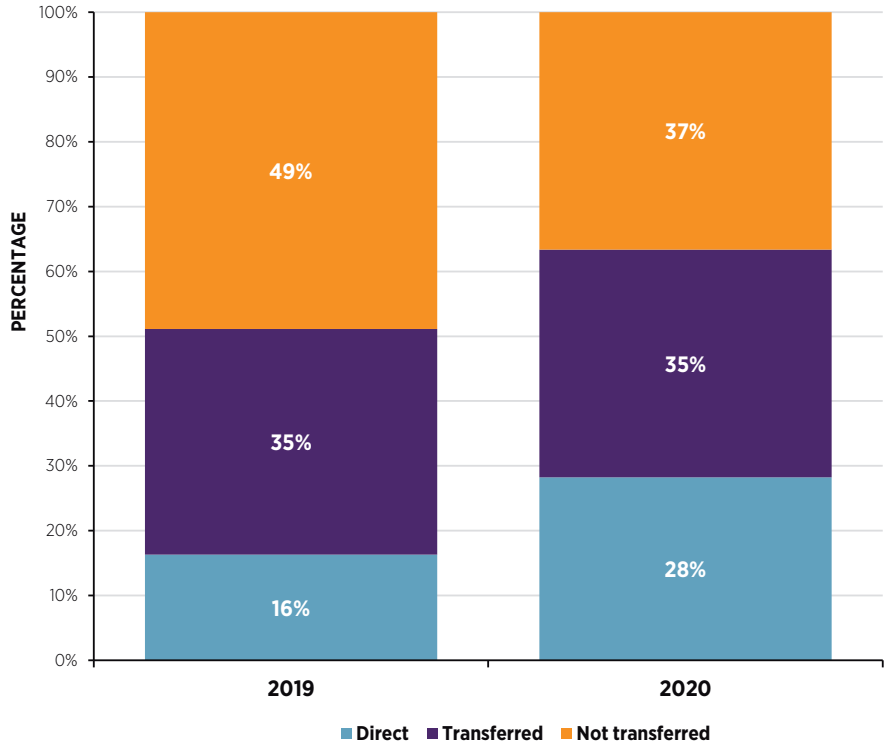
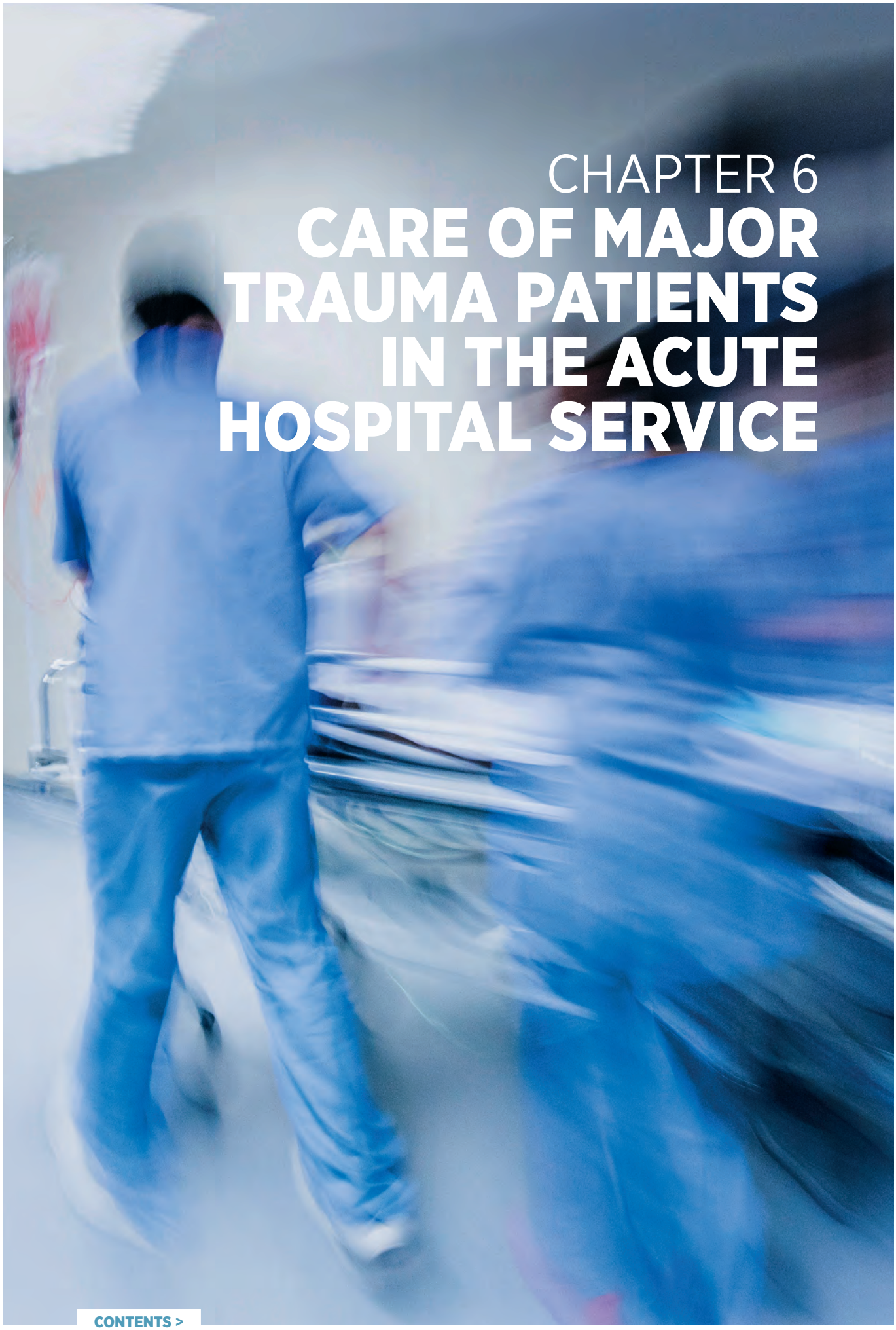


FIGURE 5.6A: PROPORTION OF PATIENTS WITH A SEVERE TRAUMATIC BRAIN INJURY WHO WERE ADMITTED TO A NEUROSURGICAL UNIT (ABBREVIATED INJURY SCALE ≥3 AND GLASGOW COMA SCALE <9) (n=266)

KEY FINDINGS FROM CHAPTER 5

- There was an approximately 10% reduction in the number of major trauma admissions during 2020 compared with 2019.
- A higher proportion of patients arrived by ambulance or helicopter in 2020 (n=2934, 80%), compared with 2019 (n=3075, 76%).
- A slightly higher proportion of patients were attended to by a paramedic or advanced paramedic in 2020 (n=2551, 87%) compared with 2019 (n=2568, 84%).
- The proportion of patients transferred to another hospital declined from 21% in 2019 to 18% in 2020.



CHAPTER 6
CARE OF MAJOR TRAUMA PATIENTS IN THE ACUTE HOSPITAL SERVICE

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CARE OF MAJOR TRAUMA PATIENTS IN THE ACUTE HOSPITAL SERVICE

PRE-ALERT

'Pre-alert' is a system whereby the ambulance service communicates to the receiving hospital that it is bringing a patient to the emergency department (ED), the nature of the patient's injuries, the patient's physiology, their expected requirements on arrival, and the expected time of arrival.

Figure 6.1 includes analysis of the pre-alert to the initial hospital the patient was brought to after sustaining traumatic injury. Both 2019 and 2020 showed a 12% pre-alert rate. Of the cases that were pre-alerted, almost all arrived by ambulance or helicopter (2019: n=500, 100%; 2020: n=465, 99%). Overall, the level of pre-alerts for major trauma patients is low and should be addressed as a matter of urgency in order to ensure that life-threatening or life-changing injuries are identified at the scene of the accident, particularly in cases involving older people, where mechanisms of injury, symptoms of injury and changes in vital signs can be less obvious. The communication of the pre-alert may also be difficult to find in the pre-hospital or admission documentation; this documentation will be improved through audit coordinators' workshops. The MTA will work with the National Ambulance Service (NAS) and the Dublin Fire Brigade (DFB) to use these data for research to better understand which patients brought in by ambulance and/or helicopter were subsequently identified as having major injuries. As a result, assessment tools and trauma triage tools used at the scene of an accident will be updated to capture information more accurately, and patients with major injuries will be identified more promptly.

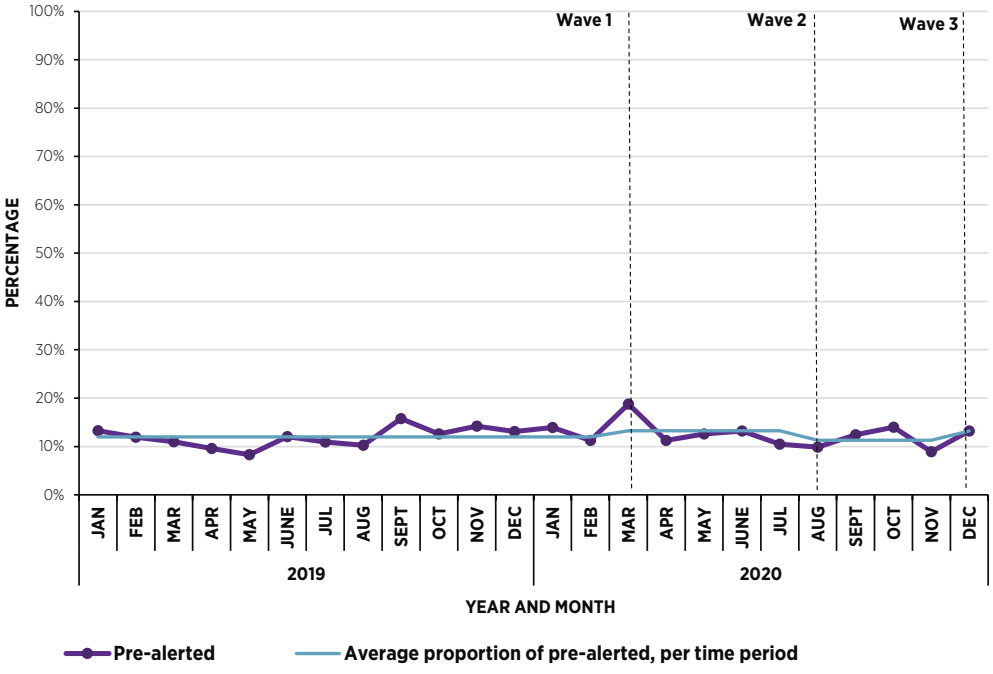


FIGURE 6.1: PROPORTION OF PATIENTS WHO WERE PRE-ALERTED, 2019 AND 2020 (n=8030)[7,8]

[7] Figure 6.1 refers to direct admissions only.
[8] Time period refer to: Pre-COVID: January 2019 to February 2020; Wave 1: March 2020 to July 2020; Wave 2: August 2020 to November 2020; Wave 3: December 2020.

