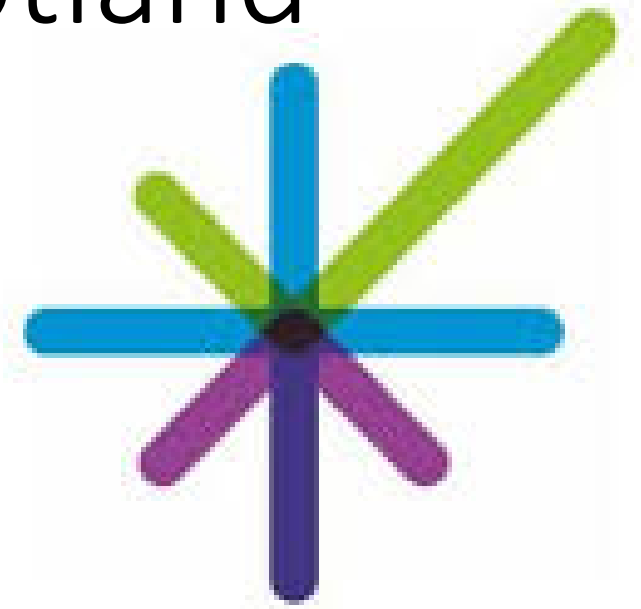


Severe Injury in Children &
Young People NHS Scotland
2018-2023
On behalf of STAG

Dr Marie Spiers
PEM Consultant RHC Glasgow
Paediatric Lead for STAG Steering Group



Background

Quality Framework for Major Trauma Services, Report to NPF – September 2013

‘Urgent need for mandatory collection of paediatric trauma data’

‘Specific component of STAG should be developed’

‘The challenges of methodology should not preclude collecting injury data.’

‘This work should be prioritised.’

‘...mandatory prospective collection of paediatric trauma data is essential to permit accurate planning of paediatric trauma services.’

Background

- Adult STAG recommenced in 2011
- Paediatric data pilot undertaken 2016
- Paediatric national data roll out November 2017
- Scottish Trauma Network (STN) fully operational in August 2021
 - NoS, EoS, SEoS and WoS regional networks
- Audit oversight- STAG Steering Group
- Governance- Scottish National Audit Programme (SNAP) within PHS
- STAG Annual report- publication 20th August 2023- KPI compliance
- Small numbers of under 16s in annual report limit data interrogation

Severe injury in children and young people, NHS Scotland 2018-2023

Scottish Trauma Audit Group

RESTRICTED STATISTICS: embargoed to 09:30
04/06/2024

www.publichealthscotland.scot

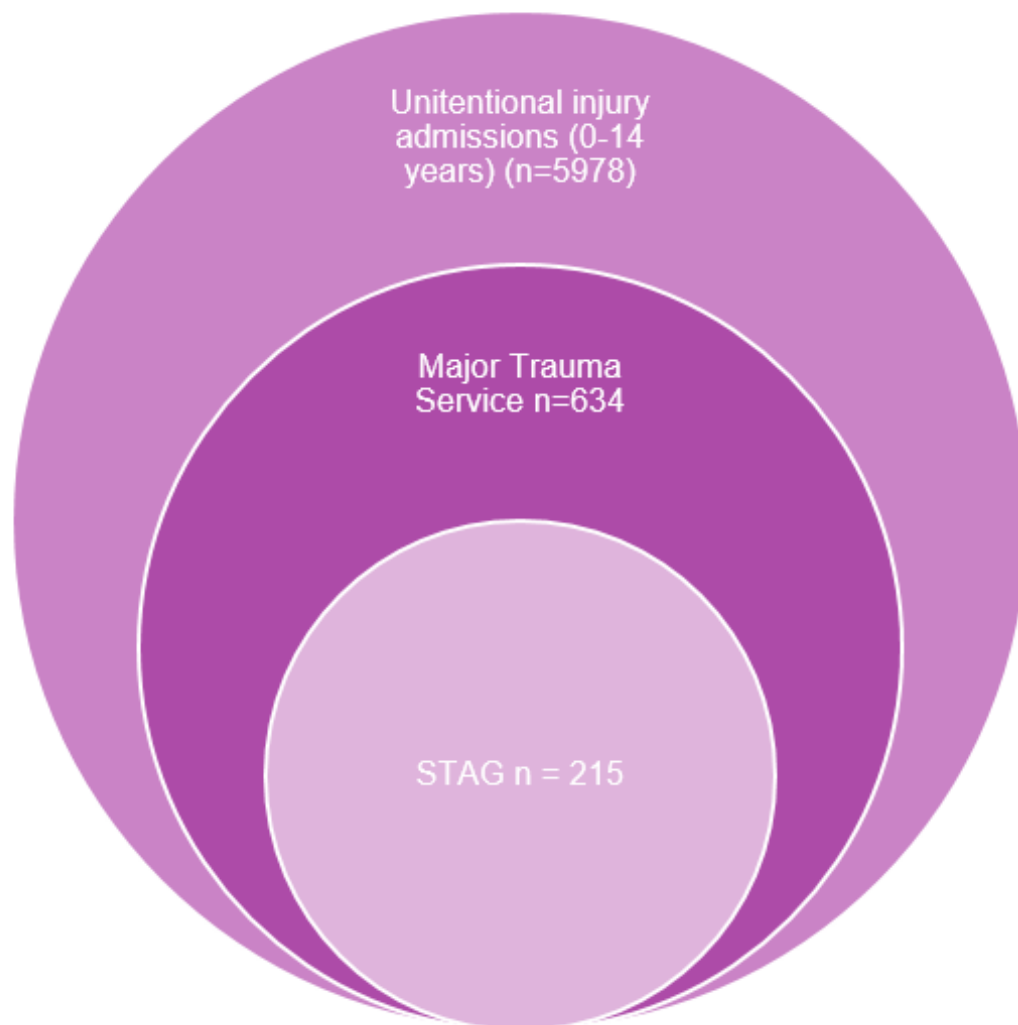
Contacts

Dr Marie Spiers, Paediatric Clinical Lead
Scottish Trauma Audit Group
phs.stag@phs.scot

Angela Khan, National Clinical Coordinator
Scottish Trauma Audit Group
phs.stag@phs.scot

STAG 6- Year Paediatric Report

- Under 16 years STAG data from 2018 to 2023 inclusive
- Purpose- ‘to provide an evidenced-based illustration of trauma epidemiology, presentation and management’
- Dataset- first of its kind in Scotland
- Published 4th June 2023
- Reports on **1326 patient trauma journeys** in under 16s from across Scotland

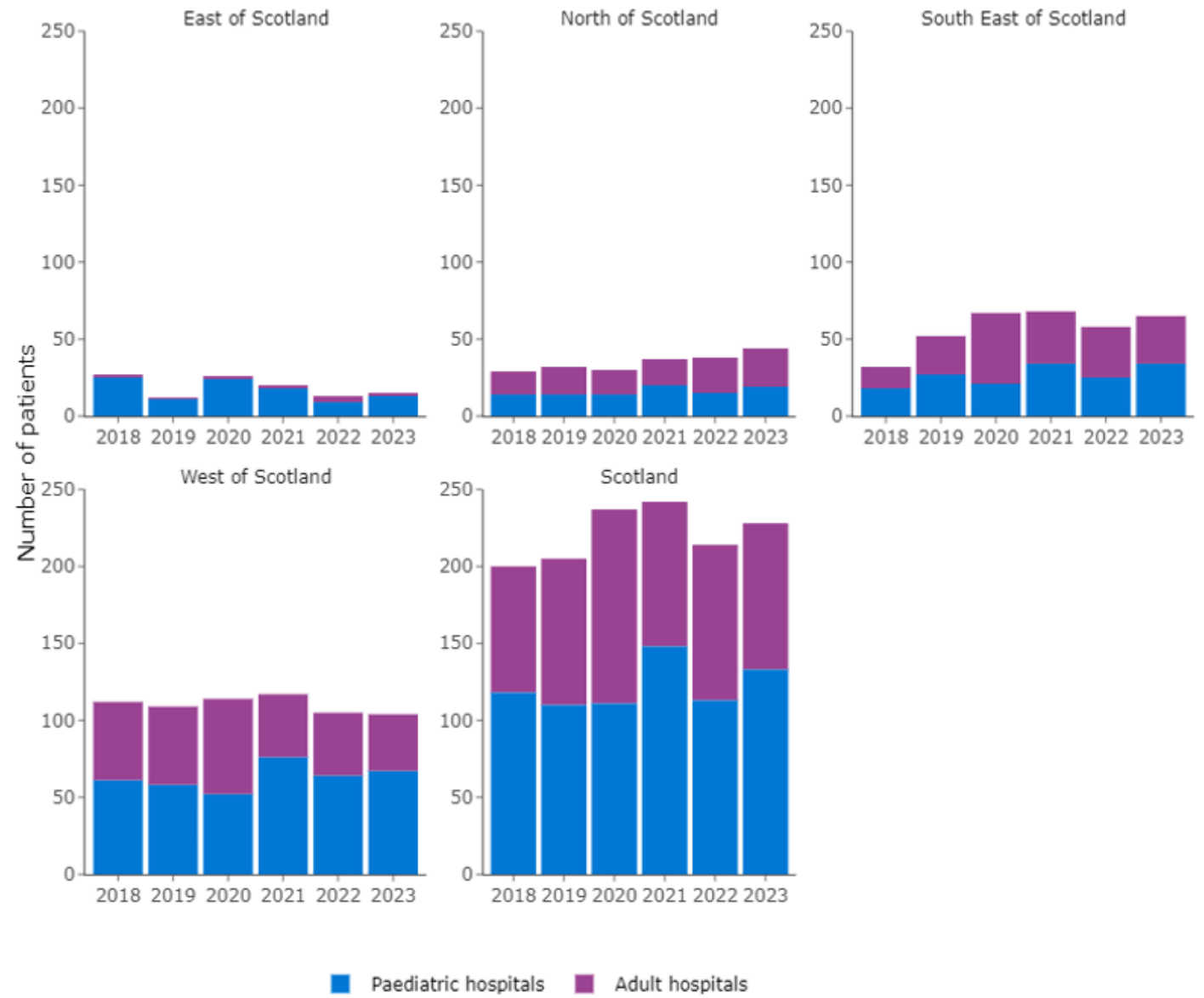


- STAG inclusion: PICU admission, 3 day hospital admission or die from injuries
- Patients who do not meet the STAG inclusion criteria but benefit from the STN
- **Further exploration of the burden of paediatric trauma that does not meet STAG inclusion criteria to inform national resource and service planning.**

Key Findings & Recommendations



Figure 2.1: Paediatric patients included in STAG (2018-2023) by first hospital (adult or paediatric hospital), network and year



- Numbers remain similar across the 6 years
- WoS and SEoS- higher volume centres
- Evidence to suggest PMTTT achieving aim- increase from 51% to 63.5% pMTC since go live

Paediatric Trauma Triage Tool

Use this tool to triage all children under 16 years old who have suspected major trauma

Clinical Judgement is important and valued.