RECEPTION BY A TRAUMA TEAM

Time to critical interventions and outcomes is improved when a trained trauma team is present on the arrival of a severely injured patient (Driscoll and Vincent, 1992). In 2020, the Irish Association for Emergency Medicine (IAEM) published a position paper on trauma teams, giving a detailed description of the composition of trauma teams (https://iaem.ie/news/publications/publications-2020/). This position paper by the IAEM marks the first step towards creating a consensus on trauma team composition and activation criteria. In Ireland, the lack of clear national standards on what should constitute a trauma team, or when such a team should be activated, has made this challenging to measure. Currently, it is up to participating hospitals to define their trauma team and report whether this definition of a trauma team was activated.

The overall percentage of major trauma patients received by a trauma team remains extremely low (2019: n=352, 8%; 2020: n=353, 9%) (Figure 6.2). This is undoubtedly linked to the under-recognition of major injuries prior to hospital presentation. It is also warranted that EDs use these data to understand where patients did not receive a trauma team reception and why the triage tools did not indicate the severity or potential severity of the injuries more accurately. There is an obvious trend towards fewer major trauma patients being received by a trauma team as the patient's age increases. Age-attuned trauma triage tools may need to be considered given the age profile of the major trauma population in Ireland. The MTA will work with the NAS and the DFB to use these data for research in order to better understand which patients could have major trauma injuries that would warrant a trauma team reception.

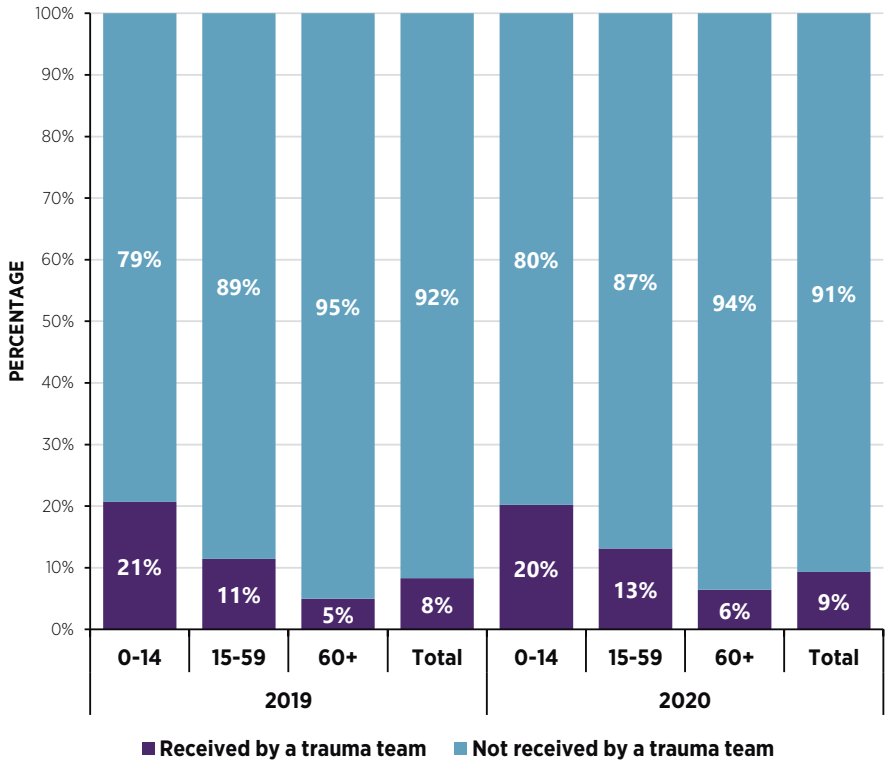


FIGURE 6.2: RECEPTION BY A TRAUMA TEAM, BY AGE GROUP AND YEAR, 2019 AND 2020 (n=8030)[9]

[9] Figure 6.2 refers to direct admissions only.

GRADE OF MOST SENIOR DOCTOR TREATING PATIENT ON ARRIVAL

In 2019, 22% (n=929), and in 2020, 20% (n=745) of patients with a major trauma were seen by a consultant on arrival. This difference between 2019 and 2020 was statistically significant (p=0.01). Figure 6.3 shows that in both 2019 and 2020 younger major trauma patients were more likely to be seen by a consultant on arrival.

Increasing age was associated with a reduced likelihood of patients being seen by a consultant or specialist registrar and a greater likelihood of patients being seen by a registrar or doctor at Senior House Officer (SHO) grade.

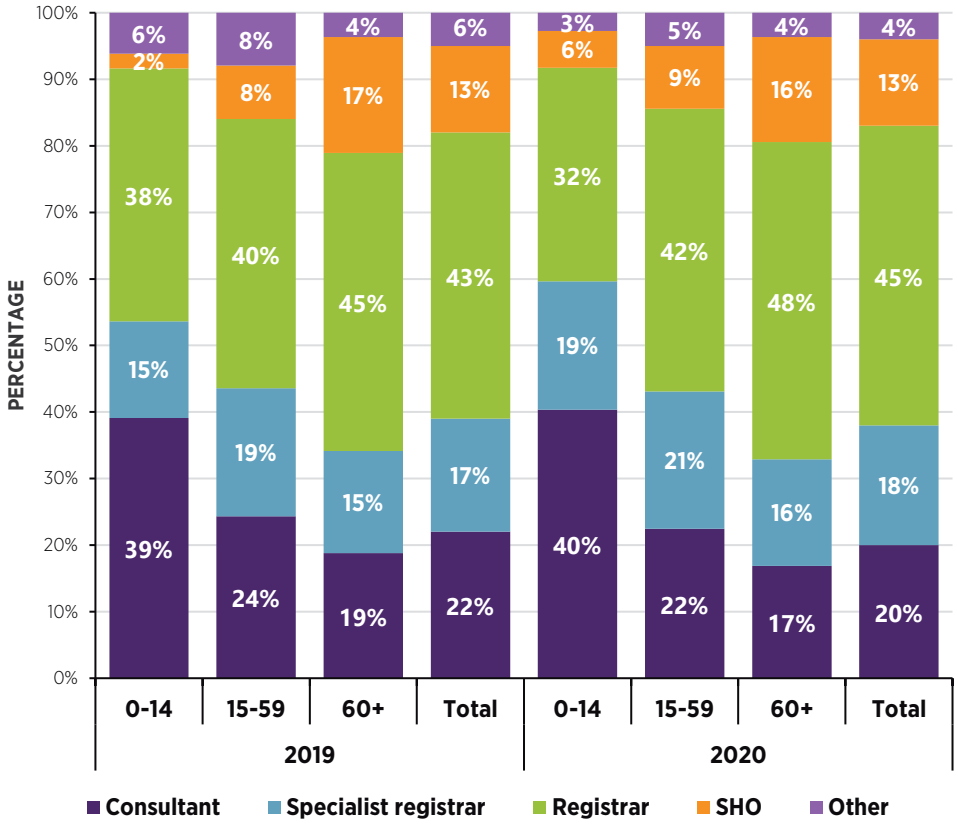
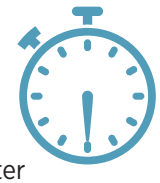


FIGURE 6.3: GRADE OF MOST SENIOR DOCTOR TREATING MAJOR TRAUMA AUDIT PATIENTS ON ARRIVAL, BY AGE GROUP AND YEAR, 2019 AND 2020 (n=8030)[10]

[10] Figure 6.3 refers to direct admissions only.

TIME TO SEE PATIENTS ON ARRIVAL TO HOSPITAL



Patients should be triaged and reviewed in a timely manner by the relevant grade doctor according to their injuries. A review by a senior doctor involves a primary survey, decision regarding trauma team activation, analgesia, appropriate imaging, and management, and can lead to better outcomes (NHS, 2018). In 2019, a consultant saw 10% (n=407) of patients with major trauma within 30 minutes of arrival to the ED. In 2020, this decreased to 8% (n=322) (Table 6.1).

TABLE 6.1: MOST SENIOR DOCTOR SEEING PATIENT ON ARRIVAL IN THE EMERGENCY DEPARTMENT AND THOSE WITH AN INJURY SEVERITY SCORE >15, 2019 AND 2020

2019	On arrival in the ED <30 mins (n=4238)*	In the ED after arrival (n=4238)*	With an ISS >15 on arrival in the ED <30 mins (n=1414)*	With an ISS >15 in the ED after arrival (n=1414)*
Consultant	407 (10%)	929 (22%)	253 (18%)	466 (33%)
Specialist registrar	~ (0%)	717 (17%)	~ (0%)	261 (18%)
Registrar	290 (7%)	1810 (43%)	133 (9%)	519 (37%)
SHO	780 (18%)	548 (13%)	296 (21%)	128 (9%)
Other (not recorded)	2756 (65%)	234 (6%)	731 (52%)	40 (3%)

*Refers to direct admissions only
~ Denotes five cases or fewer

2020	On arrival in the ED <30 mins (n=3792)*	In the ED after arrival (n=3792)*	With an ISS >15 on arrival in the ED <30 mins (n=1300)*	With an ISS >15 in the ED after arrival (n=1300)*
Consultant	322 (8%)	745 (20%)	182 (14%)	352 (27%)
Specialist registrar	~ (0%)	676 (18%)	~ (0%)	251 (19%)
Registrar	317 (8%)	1717 (45%)	142 (11%)	534 (41%)
SHO	810 (21%)	497 (13%)	307 (24%)	122 (9%)
Other (not recorded)	2339 (62%)	157 (4%)	667 (51%)	41 (3%)

*Refers to direct admissions only
~ Denotes five cases or fewer

SURGERY

Figure 6.4 shows a breakdown of surgical intervention by the body region on which surgery was performed. Some patients had multiple surgeries, whereas other patients had surgery at more than one hospital, and therefore generated more than one submission. In 2019 and 2020, 3,747 surgeries were recorded. The most common type of surgical intervention performed was limb surgery. Throughout the first three waves of the COVID-19 pandemic, there was an increase in the proportion of major trauma patients who received a limb surgery, from 56% (n=1122) in 2019 to 60% (n=1048) in 2020. This was a statistically significant difference (p<0.001) (Figure 6.4), and it corresponds with the increase in the proportion of patients in 2020 who acquired a major trauma as a result of a fall (see Figure 4.3).