If you are concerned that your patient's triage category does not reflect their needs, you require clinical or logistical advice please contact the **Trauma Desk** directly on

 **03333 990 211**

or by airwave by placing a callback to your local area dispatcher who will arrange a callback from the Trauma Desk.

Physiological Reference Ranges*

Age	RR	Pulse
<2Y	30-40	100-160
<2-5Y	25-30	95-140
5-11Y	20-25	80-120
>12Y	15-20	60-100

*Also refer to JRCALC Age-Per-Page for more physiological reference ranges

Triage Questions

Step 1

Assess your Patient's Physiology

Does your Patient have any of the following:

- Abnormal vital signs for age* not explained by pain or distress
- Abnormal conscious level
- Catastrophic haemorrhage

Step 2

Assess your Patient's Injuries

Does your Patient have any of the following:

- Penetrating injury to head, neck, torso
- Suspected open, depressed or basal skull fracture
- Suspected spinal injury with new onset neurology
- Significant bruising to chest or abdomen
- Traumatic amputation/mangled extremity proximal to wrist/ankle
- Suspected pelvic fracture
- Multiple and/or single open long bone fracture
- Burns/scalds >20% BSA and or facial or circumferential burns from flame

Step 3

Assess the Mechanism of Injury

Did any of the following occur:

- Traumatic death in same incident/by same mechanism
- "Bull's eye" damage to windscreen or damage to "A" post (from pedestrian striking outside of vehicle)
- Ejection from motor vehicle
- Pedestrian/cyclist struck by vehicle at >20mph
- Uninterrupted fall over 2x patient's height (not bouncing down stairs)
- Bicycle handlebar injury with abdominal and/or groin pain

Step 4

Special Considerations

Are any of the following present:

- Bleeding disorder or anticoagulant treatment
- Isolated burns (liaise with trauma desk)
- Pregnancy >20 weeks
- Significant crew concern (discuss case with Trauma Desk prior to transfer)

YES
NO

Response Category


Should the airway become compromised and cannot be managed, consider conveying/diverting to the nearest locally designated Emergency Department

Major trauma centre care



Your Patient requires Major Trauma Centre (MTC) Care

- If <45 minutes from MTC = convey to MTC
- If >45 minutes from MTC = contact Trauma Desk

 If you do not think your patient requires MTC, contact Trauma Desk


Remember to pre-alert the receiving hospital via airwave if you are managing a patient triaged to MTC

Trauma unit care



Your Patient requires Trauma Unit (TU) Care

- Convey to the nearest TU, or MTC if closer
- If >45 minutes from TU/MTC contact Trauma Desk

 If you do not think your patient requires TU/MTC, contact Trauma Desk

Local



Convey your patient to the nearest Local Emergency Hospital

- Your patient can be taken to the nearest hospital with an Emergency Department, regardless of designation


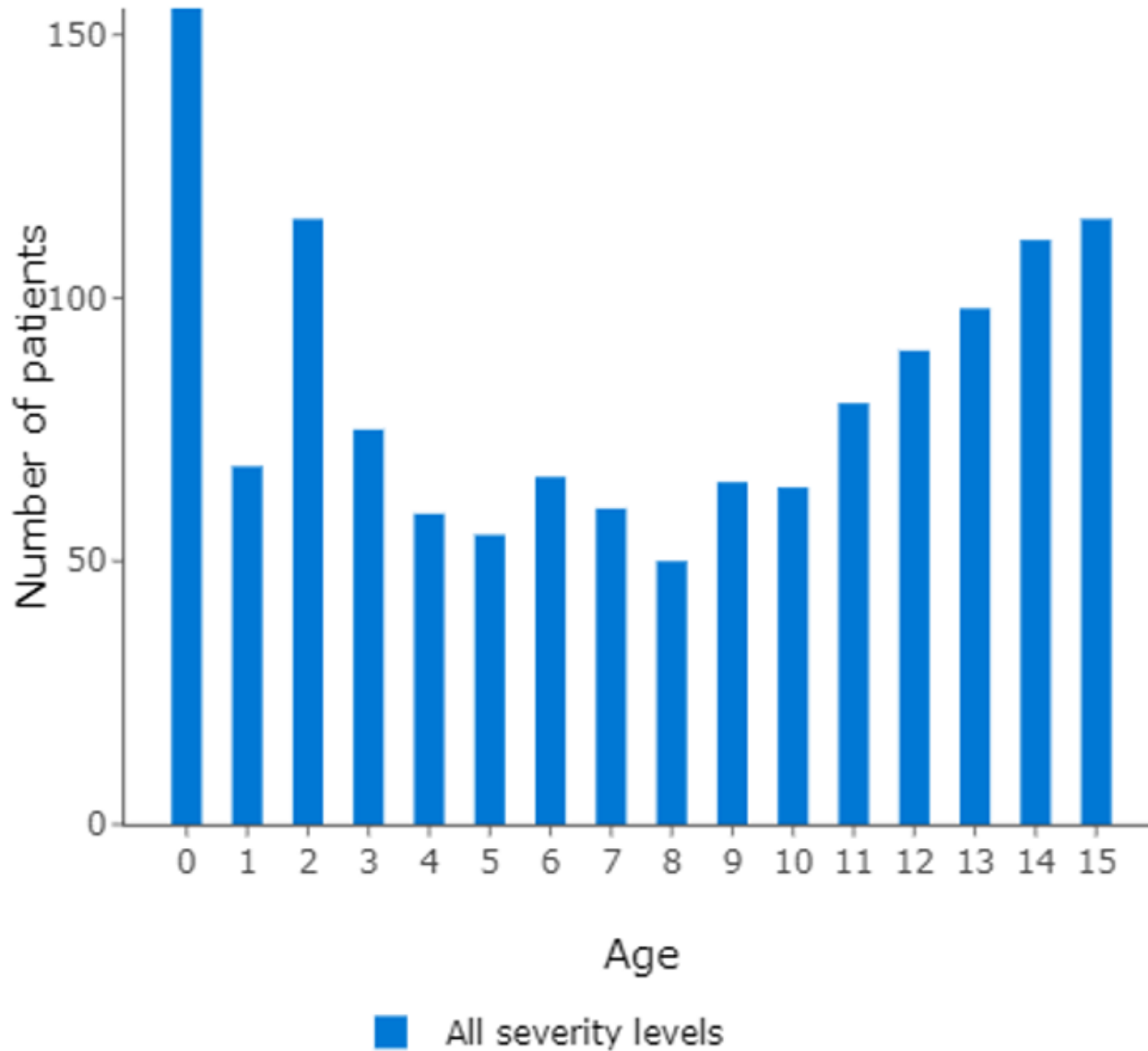
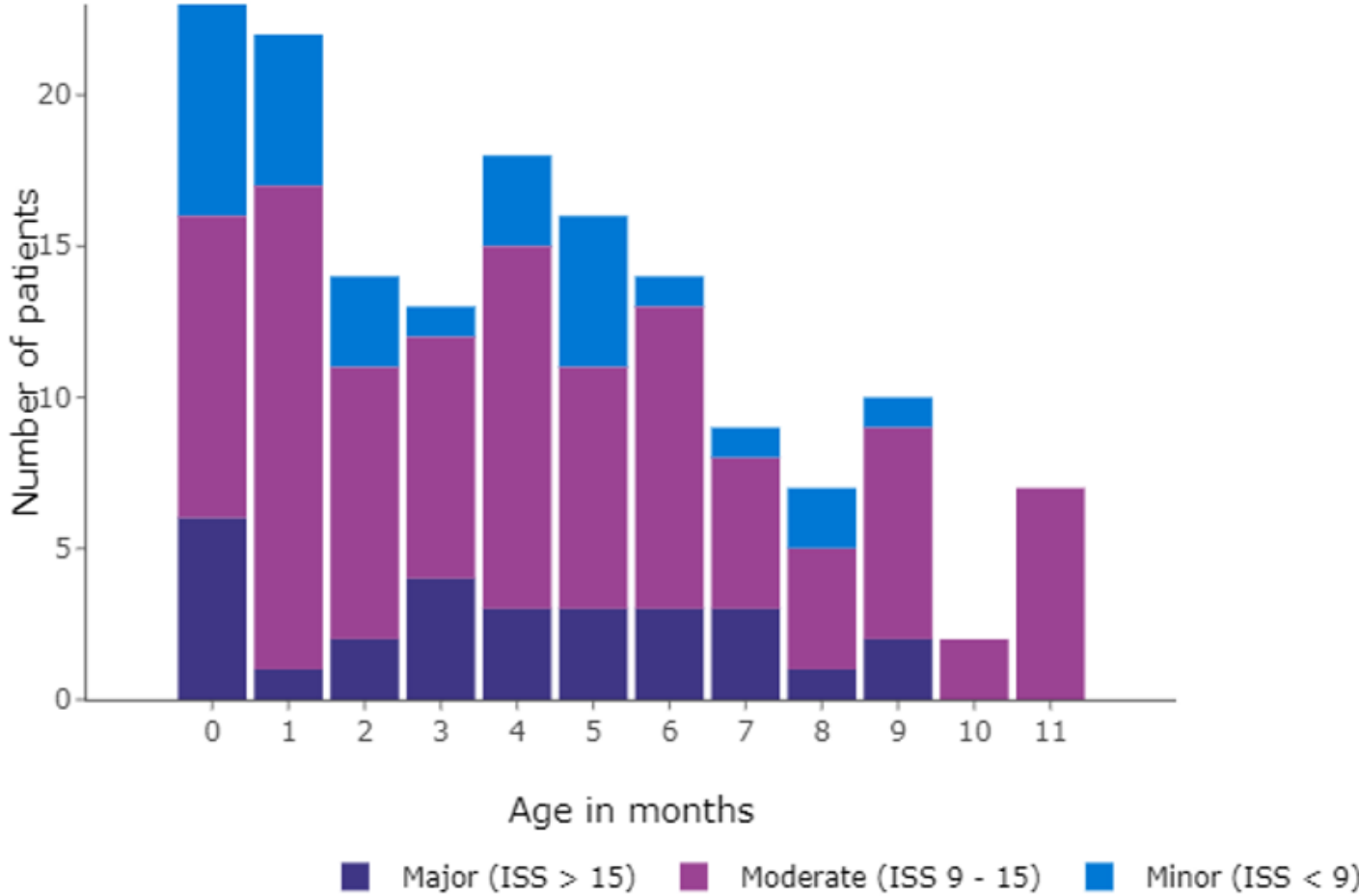
 If you think your patient requires MTC, contact Trauma desk

Figure 3.1 Age by severity of injury (2018-2023)



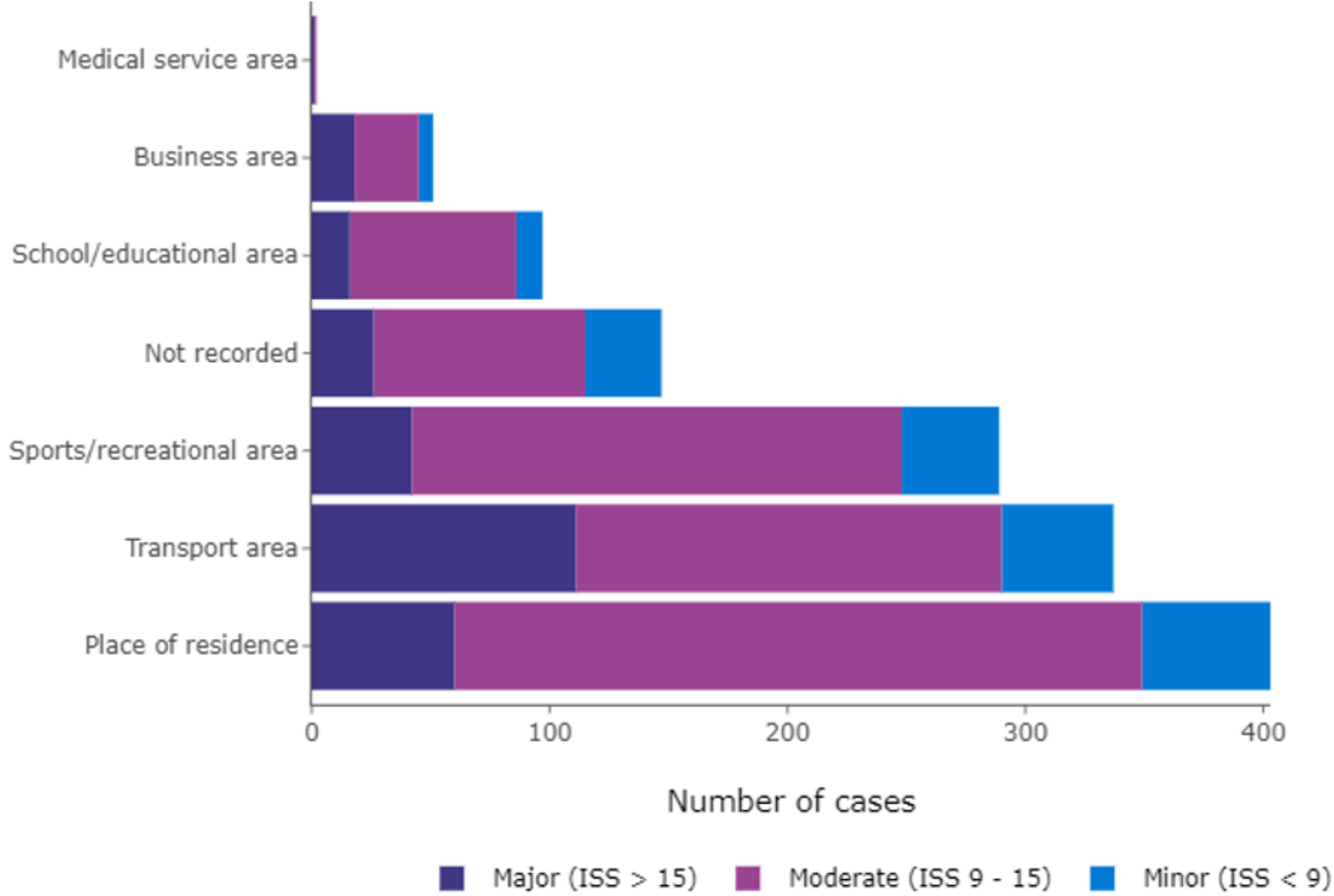
- Bimodal distribution with peaks at 0-2 and 12-15 years
- Major trauma shows a similar pattern with age- 18.6% 0-2s and 43.8% of 12-15s
- 66.4% males
- 55.5% males major trauma

Figure 3.3 Age <1 year, by month and severity of injury (2018-2023)



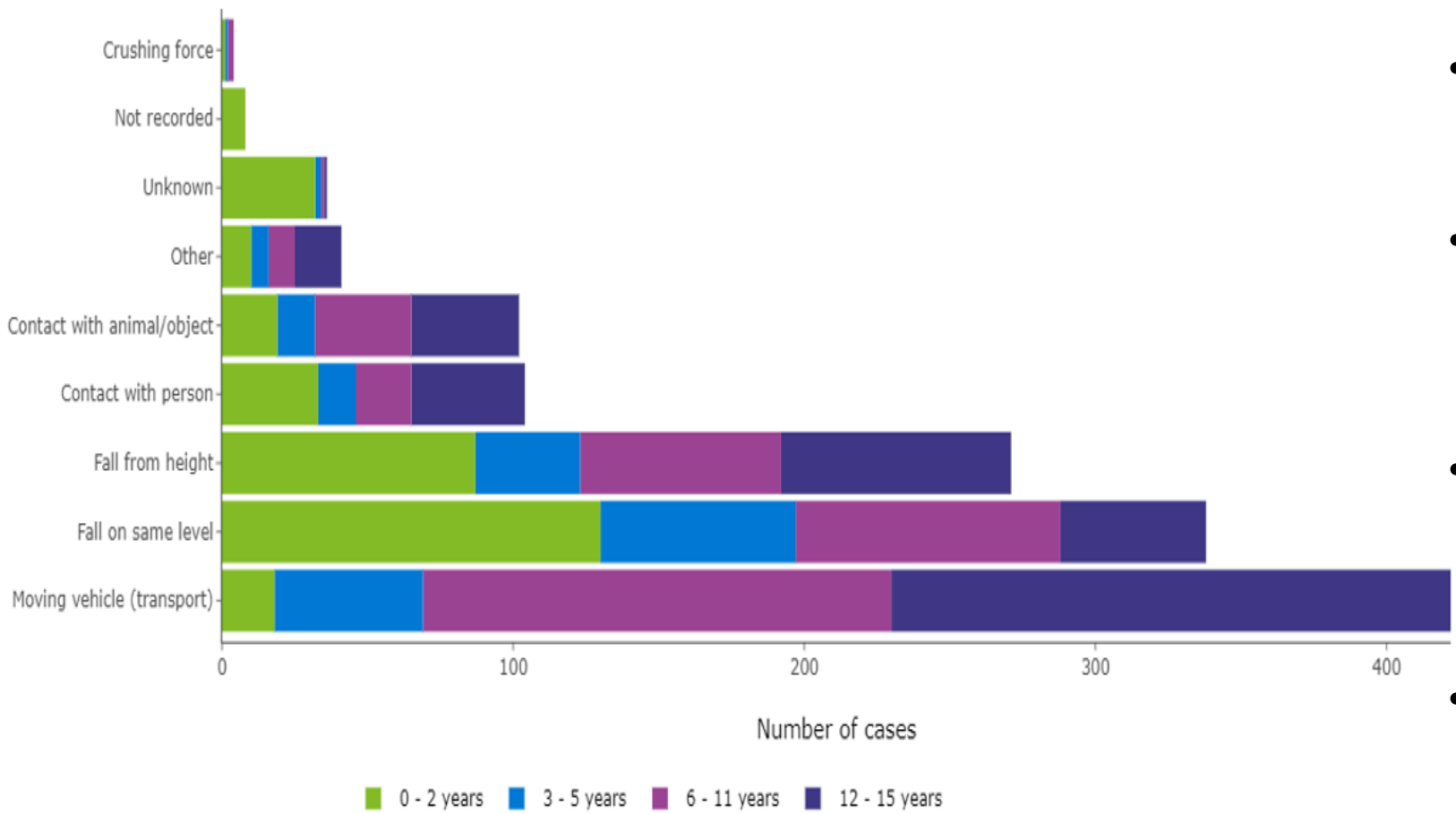
- High numbers of under 1s
- 77.4% are under 6 months- non mobile child
- Major trauma more prevalent in under 6 months- 78.6%
- **Further review of this cohort**
- **Targeted accident prevention**

Figure 4.1: Place of injury, by severity of injury (2018-2023).