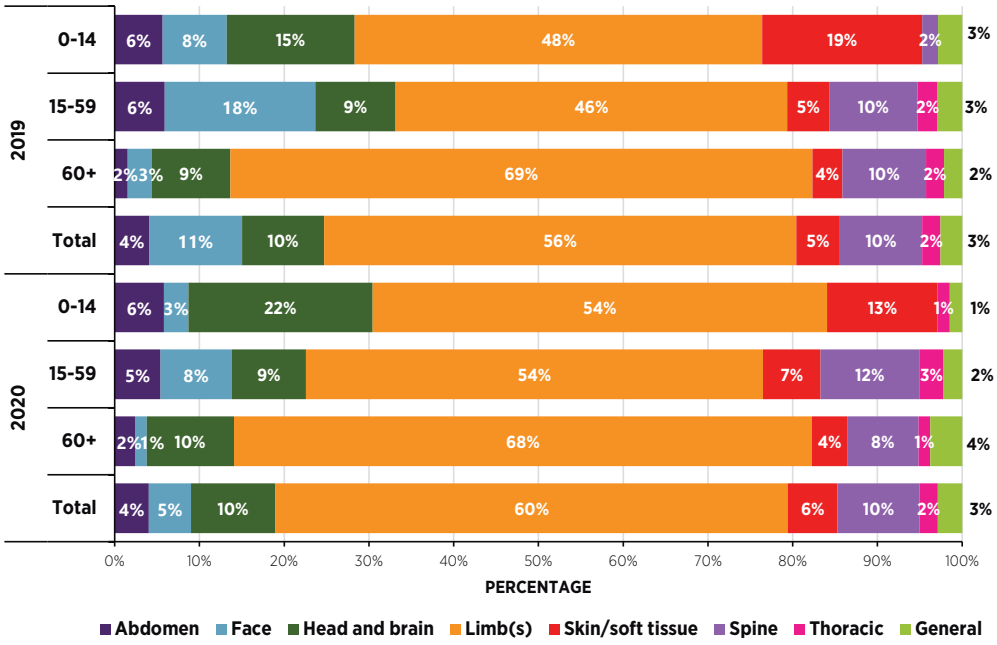


FIGURE 6.4: SURGICAL INTERVENTION, BY BODY REGION AND AGE GROUP, 2019 AND 2020 (n=3747)*

* Of the 8764 patients, 3747 had major surgery, this represents 9721 admissions to hospitals. Figure 6.4 refers to the main surgery performed in the hospital to which the patient was admitted; subsequent surgeries in the same hospital are not included here. A patient may have had two or more surgeries performed in two or more hospitals and therefore be counted more than once in Figure 6.4.

HOSPITAL SYSTEMS PERFORMANCE

The Trauma Audit and Research Network (TARN) audit is underpinned by clinical standards and systems indicators, which are intended to provide opportunities for learning and quality improvement.

1. AIRWAY MANAGEMENT IN PATIENTS WITH GCS<9

International guidelines use a GCS of <9 as a criterion for the requirement of definitive airway management, i.e. endotracheal or tracheal intubation, on arrival at an ED (Royal College of Surgeons of England, 1999). Figure 6.5 shows that there were 183 major trauma patients in 2019 and 164 in 2020 with a recorded GCS of less than 9. Of these patients, the majority were intubated in the ED (n=246, 71%). There was no statistically significant difference between 2019 and 2020 location of intubation (p=0.725).

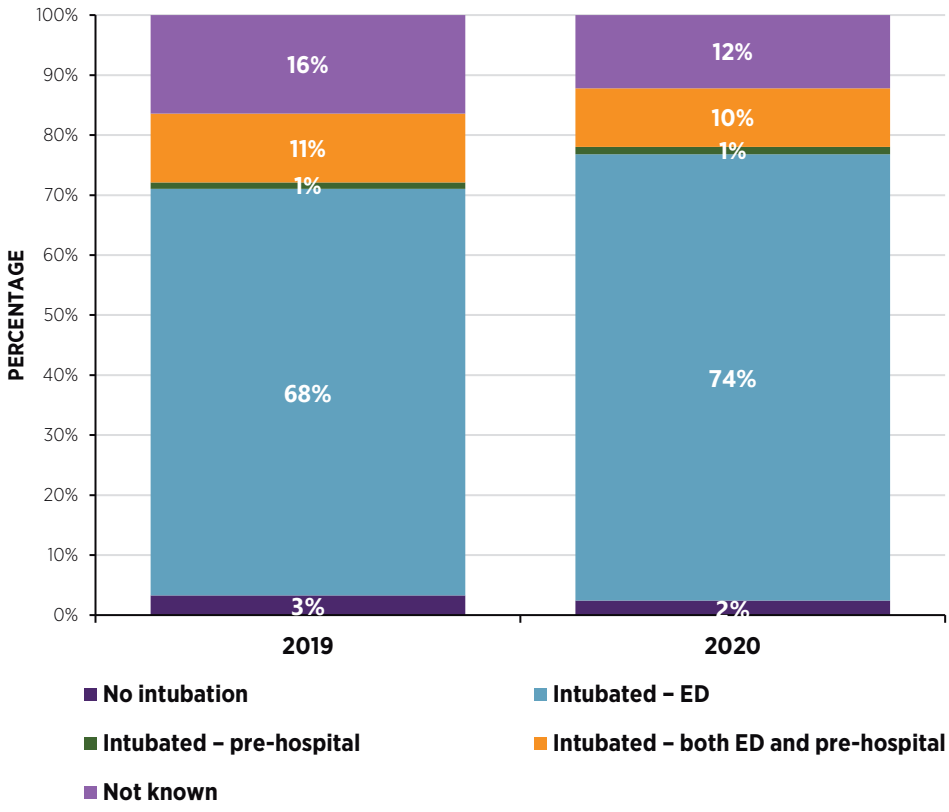


FIGURE 6.5: AIRWAY MANAGEMENT OF MAJOR TRAUMA AUDIT PATIENTS WITH A GLASGOW COMA SCALE <9, 2019 AND 2020 (n=347)

2. MANAGEMENT OF SHOCKED PATIENTS

Patients with blunt trauma admitted with a systolic blood pressure of less than 110 mmHg have a significantly increased risk of mortality (Hasler *et al*., 2011). The crude survival rate does not attempt to adjust for differences in age, gender, comorbidities, etc., which contribute to survival. In 2019, 10% (n=55) of shocked patients died and in 2020, 8% (n=33) died; this difference was not statistically significant (p=0.203).

3. TIME TO COMPUTED TOMOGRAPHY FOR HEAD INJURY PATIENTS AT INITIAL TREATING HOSPITAL

Head injury patients with an initial GCS of <13 should have a computed tomography (CT) head scan within 1 hour of arrival to hospital (National Institute for Health and Care Excellence, 2014). Of the 463 patients with major trauma who required a CT head scan (having head injuries and an initial GCS of <13) in 2019 and 2020, 42% (n=196) received it within 1 hour or less (Figure 6.6). This is based on the patients' time of presentation to the initial treating hospital. The median time to CT scan in 2019 was 1 hour and 11 minutes (interquartile range (IQR): 46 minutes to 2 hours and 15 minutes), and in 2020 it was 1 hour and 10 minutes (IQR: 46 minutes to 1 hour and 52 minutes). It is reassuring to note that equity of access to vital interventions such as a CT scan did not appear to be affected adversely throughout the COVID-19 pandemic in 2020.

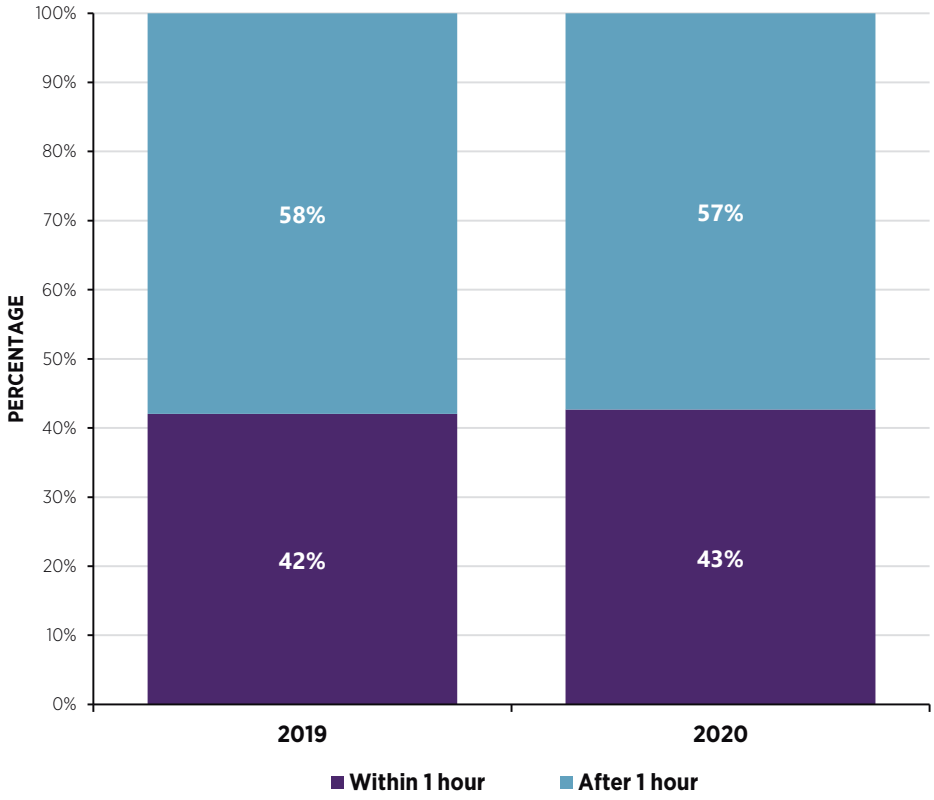
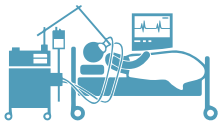


FIGURE 6.6: PERCENTAGE OF MAJOR TRAUMA AUDIT PATIENTS TO RECEIVE A COMPUTED TOMOGRAPHY SCAN WITHIN 1 HOUR, 2019 and 2020 (n=463)[11]

[11] 15 patients did not have time to CT scan recorded.

4. INTENSIVE CARE UNIT ADMISSION



Patients sustaining major trauma are admitted to a critical care service for many reasons, including ongoing resuscitation, organ support and/or closer monitoring. Critical care encompasses both intensive care and high-dependency care. In practice, level 2 is high-dependency care and level 3 is the intensive care level of critical care (National Standards for Adult Critical Care Services, 2019). The length of stay (LOS) in an intensive care unit (ICU) can be influenced by the availability of ICU beds, the needs of the patient, and/or the availability of step-down beds.

Table 6.2 shows that in 2019, the median ICU LOS for patients with major trauma was 3 days, compared with 4 days in 2020. For patients with an ISS >15, the median LOS was 4 days in 2019, and 5 days in 2020. For patients with a severe TBI, the median LOS in 2019 was 5 days; this increased to 9 days in 2020.