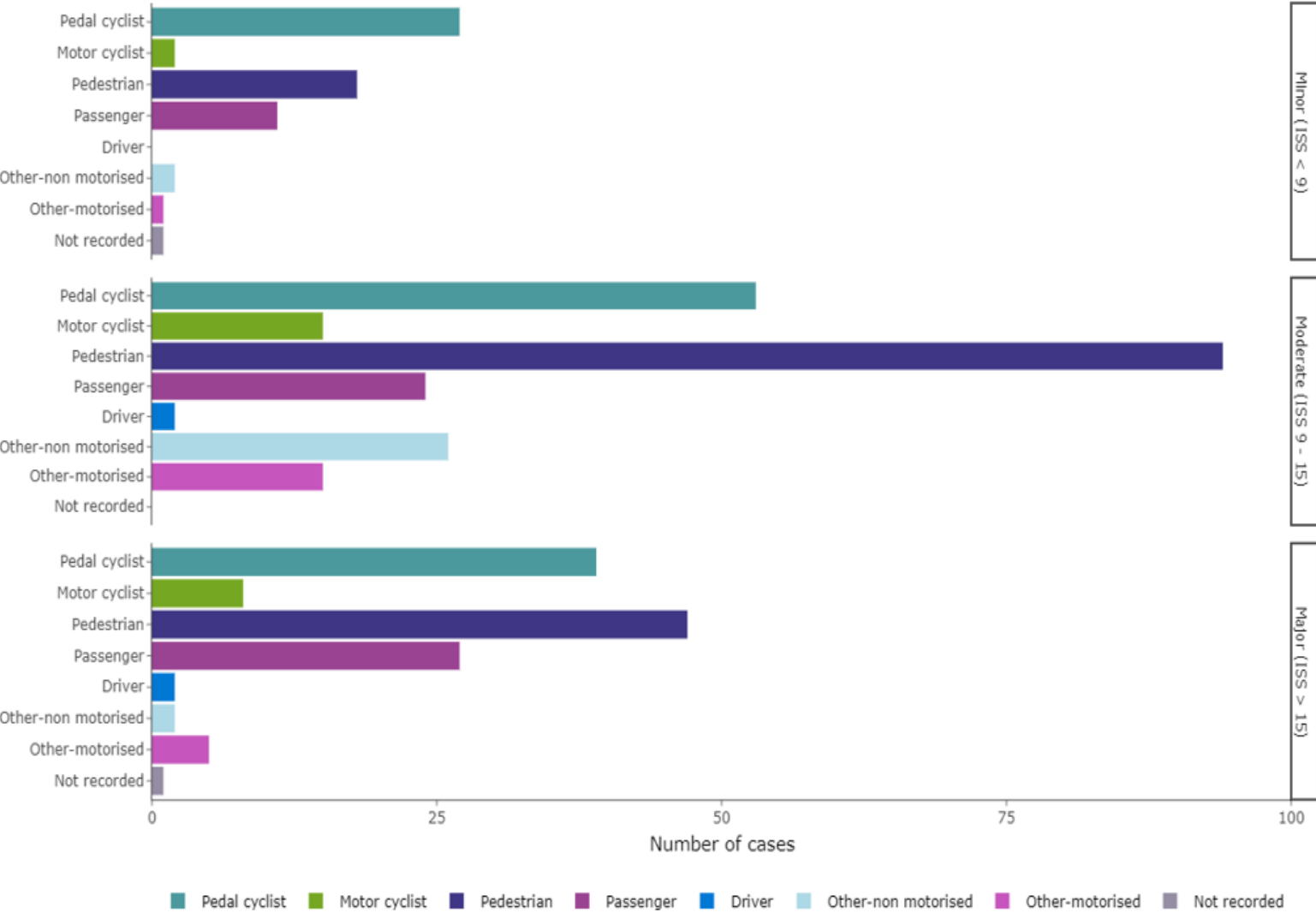
- 30.4% injuries occur in home environment
- Majority of major trauma (40.5%) occur in transport areas- consistent trend since 2019

Figure 5.2: Mechanism of injury, by age (2018-2023)



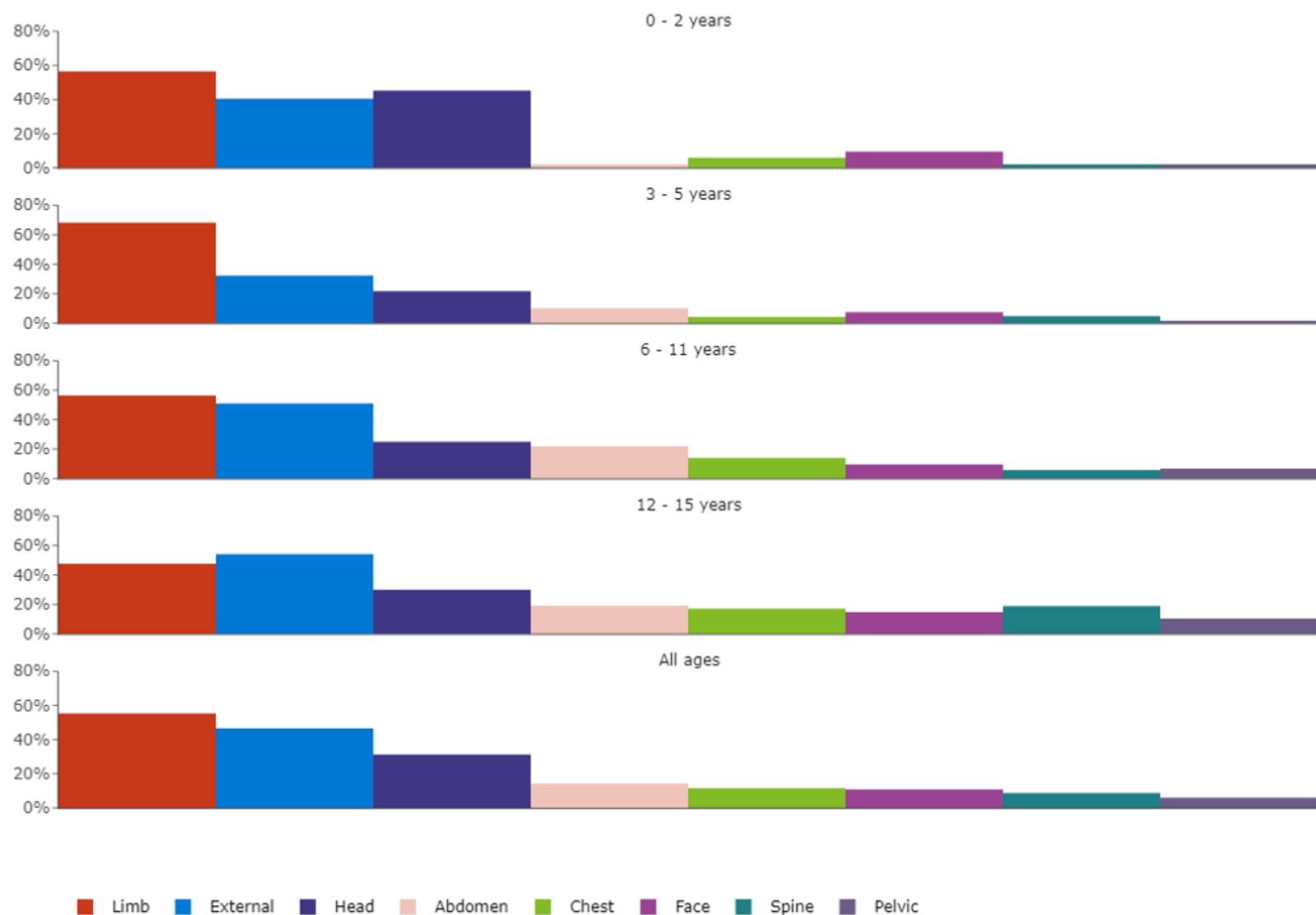
- Changing mechanism of injury pattern with age
- Most common MOI 0-2 and 3-5 years- fall from same level (38.5% and 35.4% respectively)
- Most common MOI 6-11 and 12-15 years- moving vehicle incident (41.8% and 46.4% respectively)
- Moving vehicle incident- most common for all years major trauma at 47.8%

Figure 6.2 Patient position in moving vehicle, by severity of injury (2018-2023)



- Injuries to pedestrians (37.7%) and pedal cyclists (28.2%), continue to be most frequent
- **‘Other motorised vehicles’- 89% due to e-scooters**
- Injuries to pedestrians and pedal cyclists were most frequent in all injury severities with both more likely to result in moderate or major trauma
- **The STAG data should inform the transport strategy led by Transport Scotland via PHS representation**

Figure 8.1: Injury type by body region and age (2018-2023)



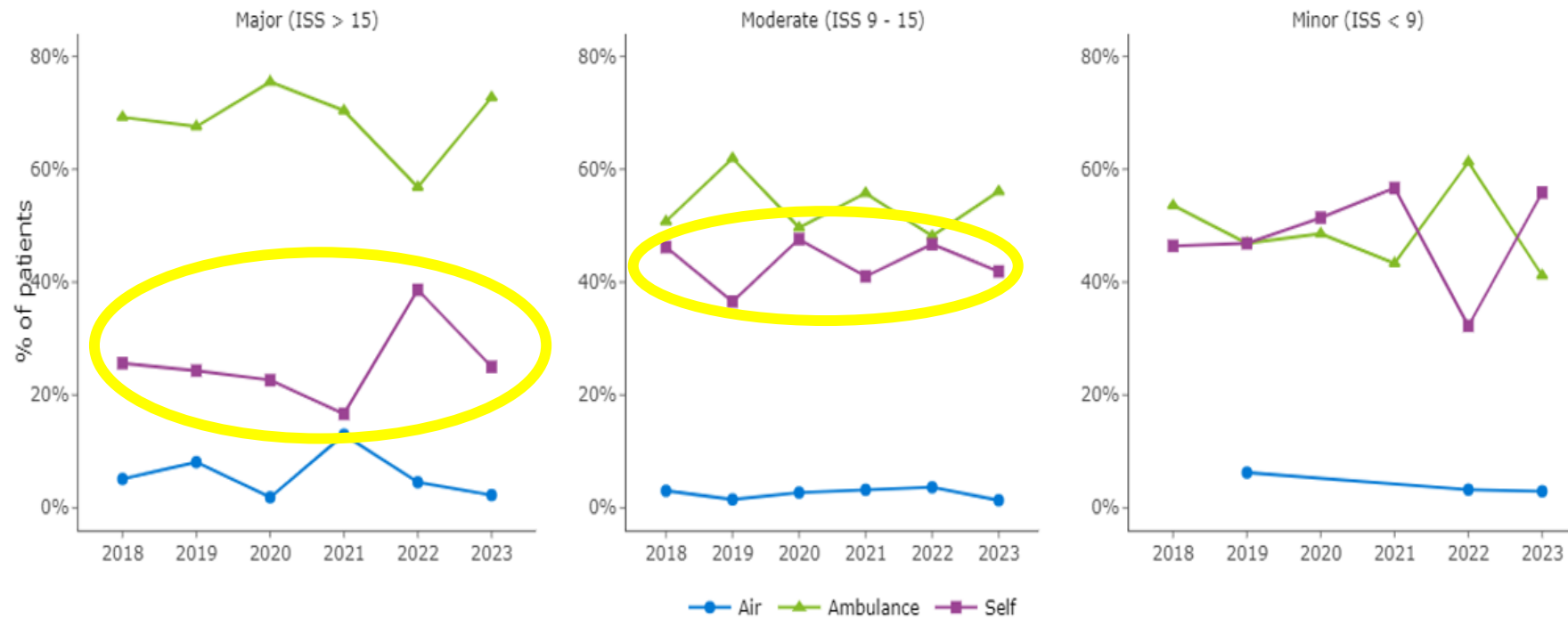
- Limb, external and head injuries most frequent across all age groups
- Head injuries- most frequent severe injury (AIS>/=3)
- Severe injury:
 - 0-2- limb (52.4%) and head (35.2%)
 - 3-5- limb (65.1%). Increasing abdominal injuries (6/.3%)
 - 6-11- abdominal (14%) and chest (7.8%)
 - 12-15- chest (10.4%) and spinal (3.4% severe, 18.8% in total)
- Polytrauma- peak 0-2 (25.4%) and 12-15 (34.8%)

Figure 9.1: Injury intent, by severity of injury and year (2018-2023)



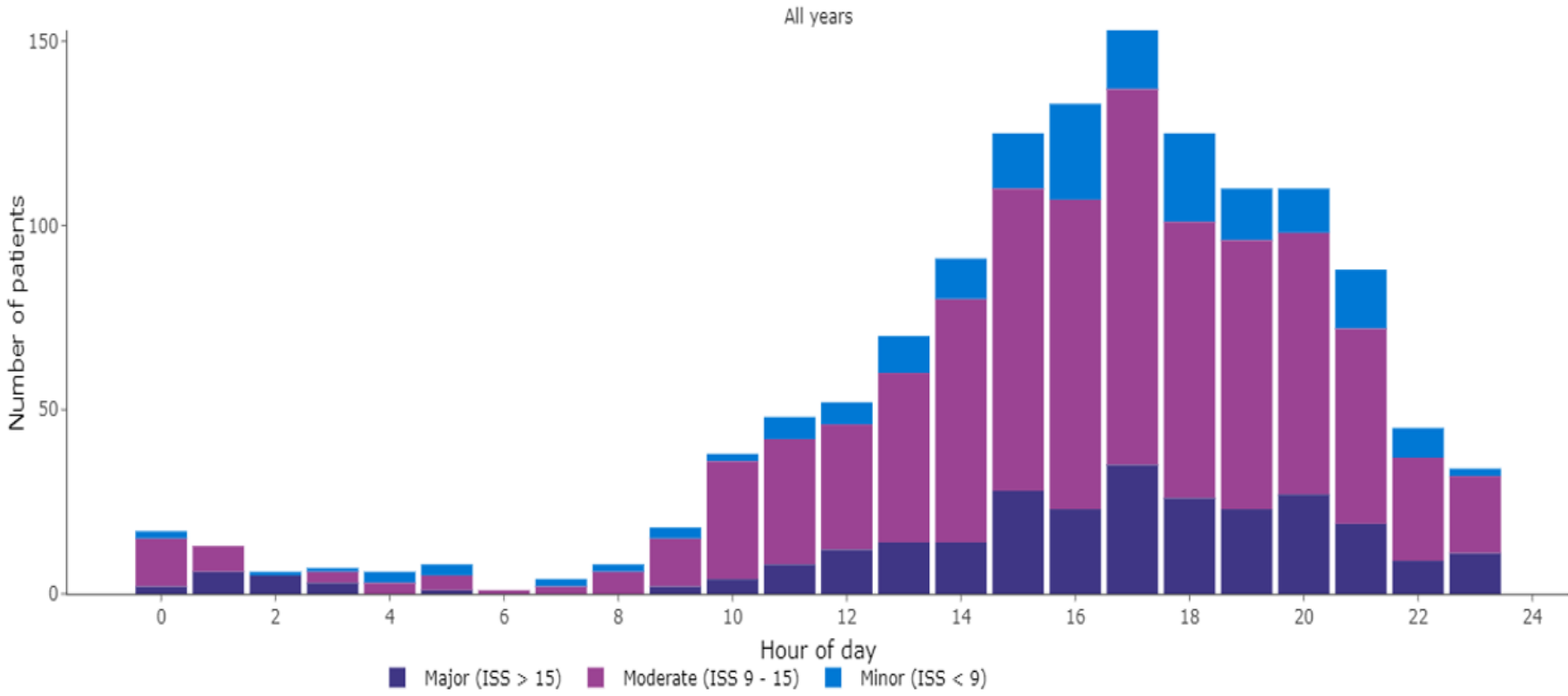
- 70.9% of injuries are unintentional
- 36.6% penetrating injuries- alleged assault
- <1% injuries result from deliberate self harm- all 12-15 age group

Figure 10.1 Patients arriving by air, ambulance, or self, by severity of injury and year (2018-2023)



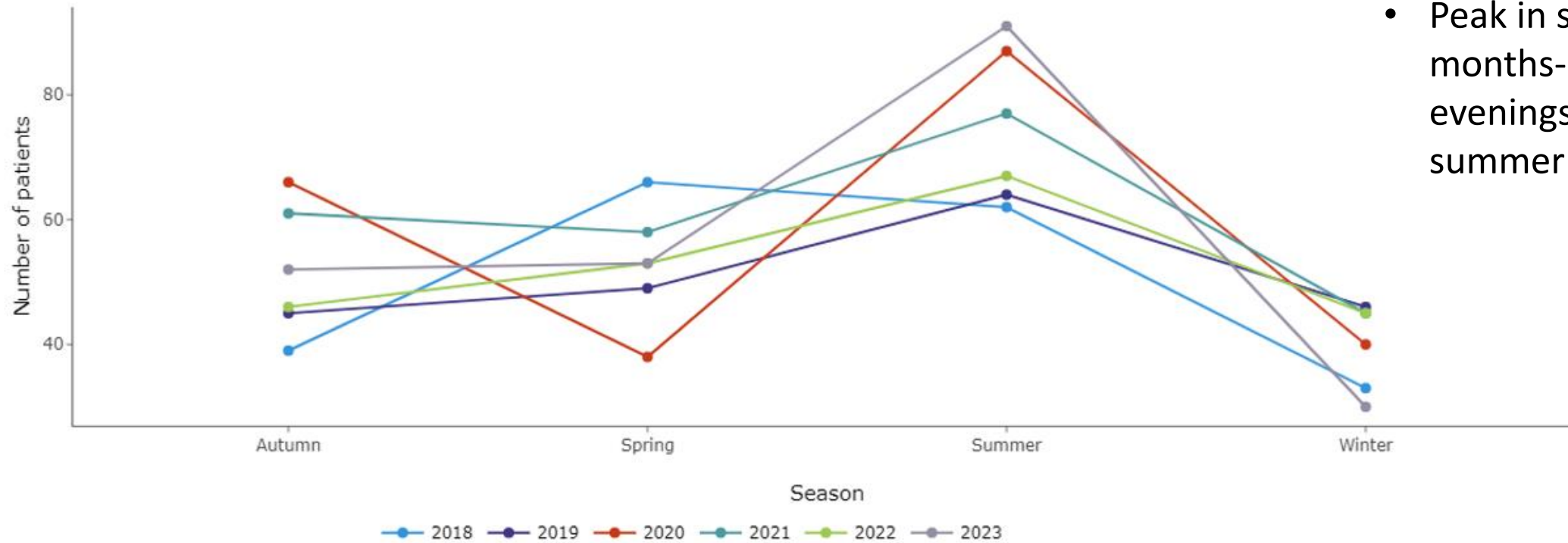
- 24.8% of major trauma and 43.0% of moderate trauma self-presented to hospital
- 8.7% and 13.5% in adults for comparison
- Of the self-presenting major trauma patients, 44.8% were taken to an MTC, 37.3% a TU and 19.4% an LEH
- **Maintain paediatric resuscitation capacity across STN**

Figure 10.2: Time of arrival in ED, by severity of injury (2018-2023)