TABLE 6.2: INTENSIVE CARE UNIT LENGTH OF STAY FOR MAJOR TRAUMA AUDIT PATIENTS

	Year	All MTA patients	MTA patients with an ISS >15	MTA patients with a severe TBI
Number of Patients	2019	768	537	99
	2020	671	447	108
Median (IQR) ICU LOS, in days	2019	3 (1–9)	4 (1–10)	5 (2–12)
	2020	4 (2–9)	5 (2–11)	9 (2–17)
Total number of ICU bed days	2019	5243	4177	920
	2020	5220	4003	1346

5. HOSPITAL LOS

Hospital LOS for trauma patients is dependent on the nature and severity of the injuries sustained, the baseline health of the patient, the efficiency of the hospital in delivering care, and the ability of the hospital to discharge the patient to an appropriate setting when they are medically well enough to leave the acute hospital. Many patients' recovery will extend well beyond discharge. For severely injured patients, access to rehabilitation, step-down facilities, and home and community supports influence the LOS at the acute hospital.

In both 2019 and 2020, the median hospital LOS for all patients with major trauma was 9 days. In 2019, the median LOS for major trauma patients with ISS >15 was 11 days; in 2020, it was 10 days (Table 6.3).

TABLE 6.3: HOSPITAL LENGTH OF STAY FOR MAJOR TRAUMA AUDIT PATIENTS

	Year	All MTA patients	MTA patients with an ISS >15
Number of Patients	2019	4618	1586
	2020	4146	1459
Median (IQR) LOS, in days	2019	9 (5-18)	11 (5-24)
	2020	9 (5-18)	10 (5-22)

KEY FINDINGS FROM CHAPTER 6

- The pre-alert rate in both 2019 and 2020 was 12%.
- The overall percentage of major trauma patients received by a trauma team remains extremely low (2019: n=352, 8%; 2020: n=353, 9%) (Figure 6.2). The data show a trend where, with increasing age, patients are less likely to be met by a trauma team.
- In 2019, 22% (n=929), and in 2020, 20% (n=745) of patients with a major trauma were seen by a consultant on arrival to the ED.
- In 2019, a consultant saw 10% (n=407) of patients with major trauma within 30 minutes of arrival to the ED. In 2020, this decreased to 8% (n=322).
- There was an increase in the proportion of patients who received a limb surgery, from 56% (n=1122) in 2019 to 60% (n=1048) in 2020.
- The median ICU LOS increased by 1 day in 2020 compared with 2019. The most significant increase in ICU LOS occurred in MTA patients with a severe TBI, from 5 days in 2019 to 9 days in 2020.

CHAPTER 7
OUTCOMES

CONTENTS >

OUTCOMES

This chapter describes the outcomes of major trauma patients in terms of mortality and discharge destination. Mortality is reported at 30 days post-discharge.

MORTALITY AT 30 DAYS POST-DISCHARGE

Mortality is a crude measure of the quality of care in major trauma patients; quality of survival and return to independent living are far more patient-centred measures. The MTA is working towards developing mechanisms to capture outcome measures. In 2019, 209 (5%) major trauma patients were recorded as having died during their hospital admission; the comparable figure in 2020 was 228 (5%). Figure 7.1 shows the proportion of patients recorded as having died each month in 2019 and 2020. The highest proportion of deaths occurred in April 2020 (n=26, 9%). It is unclear what the cause of this increase was, but it should be noted that there was significant restructuring of hospital services during this period, in order to cater for the potential influx of COVID-19 patients.

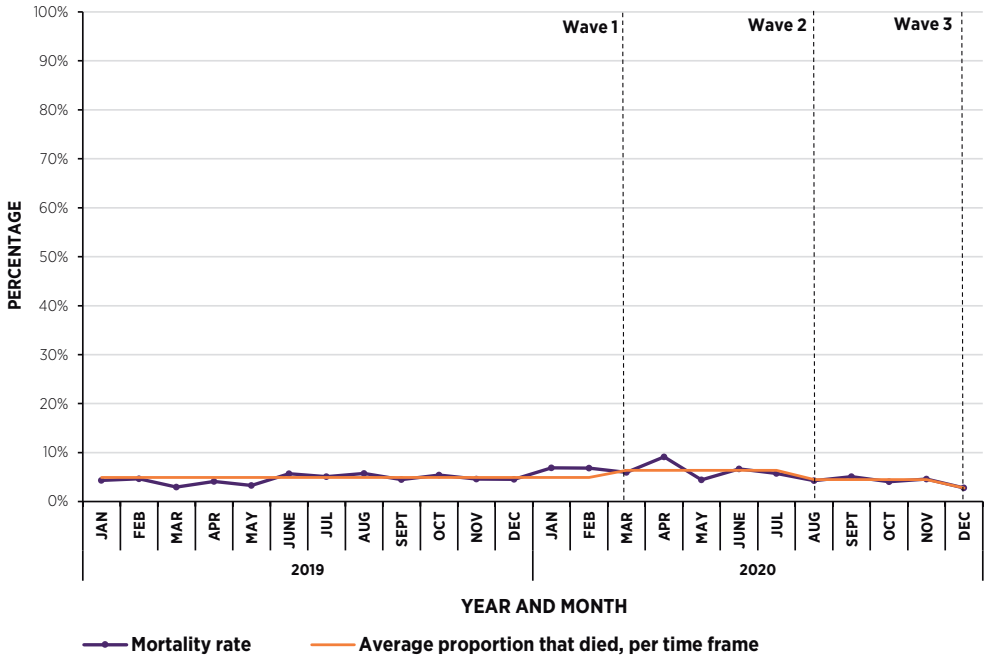


FIGURE 7.1: PROPORTION OF PATIENTS WITH MAJOR TRAUMA WHO DIED, BY MONTH AND YEAR (N=8764)[12]

[12] Time period refer to: Pre-COVID: January 2019 to February 2020; Wave 1: March 2020 to July 2020; Wave 2: August 2020 to November 2020; Wave 3: December 2020

MORTALITY AND AGE

Figure 7.2 shows the percentage of patients within each age group who died from their injuries as a proportion of the total number of patients who died (n=437). A higher proportion of patients with major trauma who were aged 0–34 years died in 2019 (n=30, 14%) than in 2020 (n=15, 7%). This represents a statistically significant difference (p<0.001). There was no significant difference in the proportion of deaths in all other age groups in 2019 and 2020.

Of all patients who had died at 30 days post-discharge, 60% (n=264) were male. There was almost no difference in mortality between male and female patients between 2019 (male: n=127, 61%) and 2020 (male: n=137, 60%).

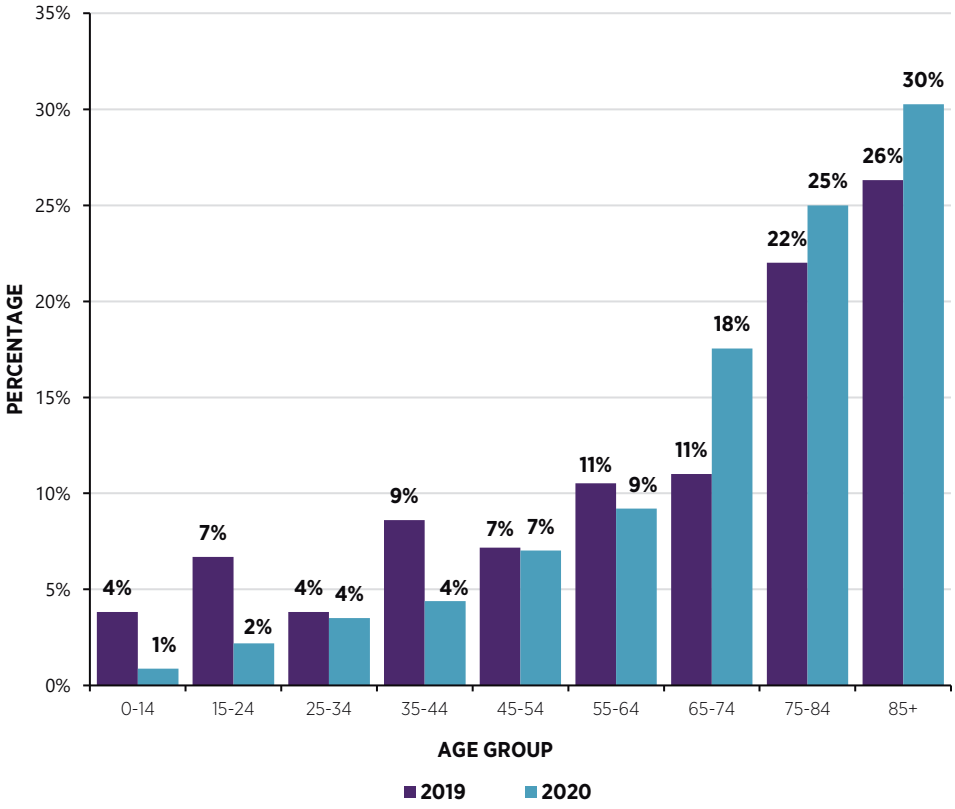


FIGURE 7.2: MORTALITY BY AGE GROUP AND YEAR, 2019 AND 2020 (n=437)

MORTALITY BY MECHANISM OF INJURY

The highest proportion of deaths continues to be attributable to falls (n=327, 75%). There was a statistically significant increase (p=0.001) in the proportion of patients who died after a fall, from 69% (n=145) in 2019 to 80% (n=182) in 2020 (Figure 7.3). This increase may be due to the significant increase in the proportion of people who were injured at home in 2020, as outlined in Figure 4.5.

The second leading cause of mortality in major trauma patients was 'other' (which includes asphyxiation, drowning, and amputation), and the third leading cause was road trauma. In both 2019 and 2020, there was no statistically significant difference between those two categories (i.e. 'other' and road trauma) (Figure 7.3).

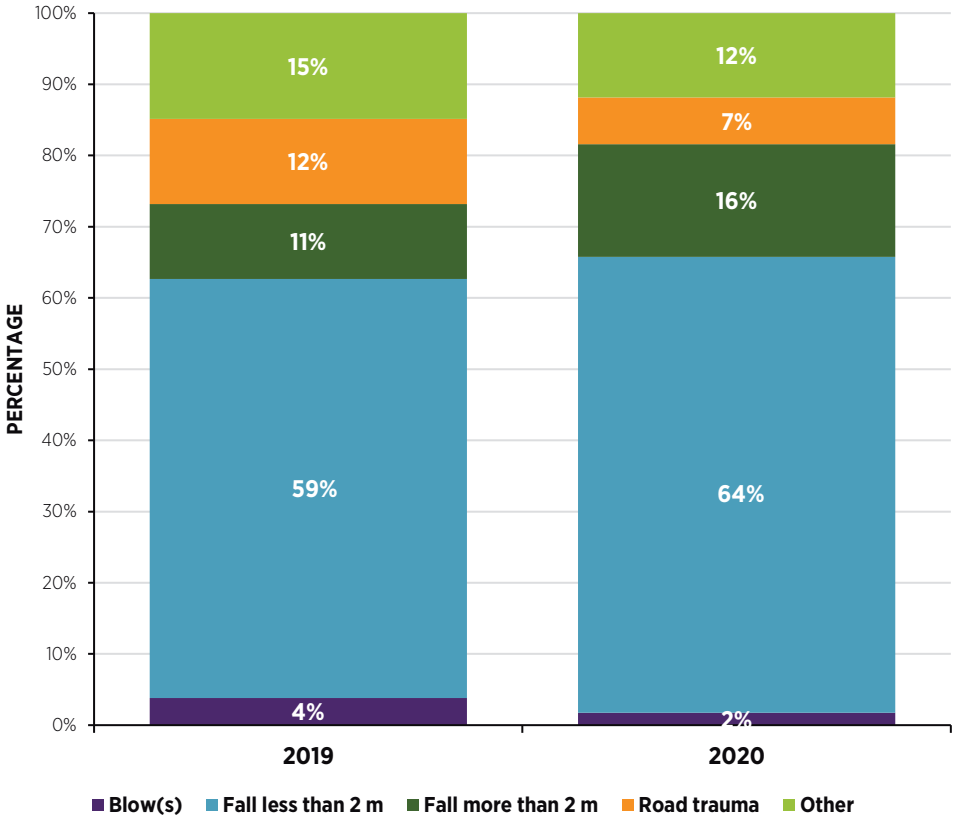


FIGURE 7.3: MORTALITY BY MECHANISM OF INJURY AND YEAR, 2019 AND 2020 (n=437)

MORTALITY BY ISS

Of those patients who died in 2019 and 2020, 74% (n=324) had an ISS >15, indicating severe injury (Figure 7.4).

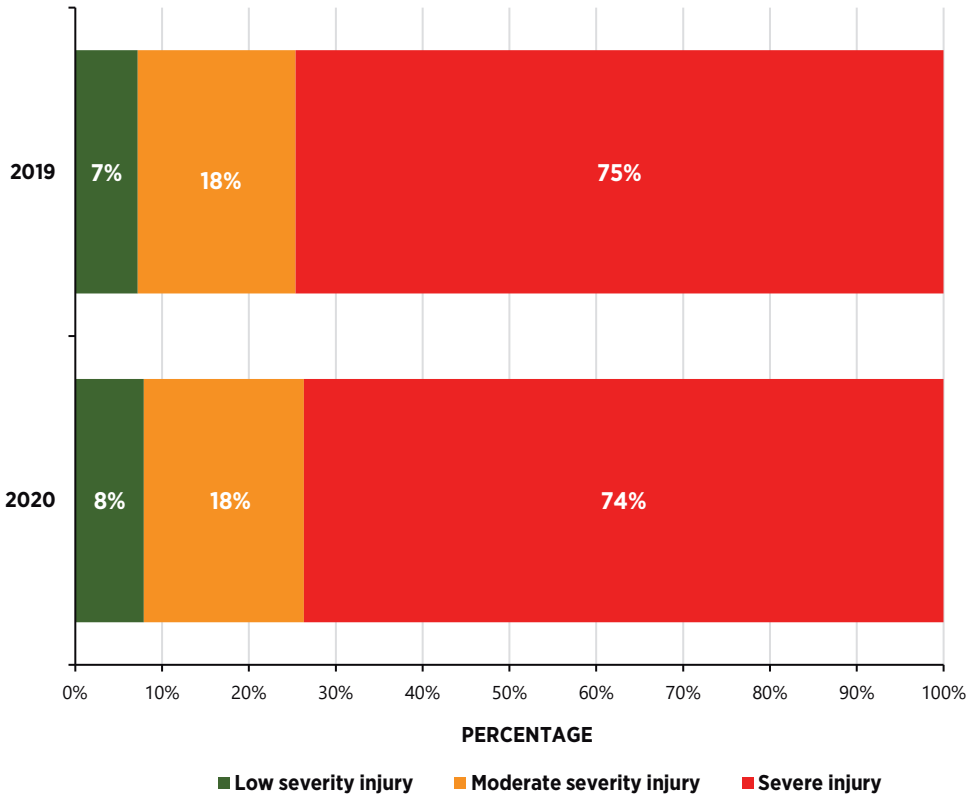


FIGURE 7.4: MORTALITY BY INJURY SEVERITY SCORE AND YEAR, 2019 AND 2020 (n=437)

DISCHARGE DESTINATION

Figure 7.5 shows that in 2019 and 2020, the majority of major trauma patients were discharged directly home from hospital (n=5218, 60%). It is of concern that so few patients continued to receive rehabilitation in an in-patient facility (n=884, 10%).

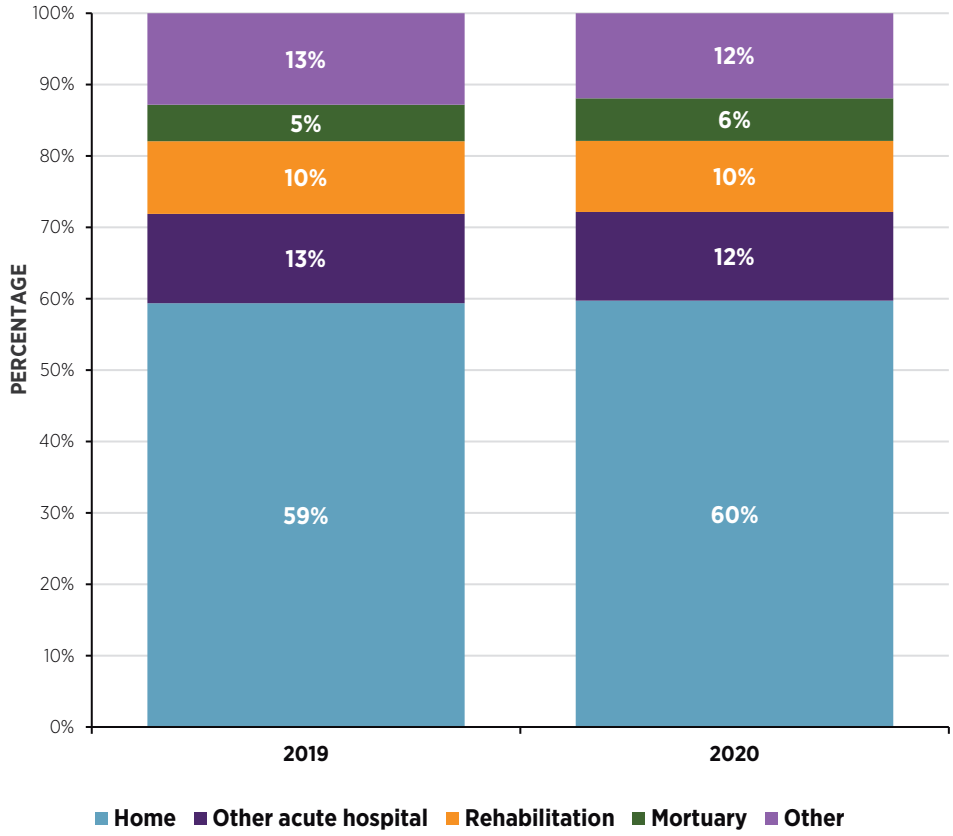


FIGURE 7.5: DISCHARGE DESTINATION BY YEAR, 2019 AND 2020 (N=8764)[13]

[13] The category 'Other' includes information that was not recorded.

RISK-ADJUSTED BENCHMARKING

Risk adjustment is a process that allows data to be compared by adjusting for confounding factors (i.e. age, gender, severity of injury, pre-existing comorbidities and GCS) that influence the outcome. Within TARN, this is done at an individual patient level as well as at a hospital level. From approved TARN submissions, a risk-adjusted survival rate was calculated for Ireland for 2018. This was based on all approved submissions from participating hospitals and was adjusted for case mix.

The risk-adjusted survival rate is referred to as the Ws value. This means that for every 100 major trauma patients treated in Ireland, there are 1.81 (2019 data) more survivors than the TARN statistical model predicts (Bouamra et al., 2015). Ireland's Ws value for 2019 of 1.82 (95% confidence interval (CI), 1.1–2.33) (Table 8.1) , Ws value for 2020 of 1.25 (95% CI, 0.56-1.95) and combined Ws value of 1.52 for 2019 and 2020 (95% CI, 1.02-2.02) all fall within acceptable limits for the audit period.

TABLE 7.1: CASE-MIX-STANDARDISED RATE OF SURVIVAL FOR IRELAND, 2019

Ps band	n	Survivors	Expected Survivors	W	TARN Fraction	Ws	95% CI
95 - 100	3123	3096	3075.67	0.65	0.65	0.42	
90 - 95	593	568	550.75	2.91	0.17	0.50	
80 - 90	336	305	288.28	4.98	0.10	0.50	
65 - 80	141	115	103.51	8.15	0.04	0.30	
45 - 65	69	36	38.22	-3.21	0.02	-0.06	
25 - 45	56	25	21.07	7.02	0.01	0.10	
0 - 25	45	8	5.93	4.60	0.01	0.06	
Total	**4363**	**4153**	**4083.41**			**1.82**	**(1.1 - 2.53)**

TABLE 7.2: CASE-MIX-STANDARDISED RATE OF SURVIVAL FOR IRELAND, 2020

Ps band	n	Survivors	Expected Survivors	W	TARN Fraction	Ws	95% CI
95 - 100	2671	2645	2629.20	0.59	0.65	0.38	
90 - 95	642	611	596.34	2.28	0.17	0.39	
80 - 90	377	341	323.89	4.54	0.10	0.46	
65 - 80	144	107	106.57	0.30	0.04	0.01	
45 - 65	85	42	48.01	-7.06	0.02	-0.13	
25 - 45	59	20	20.92	-1.55	0.01	-0.02	
0 - 25	35	10	5.01	14.26	0.01	0.17	
Total	**4013**	**3776**	**3729.94**			**1.25**	**(0.56 - 1.95)**

TABLE 7.3: CASE-MIX-STANDARDISED RATE OF SURVIVAL FOR IRELAND, 2019 AND 2020 COMBINED

Ps band	n	Survivors	Expected Survivors	W	TARN Fraction	Ws	95% CI
95 - 100	5794	5741	5704.87	0.62	0.65	0.40	
90 - 95	1235	1179	1147.09	2.58	0.17	0.44	
80 - 90	713	646	612.17	4.74	0.10	0.48	
65 - 80	285	222	210.08	4.18	0.04	0.16	
45 - 65	154	78	86.22	-5.34	0.02	-0.10	
25 - 45	115	45	41.98	2.62	0.01	0.04	
0 - 25	80	18	10.94	8.83	0.01	0.11	
Total	**8376**	**7929**	**7813.35**			**1.52**	**(1.02 - 2.02)**

Note: Patients who died at or were discharged from a hospital are eligible for Ws calculations. Patients who were transferred out from a hospital and not readmitted are included in the receiving (final) hospital's Ws.