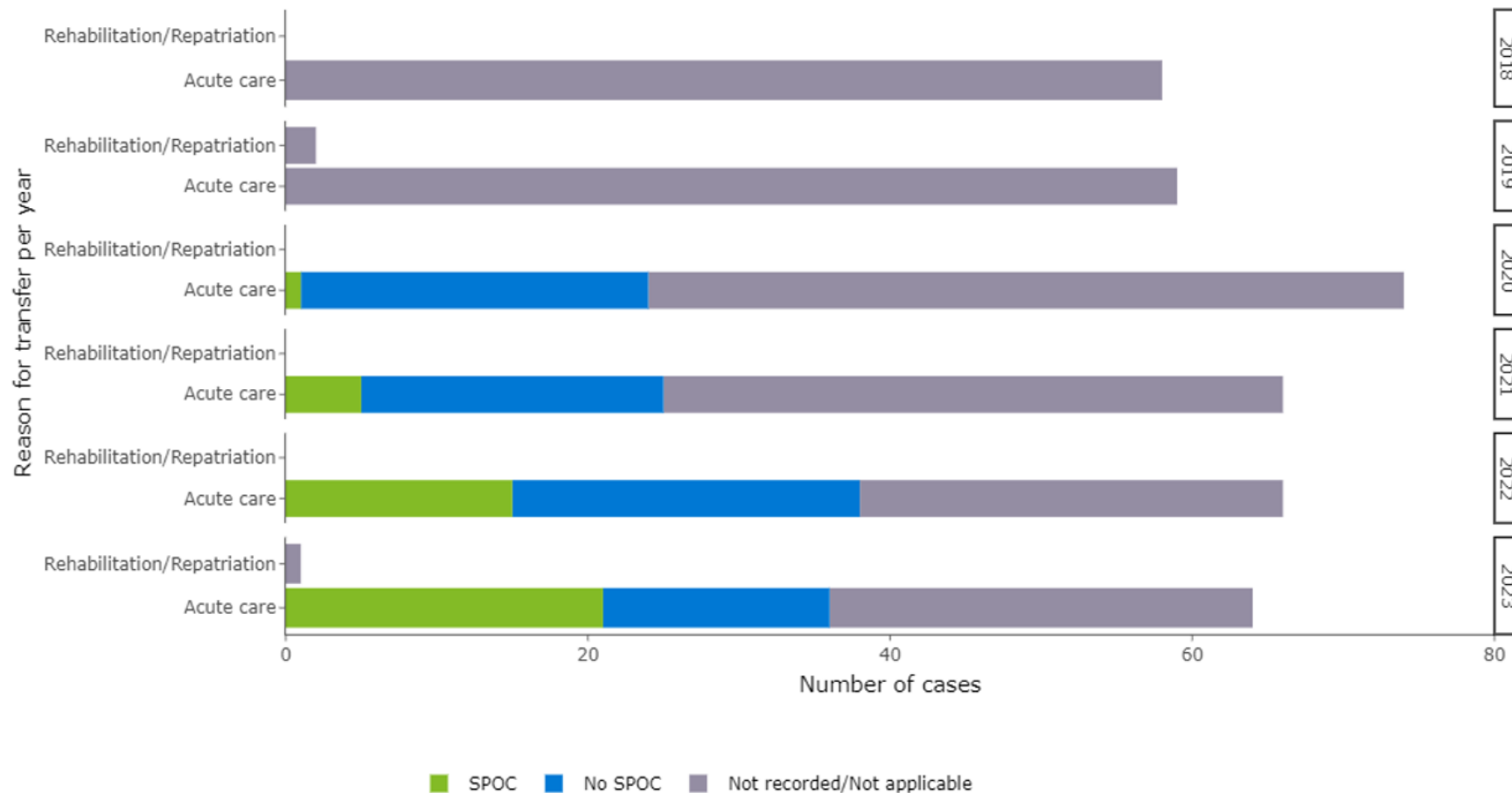
- Diurnal variation of presentations- peak in late afternoon and early evening
- Presentations between midnight and 8am are few but 27.4% are for major trauma
- Advise staffing models for overnight period

Figure 10.3: Seasonal pattern of injury (2018-2023)



- Peak in summer months- light evenings and summer holidays

Figure 11.1: Patient transfers, by SPOC, reason and year (2018-2023)

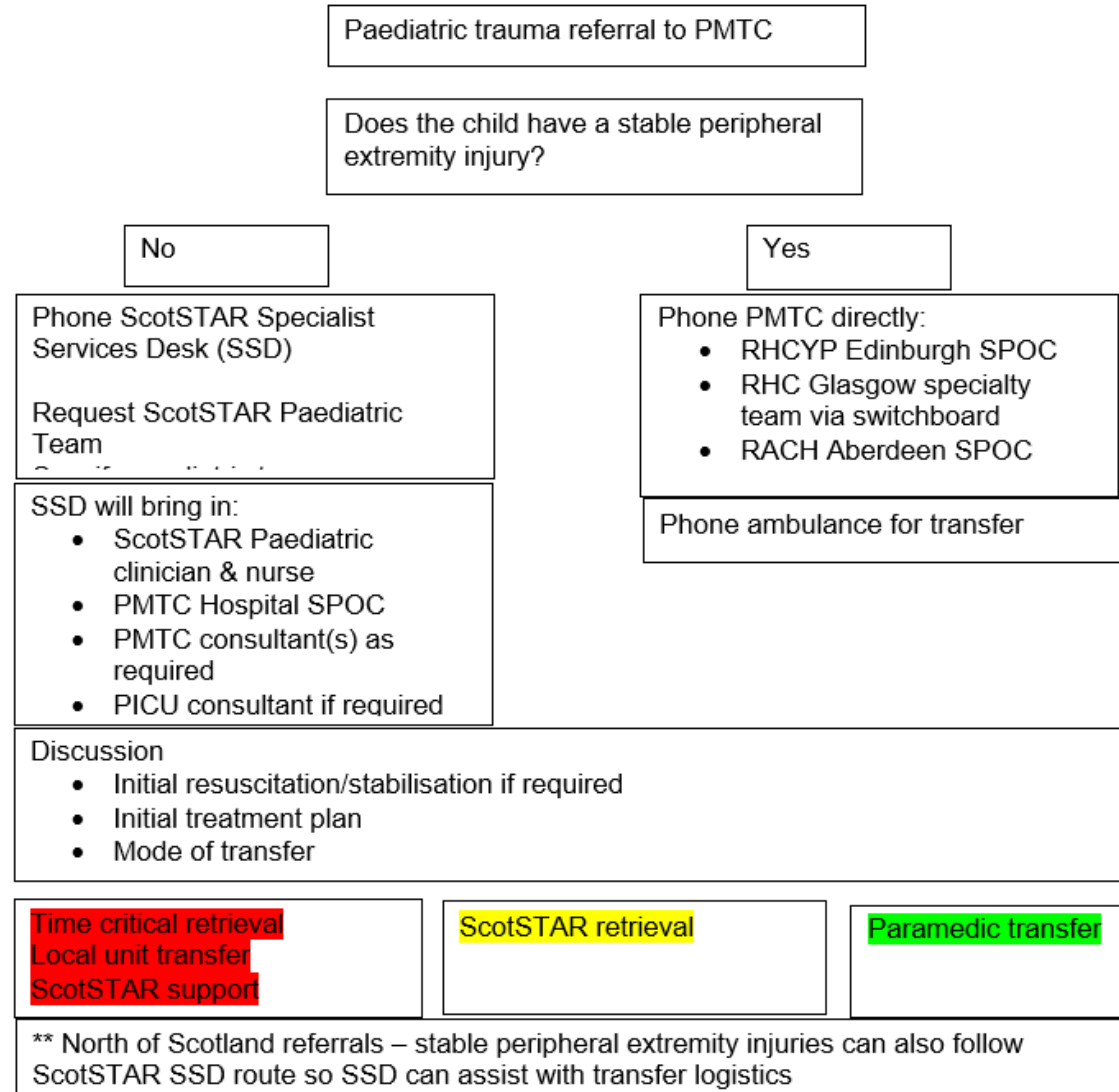


- 387 acute secondary transfers required
- Demonstrating need for national SPoC- implemented May 2021
- SPoC use increased from 7.6% to 32.8% from 2021 to 2023