Risk-adjusted survival does not take into account the potential high personal and societal costs when patients are delayed or prevented from returning to their pre-trauma functional status or quality of life.

KEY FINDINGS FROM CHAPTER 7

- At 5%, the mortality rate did not change between 2019 and 2020.

- There was an increase between 2019 and 2020 in the proportion of major trauma patients who died from falls: in 2019, falls less than 2 m accounted for 59% of deaths (n=123) and falls more than 2 m accounted for 11% of deaths (n=22), while the comparable figures for 2020 were 64% (n=146) and 16% (n=36), respectively.

- Of those patients who died in 2019 and 2020, 74% (n=324) had an ISS>15, indicating severe injury.

CHAPTER 8
AUDIT UPDATE

CHAPTER 8

AUDIT UPDATE

This chapter presents a summary of progress made since publication of the *Major Trauma Audit Paediatric Report 2014–2019,* as well as a list of key events that took place and key outputs generated during 2020 and 2021.

UPDATES ON AUDIT RECOMMENDATIONS FROM THE *MAJOR TRAUMA AUDIT PAEDIATRIC REPORT 2014–2019*

Strategic Recommendations	Update
The National Office for Trauma Services (NOTS), Health Service Executive (HSE) will: • Use the *Major Trauma Audit Paediatric Report 2014–2019* to develop interim paediatric pathways of major trauma care until the trauma system is fully developed and until the new children's hospital is built. The report will also be used to determine investment and requirements for rehabilitation services regionally and nationally. • Continue to progress the development of a coordinated trauma system and fully implement the National Trauma Strategy, as outlined in *A Trauma System for Ireland: Report of the Trauma Steering Group*. • Define meaningful trauma team and rehabilitation criteria, in order to enable collection of relevant trauma team and rehabilitation data in the MTA.	**• Since the publication of the *Major Trauma Audit Paediatric Report 2014–2019*, a data access request was approved and shared with the Paediatric Clinical Lead in the NOTS, in order to build pathways and business cases to support the trauma system.** **• During 2021, many developments took place, with key personnel recruited for NOTS, and further data from the MTA used to support the work reconfiguring the trauma system.** **• The Irish Association for Emergency Medicine (IAEM) has developed a paper on trauma teams which has been shared with the MTA Governance Committee. The committee is awaiting guidance from NOTS about this. NOCA has collaborated with the NOTS Rehabilitation Coordinator to support workshops for the development of a rehabilitation needs assessment and rehabilitation prescription. Work on this is continuing.**
The HSE's National Healthy Childhood Programme and the Road Safety Authority (RSA) will use the information about mechanisms and location of injuries published in the *Major Trauma Audit Paediatric Report 2014–2019* to inform injury prevention strategies for children.	**In 2022, the RSA published its strategy *Our Journey Towards Vision Zero Ireland's Government Road Safety Strategy 2021–2030 (DOT, 2022)*, which includes recommendations for injury prevention on roads in addition to increased road safety measures specifically aimed at children as well as adults. The MTA will work closely with the RSA as it implements its new strategy.** **NOTS requested further data about paediatric trauma in order to develop a report led by the National Clinical Paediatric Lead for NOTS. This will include advice on child injury prevention drawn from the *Major Trauma Audit Paediatric Report 2014–2019*. This injury prevention information has also been disseminated through the HSE and the Department of Health.**

Strategic Recommendations	Update
Hospital MTA governance committees should meet regularly to review and discuss the outputs from the MTA. Action should be taken to improve services where deficits are identified.	**In 2020, an MTA hospital governance audit was prepared and disseminated to evaluate the status of all hospital MTA governance committees.**
NOCA should support hospitals to attain high levels of data coverage and quality until at least 2022, as they recover from the COVID-19 pandemic	**Due to the impact of the COVID-19 pandemic, data entry dates were adjusted, and hospitals were accommodated in order to allow them to enter data after the originally agreed deadlines.**
NOCA will conduct a survey of hospital MTA governance committees to determine what supports are required within the system to support hospitals to utilise the audit data for improvement.	**In 2020, an MTA hospital governance audit was conducted. The response rate was poor. As a result, NOCA will develop and disseminate guidance on how to establish a hospital governance committee for the MTA; in addition, it will hold a workshop with the MTA hospital clinical leads to improve this. NOCA will develop resources to support these governance committees and will publish them on the NOCA website (www.noca.ie).**
NOCA will develop meaningful quarterly dashboard reports of key performance indicators for the hospitals and Hospital Groups.	**Significant progress has been achieved on the quarterly MTA reports that have been developed by the NOCA data analytics team using Microsoft Power BI. These reports indicate each hospital's overall performance against defined standards. Each standard is then displayed on a statistical process control (SPC) chart to facilitate local quality improvement.**
NOCA will implement processes for the introduction of long-term outcome measures for all ages in the MTA.	**The Health Research Board-funded TRAUMA: Targeted Review and Amalgamation of Unmapped Major trauma and Ambulance data in Ireland study due to commence in 2022 will potentially pave the way for longer-term data collection. Within NOCA, there are a number of studies under way around the development of longer-term data collection for clinical audits.**

Strategic Recommendations	Update
NOCA will develop a MTA research group, which will include Public and Patient Interest (PPI) representatives.	**Ethical approval will be sought to perform secondary analysis of the MTA data for research purposes. In addition, members of the MTA Governance Committee will form a subcommittee to lead the process of research priorities for the MTA.**
NOCA will increase engagement with PPI representatives to: • develop resources to raise public awareness of preventable causes of major trauma • create information resources for patients • create opportunities for multistakeholder engagement around key issues faced by patients.	**Both PPI MTA members have contributed to the development of the MTA National Reports and summary reports. They continue to inform the MTA about what is meaningful for patients and their carers. In addition, MTA information has been disseminated through patient groups and organisations, and PPI representatives from the MTA committee have also given presentations on the findings.**

AUDIT DEVELOPMENTS

The *Major Trauma Audit Paediatric Report 2014–2019* was published in 2021 via webinar. The event, which was very well attended, featured expert speakers including Professor Conor Deasy, MTA Clinical Lead, Dr. Ciara Martin, National Clinical Advisor and Group lead for Children and young people, Professor Warwick Teague, Associate Professor at Monash University, Consultant Neonatal and Paediatric Surgeon Louise Brent, Irish Hip Fracture Database and MTA Manger, Naomi Fitzgibbon, Public and Patient Interest representative MTA,and Mr Keith Synnott, Clinical Lead, National Office for Trauma Services.. Two TARN workshops also took place during 2021, both virtually. Throughout 2019 and 2020 monthly teleconferences were held and, due to the pandemic, these became videoconferences due to the COVID-19 pandemic in order to bridge the gap while networking in person was no longer possible. Due to the pandemic restrictions on holding face-to-face meetings, NOCA has had to find new ways of working and supporting the hospitals. The virtual nature of the most recent workshops meant that the sessions could be recorded and shared with anyone who could not attend on the day. These recordings will now form part of a repository of materials to support hospital audit coordinators.

In 2019 and 2020, several key developments took place, including:

- completion of the MTA data dictionary
- updating of the quarterly hospital and Hospital Group reports
- implementation of the new data analytical portal by TARN
- development of the Hospital In-Patient Enquiry (HIPE) MTA portal for ineligible cases.

FIGURE 8.1: SCREENS FROM THE DATA ANALYTICAL PORTAL BY TARN

HEALTH RESEARCH BOARD GRANT

In 2021, an application to the Health Research Board seeking funding for a secondary data analysis project Secondary Data Analysis Projects (SDAP) was made in collaboration with Dr Frank Doyle and Professor Anne Hickey, Royal College of Surgeons in Ireland (RCSI); the NAS; NOCA; and TARN. The project is titled TRAUMA: Targeted Review and Amalgamation of Unmapped Major trauma and Ambulance data in Ireland. The application was successful and the Health Research Board awarded funding for a 3-year study to explore the possibility of creating a dataset that would combine the NAS electronic patient care record (ePCR) with the TARN submission dataset to create a more complete picture of the major trauma patient's journey through the hospital system (Figure 8.1). The data combined in both datasets would allow for pre-hospital care planning, pathway development for the new trauma system, analysis of the accuracy of triage tools, areas for staff education, and much more. Potentially, it could set a precedent for combining other national datasets; for example, outcome datasets.

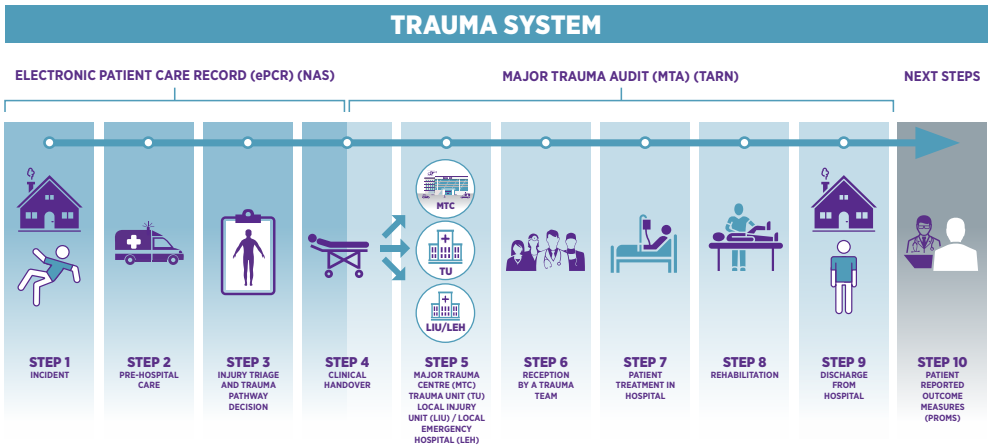


FIGURE 8.2: TRAUMA PROJECT

NATIONAL OFFICE FOR TRAUMA SERVICES

Trauma Care Ireland

The MTA continues to work closely with NOTS to support the reconfiguration of the trauma system. Several data access requests were submitted to NOTS to support its ongoing work. In 2022, NOCA supported NOTS in running a workshop on rehabilitation with the two future major trauma centres (MTCs), using the world café methodology.

PUBLICATIONS

Two recent publications from the MTA are detailed below. The first by Walsh et al (2021) focused on the use of tranexamic acid for major trauma patients and the second paper by McAleese et al (2021), was focused on Paediatric major trauma in Ireland.

Walsh, K., O'Keeffe, F., Brent, L. and Mitra, B. (2021) Tranexamic acid for major trauma patients in Ireland. *World Journal of Emergency Medicine*, 13(1), pp. 11-17.

McAleese, T., Brent, L., O'Toole, P., Synnott, K., Quinn, N., Deasy, C. and Sheehan, E. (2021) Paediatric major trauma in the setting of the Irish trauma network. *Injury*, 52(8), pp. 2233-2243.

QUALITY IMPROVEMENT

The MTA retains a strong focus on using the data for quality improvement at the national level with a pertinent example of this being the reconfiguration of the trauma system and continued use of the data to inform the shape of this. Work is also ongoing with the National Ambulance Service to improve the capture and use of pre-hospital data via the electronic Patient Care Record.

The data is also a key driver for local quality improvement in the local hospitals with examples of this including the Mater Miseracordiae Univeristy Hospital running a weekly trauma meeting reviewing specific case examples and sharing this with the local trauma team and other hospitals for educational learning and improvement. This has also been done in Cork University Hospital.

SURVEY OF MTA HOSPITAL GOVERNANCE COMMITTEES

In 2020, NOCA conducted a survey of MTA hospital governance committees to determine how many were operational, how often they met, their composition, and the topics discussed.

It was disappointing that only seven hospitals completed the survey fully. Each of the seven respondents indicated that they have an MTA hospital governance committee; several hospitals replied to say they did not have a committee; and about one-third did not respond. In light of this, NOCA has published a guidance document to support clinical leads and hospitals in developing their local MTA hospital governance committee (Figure 8.2). This guidance is in line with the HSE Framework for Improving Quality (2016) and it outlines how to structure a meeting, how often to meet, the resources required to run a meeting successfully, who should attend the meetings, and what topics should be discussed. NOCA will endeavor to support this process further by running a workshop with MTA hospital clinical leads throughout 2022 and will support the development of the local MTA hospital governance committees by providing any materials and resources it can.

MAJOR TRAUMA GOVERNANCE COMMITTEE (MTGC) GUIDANCE

WHAT IS GOVERNANCE?

The system through which healthcare teams are accountable for the quality, safety and experience of patients in the care they have delivered (HSE, 2014). What this means to healthcare staff- Specifying the clinical standards you are going to deliver and showing everyone the measurements you have made to demonstrate that you have done what you set out to do (HSE, 2014).

The MTA National Report 2019/2020 recommends that: every hospital participating in the MTA should have a committee to ensure that the data from the major trauma audit is being used to drive continuous quality improvement in major trauma care (NOCA, 2022).

Health Service Executive, Quality Improvement Division (2016)

RESOURCES

https://www.noca.ie/publications
Template for agenda, minutes & PowerPoint.

MEETING ETIQUETTE

- Terms of reference developed for group
- Frequency of meetings: Quarterly minimum
- Agenda to be circulated one week in advance
- Minutes to be circulated one week later
- Key actions identified and allocated to specific members at each meeting.

SUGGESTED MEMBERSHIP OF MTGC

- Chair - Clinician
- Vice-Chair (from other professional group)
- MTA clinical lead and audit coordinator

Members representing: Emergency medicine, Paediatrics, General surgery, Trauma coordinator, Orthopaedics, Geriatric medicine, Anaesthetics, Radiology, HSCP, Nursing, Quality & Safety, Risk management, Senior Hospital Management, Rehabilitation, Administration, Ambulance service, HIPE personnel, Public/ Patient Representative, Bed Manager, Theatre Manager

TOPICS FOR DISCUSSION

- Major trauma audit reports (clinical and dashboard reports)
- TARN analytics reports
- Data quality
- Quality improvement
- Patient safety
- Critical incidents
- Complaints
- Pre-alert
- Trauma team activation
- Length of stay
- Transfers
- Mortality
- Delayed discharges
- Resources/ business cases.

FIGURE 8.3: MTA GOVERNANCE COMMITTEE GUIDANCE

FUTURE DEVELOPMENTS

The robust nature and maturity of the MTA means that it can be used to provide data for high-quality research publications, quality improvement projects, service planning and policy development. MTA data can also be used to conduct detailed subgroup analysis; assist the development and reconfiguration of the trauma system; support hospitals to undertake quality improvement projects with the data; and present findings at national and international conferences.

CHAPTER 9
RECOMMENDATIONS

CHAPTER 9

RECOMMENDATIONS

RECOMMENDATIONS TO THE NATIONAL OFFICE FOR TRAUMA SERVICES, HSE

RECOMMENDATION 1

The National Office for Trauma Services, HSE should continue to work closely with, and support, the MTA by:

- **providing clarity about key definitions for trauma teams and trauma team activation criteria**
- **using the data from the MTA to identify injury prevention opportunities for the new trauma system.**
- **using the data from the MTA to support trauma care re-organisation and monitor the effect of changes.**

Rationale
• Since the publication of *A Trauma System for Ireland: Report of the Trauma Steering Group*, (Department of Health, 2018), the National Office for Trauma Services (NOTS) has been working closely with the MTA, using the data to help determine how to reconfigure the trauma system, including the identification of which hospitals should become major trauma centres (MTCs) and which should become trauma units (TUs).
• NOTS's remit is such that the MTA seeks direction for key definitions in order to enable the audit to continue to collect robust and relevant data to support the ongoing reconfiguration of the trauma system.
• Thus far, there is disparity at hospital level about the definition of a trauma team and when a trauma team should be activated.
• The MTA has consistently highlighted areas where injury prevention opportunities can be achieved through better home and work safety, and by encouraging the public to 'Think Safety First'.
What action should be taken?
• NOTS should provide clear definitions of trauma team composition for the MTCs and TUs. It should also provide trauma team activation criteria, so that each hospital can measure this in a standardised way for the MTA.
• NOTS should use the data to identify injury prevention areas and deliver the already developed MTA injury prevention advice to the community.
Who will benefit from this action/recommendation?
• Patients will benefit from earlier recognition of their injuries by medical, nursing and paramedical staff. In addition, patients will receive more timely and appropriate care, and have better outcomes.
• The trauma system will benefit from a reduced workload if more injuries are prevented.
Who is responsible for implementing this action/recommendation?
• NOTS is responsible for developing and providing these definitions to hospitals.
When will this be implemented?
During 2022

RECOMMENDATIONS TO HOSPITAL MANAGERS, CLINICIANS AND AUDIT COORDINATORS

RECOMMENDATION 2

Each hospital should establish a local MTA governance committee to ensure their local audit findings are acted on; this is in line with the guidance issued by the MTA.

Rationale
• This report shows that the majority of hospitals currently do not have robust local governance committees in place afor the MTA.
• In order to ensure that clinical audits reach their full potential and drive quality improvement, the users of the audit (i.e. hospitals, the HSE, DOH, patient organisations) must have structures in place to review the data, ensure that data quality is good, and act on the data findings in order to drive service improvement, safeguard appropriate resourcing for services, and improve patient outcomes.
What action should be taken?
• Using the guidance provided in the MTA National Report, the clinical lead for the MTA in each hospital, supported by their hospital management team, should establish an MTA governance committee.
Who will benefit from this action/recommendation?
• The hospitals will benefit from better data and be able to use the data for service development and planning, as well as for identifying areas where patients' care could be improved.
Who is responsible for implementing this action/recommendation?
• Hospital managers and clinical leads for the MTA are responsible for establishing and maintaining local MTA governance committees.
When will this be implemented?
During 2022/2023

RECOMMENDATIONS FOR THE NATIONAL OFFICE OF CLINICAL AUDIT

RECOMMENDATION 3

The National Office of Clinical Audit (NOCA) will work with the Health Service Executive to develop a strategy for sustainable support for clinical audit in the hospitals.

NOCA should continue to support each hospital to:

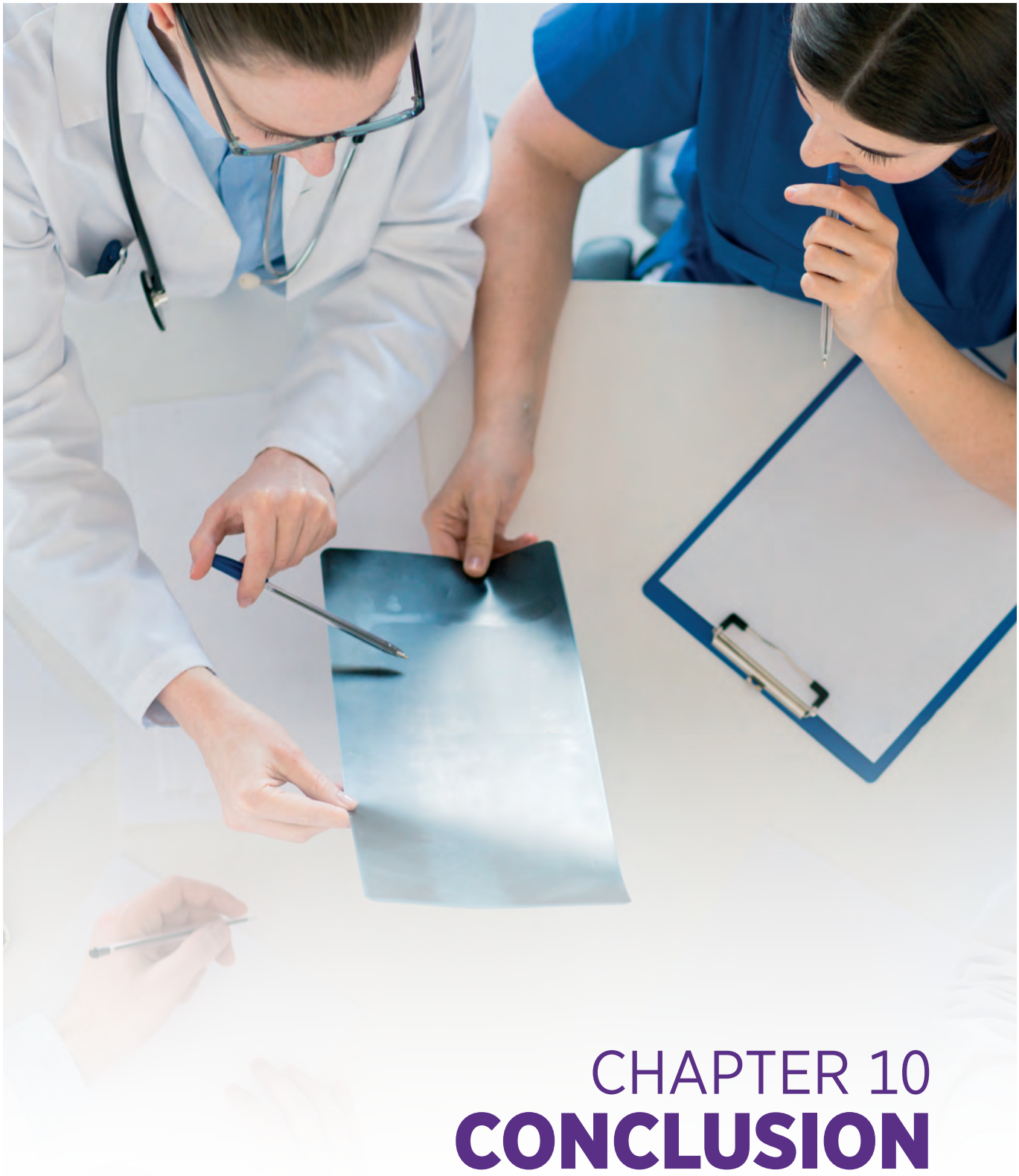
- **establish a local MTA governance committee.**
- **achieve high standards of data quality and data completeness**
- **improve quarterly reports to support hospitals with quality improvement and facilitate training in the use of the Trauma Audit and Research Network (TARN) analytics portal.**