Appendix 3 – Single Point of Contact – referral to paediatric MTC



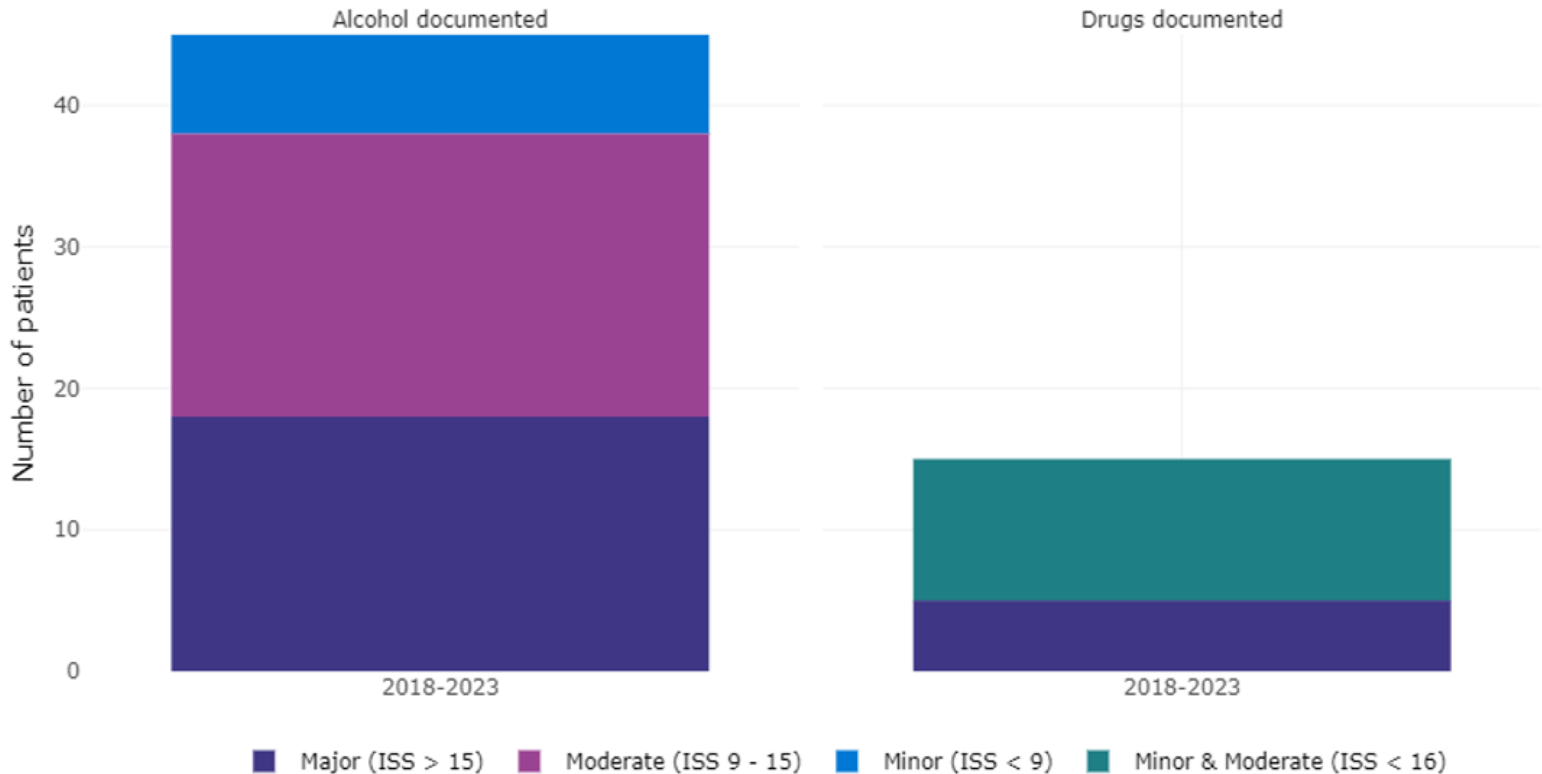
Single Point of Contact – Referral to Paediatric Major Trauma Centre (PMTc)



Population Health

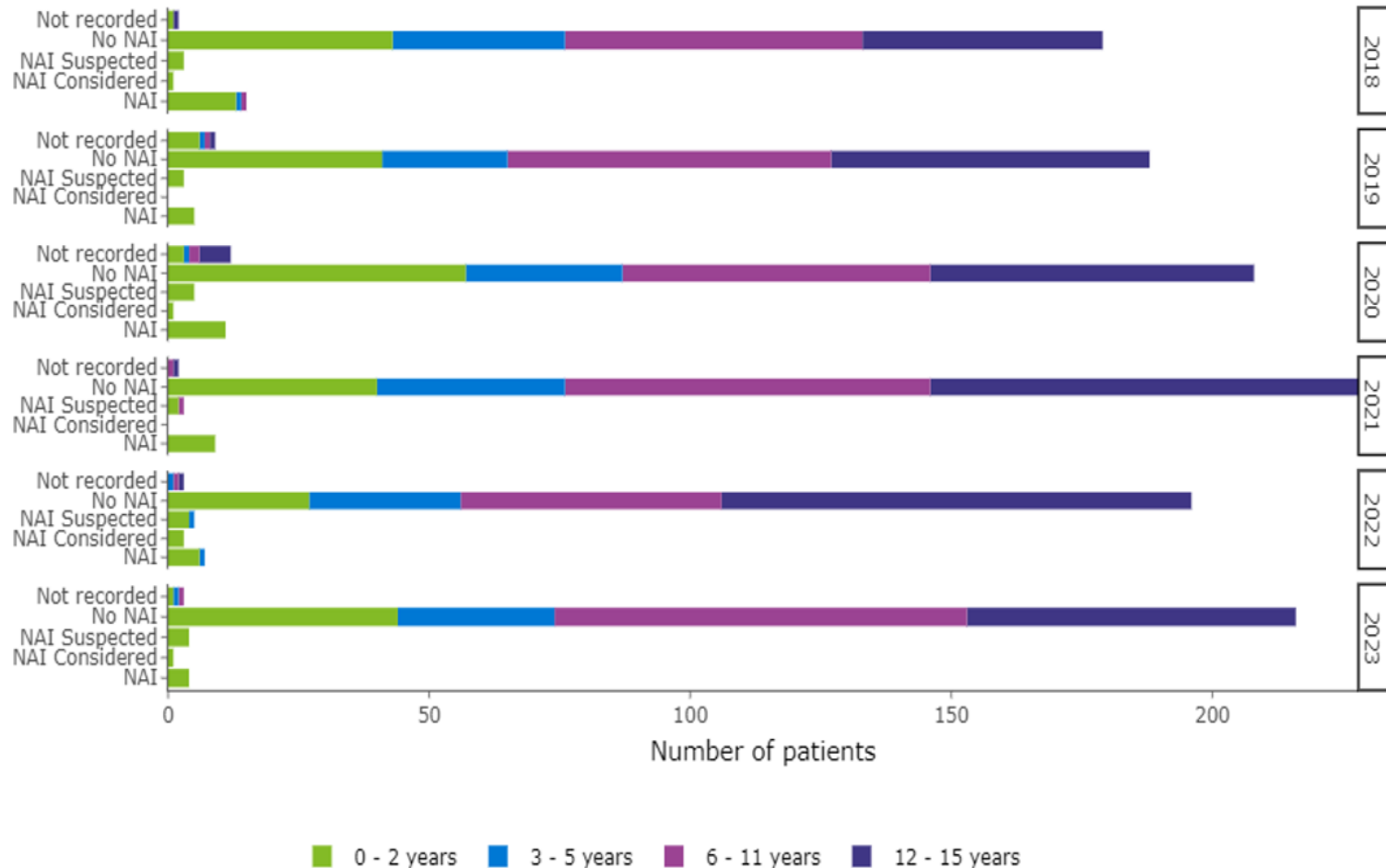


Figure 12.1: Number of patients where there was evidence of involvement of alcohol and/or drugs, by severity of injury (2018-2023)



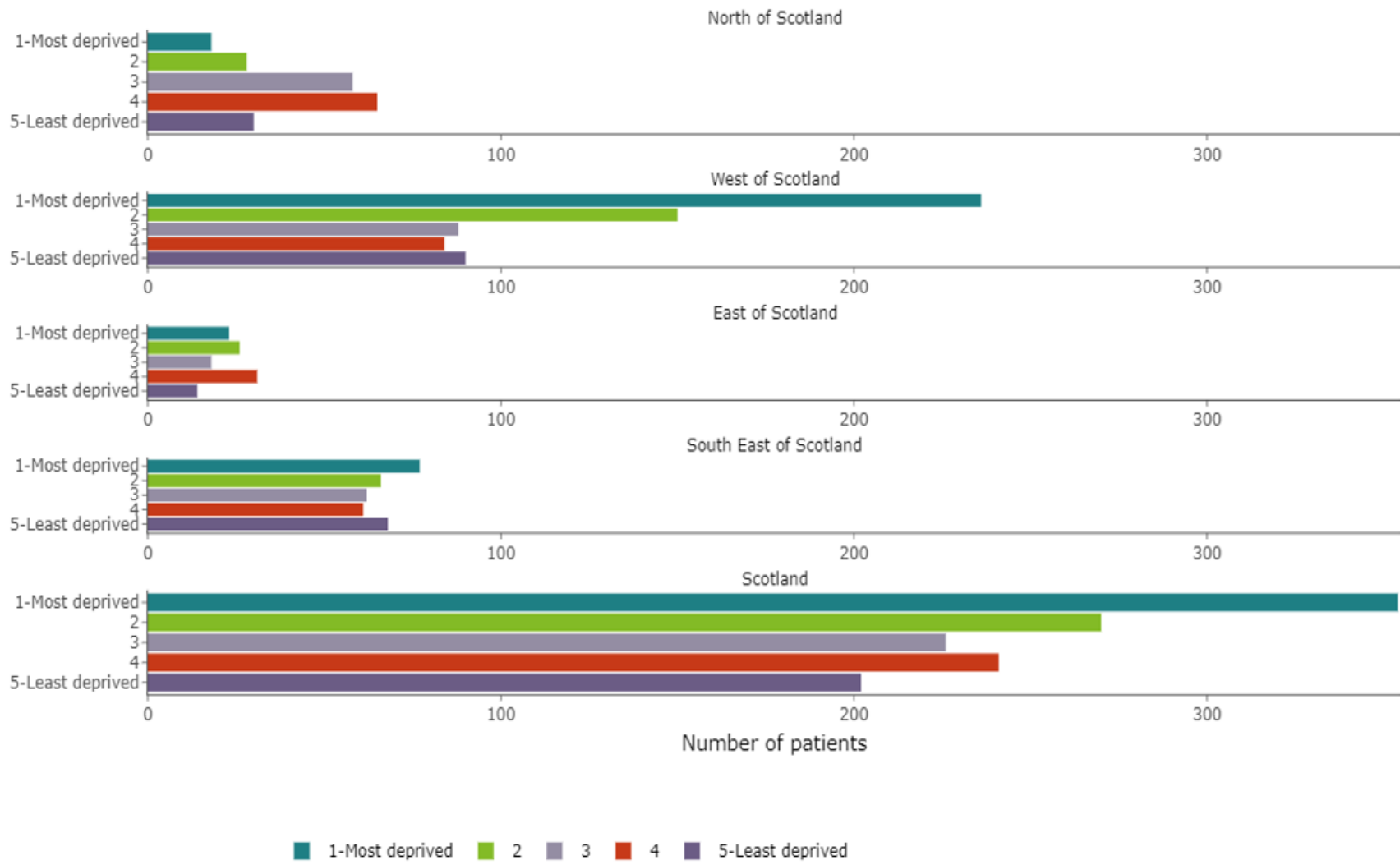
- Small numbers have evidence of alcohol (3.4%) or drug (1.1%) use
- Majority of drug and alcohol use was in the 12-15 age group
- Higher incidence of major trauma where alcohol (40%) and drugs (25%) are involved
- **Collaboration with public health strategies on alcohol and drug use**