NOCA should also:

- **work with relevant organisations to carry out research on how to better identify patients with major trauma injuries at the earliest possible time**
- **work with Public and Patient Interest (PPI) representatives and organisations to utilise and disseminate public health messages from the MTA.**

Rationale
• The data quality for MTA has suffered due to the redeployment of audit staff during the pandemic, which further compounded the lack of protected time for audit coordinators thus reducing the volume and quality of data collected for this report.
• The recent audit of MTA hospital governance committees and the decrease in data coverage shows that there are still challenges at the hospital level with governance and data quality.
• NOCA has committed to improving the reporting from the MTA and the usability of the data in order to better support the hospitals and MTA hospital governance committees to engage in the audit.
• Through a series of workshops and the publication of guidance documents, NOCA will support MTA hospital clinical leads and hospitals to develop local MTA governance committees.
• NOCA will work with all agencies, especially public and patient organisations, to disseminate information relevant to their respective groups.

What action should be taken?
• NOCA should engage with the Health Service Executive (HSE) to develop a sustainable strategy to ensure clinical audit staff have allocated time to work on audit.
• NOCA should hold workshops and training for MTA hospital clinical leads and audit coordinators on how to set up and maintain a local MTA governance committee.
• NOCA should develop reports, in collaboration with the clinical leads and audit coordinators, to support their meetings and enable them to use the data for quality improvement.
• NOCA should develop infographics about home safety, keeping active at home, and home safety assessments in order to support organisations to inform the public about falls prevention.
Who will benefit from this action/recommendation?
• NOCA will benefit from better engagement with the audit data, data quality, and use of data for quality improvement (QI).
Who is responsible for implementing this action/recommendation?
• NOCA is responsible for engaging with the HSE to develop a sustainable strategy for audit work in the hospitals.
• NOCA is responsible for supporting hospitals in the development of local MTA governance committees in order to improve data quality and enable the use of data for quality improvement.
When will this be implemented?
During 2022/2023



CHAPTER 10
CONCLUSION

CONTENTS >

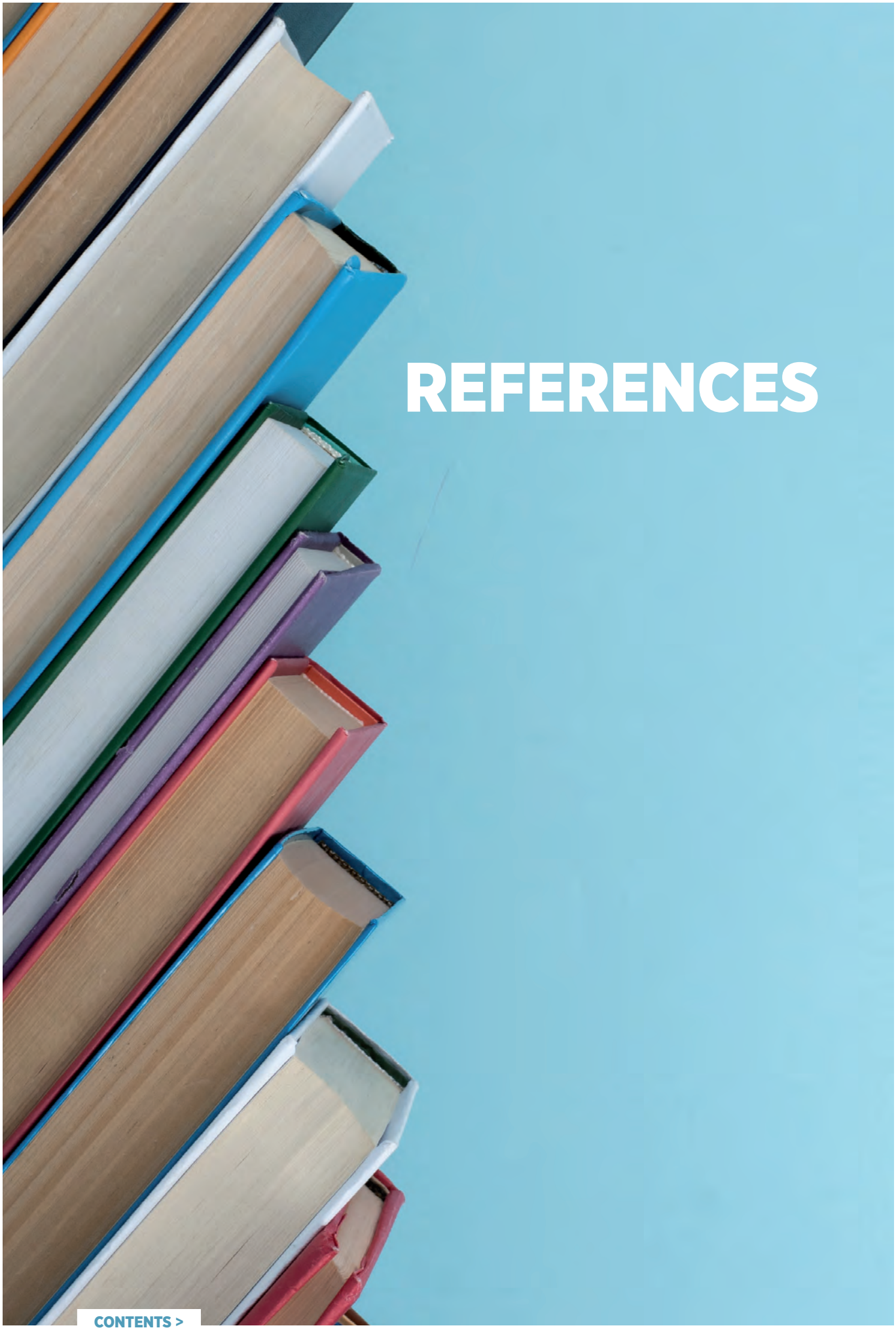
CHAPTER 10

CONCLUSION

The *Major Trauma Audit National Report 2019 and 2020* describes the impact of the COVID-19 pandemic on major trauma patients. The report is especially relevant as our trauma system continues to evolve. The information contained in this report should be used to support the trauma system to prepare robust plans for unforeseen events, such as a pandemic and a cyberattack, in order to ensure that major trauma patients continue to receive the highest level of care.

As has been highlighted in this and many of the previous MTA National Reports, the preventable nature of many of accidents, in particular the number of falls at home which lead to major injuries, requires all of us to consider what we can do in our own homes to improve safety and prevent harm. Using the home safety infographic published in the *Major Trauma Audit National Report 2018* (link), we have built on the home safety message by further recommending a home safety checklist that can be used by all healthcare workers visiting a patient's home, or indeed by members of the public to assess their own homes.

As the new trauma system develops and changes, continued support for the MTA will be critical in order to monitor the impact of these changes, ensure that the right resources and care pathways are available for major trauma patients, and also ensure that patient outcomes are monitored and improved continuously. Such is the maturity of the audit that it is now a rich repository of quality information.



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GLOSSARY OF TERMS AND DEFINITIONS

ACRONYM	FULL TERM
AIS	Abbreviated Injury Scale. A value between 1 (minor) and 6 (fatal) is assigned to each injury.
CT	Computed tomography is a scanning technique that uses X-rays to take highly detailed images of the body.
direct admissions	Describes care in the first treating hospital.
DFB	Dublin Fire Brigade
ED	emergency department
ePCR	electronic patient care report
GCS	Glasgow Coma Scale. A measure of consciousness ranging from 3, indicating complete unconsciousness, to 15, indicating a state of normal alertness. GCS is composed of eye, verbal and motor scores.
HIPE	Hospital In-Patient Enquiry
HIQA	Health Information and Quality Authority
HPO	Healthcare Pricing Office
HSCP	Health and Social Care Professionals
HSE	Health Service Executive
IAEM	Irish Association for Emergency Medicine
ICD 10	International Classification of Diseases, Tenth Revision
ICU	intensive care unit
IQR	interquartile range
ISS	The Injury Severity Score is a score ranging from 1 (indicating minor injuries) to 75 (indicating very severe injuries that are very likely to result in death). An ISS between 9 and 15 is considered moderate. An ISS of >15 is considered severe and signifies major trauma.
LOS	Length of stay refers to the length of time spent in an acute hospital for each patient.
mmHG	Blood pressure is measured in millimetres of mercury (mmHG)

ACRONYM	FULL TERM
MTC	A major trauma centre is a multispecialty hospital, on a single site, which is optimised for the provision of trauma care and integrated with the rest of the trauma network.
major trauma	Major trauma describes serious and often multiple injuries where there is a strong possibility of death or disability.
MTA	Major Trauma Audit
NAS	National Ambulance Service
NCEC	National Clinical Effectiveness Committee
NOCA	National Office of Clinical Audit
NOTS	National Office for Trauma Services
PPI	Public and Patient Interest
QI	Quality improvement
QIP	quality improvement project
RCSI	Royal College of Surgeons in Ireland
SHO	senior house officer
SPC	statistical process control
SPSS	Statistical Package for the Social Sciences
TARN	Trauma Audit and Research Network
trauma	Trauma is a term which refers to physical injuries of sudden onset and severity which require immediate medical attention.
trauma network	A trauma network is a coordinated, integrated system within a defined geographical region to deliver care to injured patients from injury to recovery, through prevention, pre-hospital care and transportation, emergency and acute hospital care, and rehabilitation.
TU	A trauma unit is a major hospital within a trauma network that provides care for most injured patients.
UK	United Kingdom
WHO	World Health Organization

APPENDICES

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ACCESSING REPORT APPENDICES

National Office of Clinical Audit (2022)
Major Trauma Audit National Report 2019 and 2020 - Appendices.
Dublin: National Office of Clinical Audit.
Available at: https://www.noca.ie/publications/publications-listing/PO/category/3

APPENDIX 1:
AUDIT OBJECTIVES

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APPENDIX 2:
INCLUSION CRITERIA

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APPENDIX 3:
ABBREVIATED INJURY SCALE (AIS)

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APPENDIX 4:
MTA GOVERNANCE COMMITTEE MEETING ATTENDANCE 2021

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APPENDIX 5:
FREQUENCY TABLES

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