Figure 13.2: Number of patients by NAI category, age and year (2018-2023)



- Proven NAI rate of 3.8% across the 6 years
- 1/3 of which resulted in major trauma
- 94.1% of proven NAI cases in 0-2s
- NAI proven cause of injury in 14.2% of all under 2s
- **Further review of NAI data**

Figure 14.1 SIMD quintile, by network (2018-2023)



- Severe injury more frequent (48.3%) in more deprived areas SIMD 1 and 2
- NoS demonstrates least deprivation related injury profile- 23.1% SIMD 1 and 2
- WoS demonstrated most deprivation related injury profile- 59.6% SIMD 1 and 2
- **Warrants further review**

Outcomes

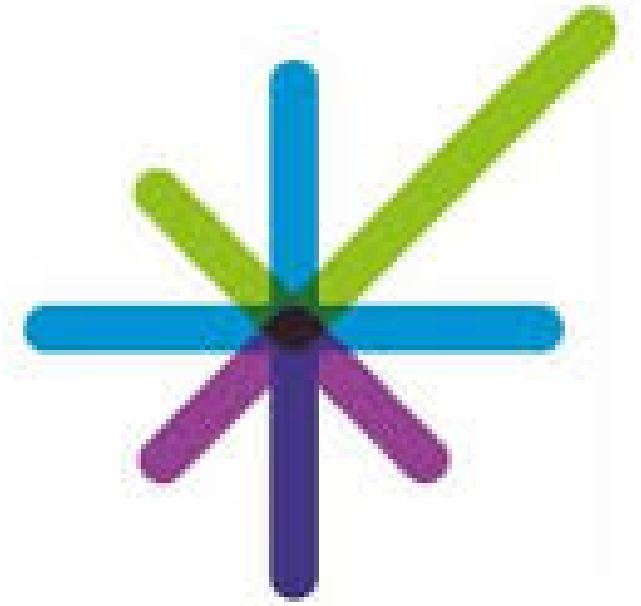
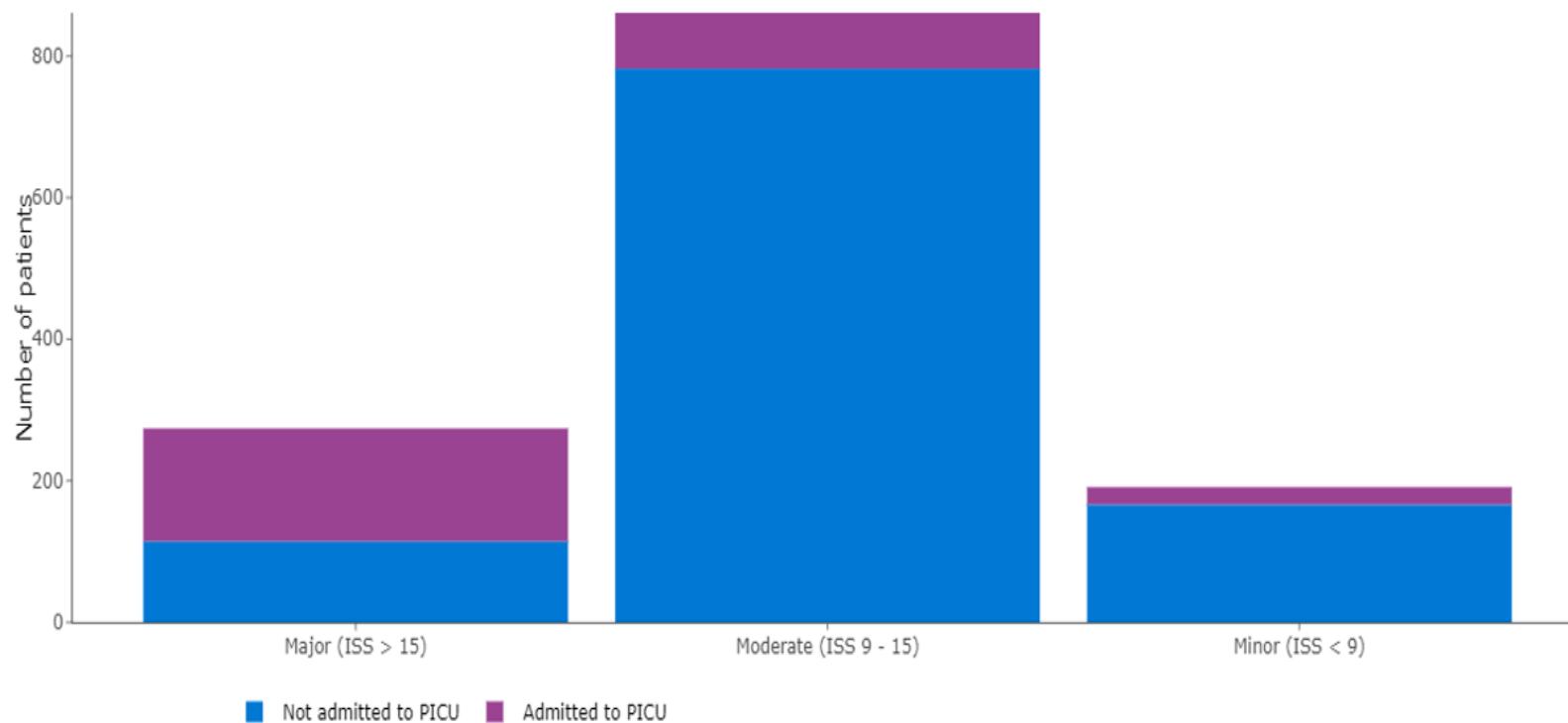
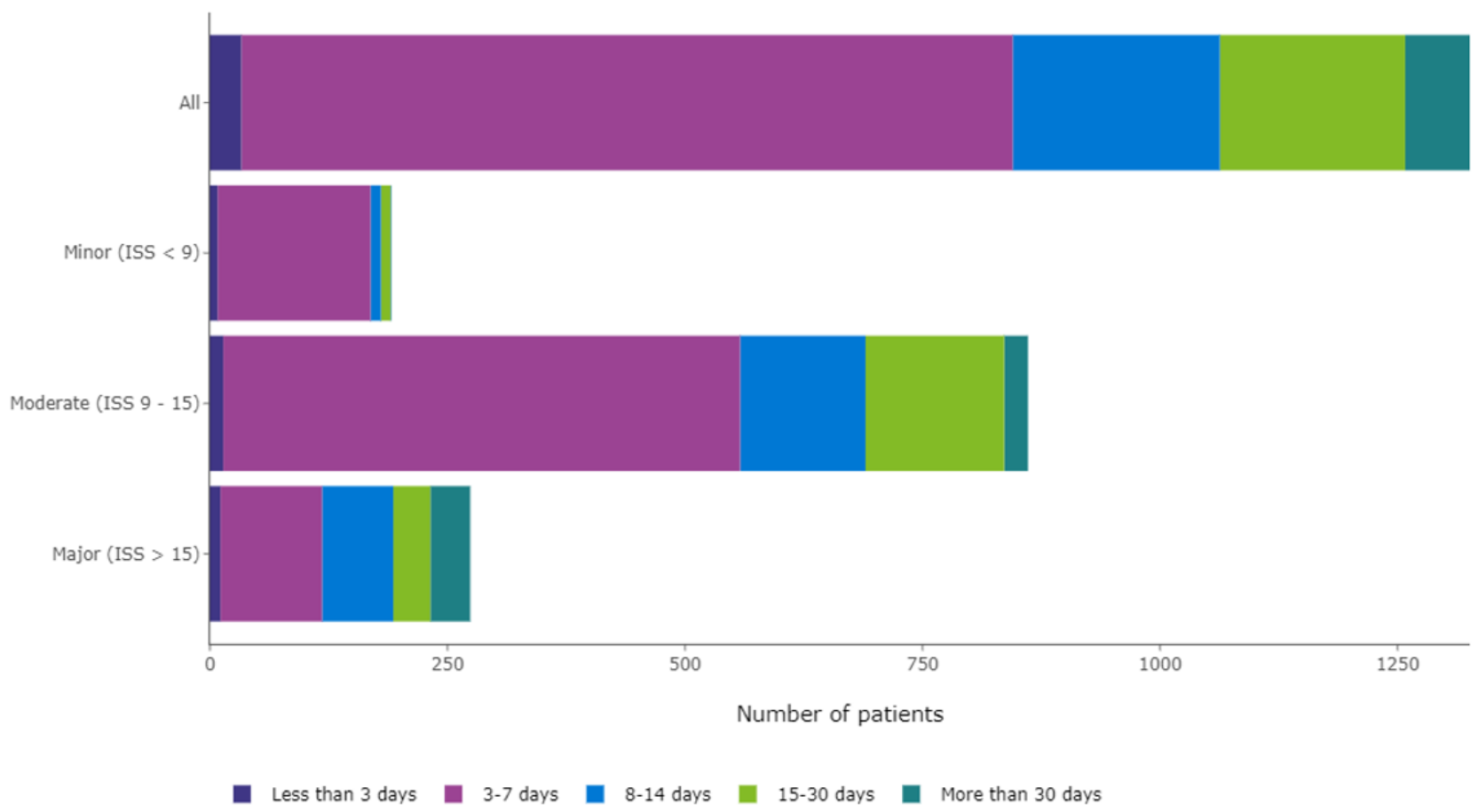


Figure 20.1: Number of patients admitted to a PICU, by severity of injury (2018-2023)



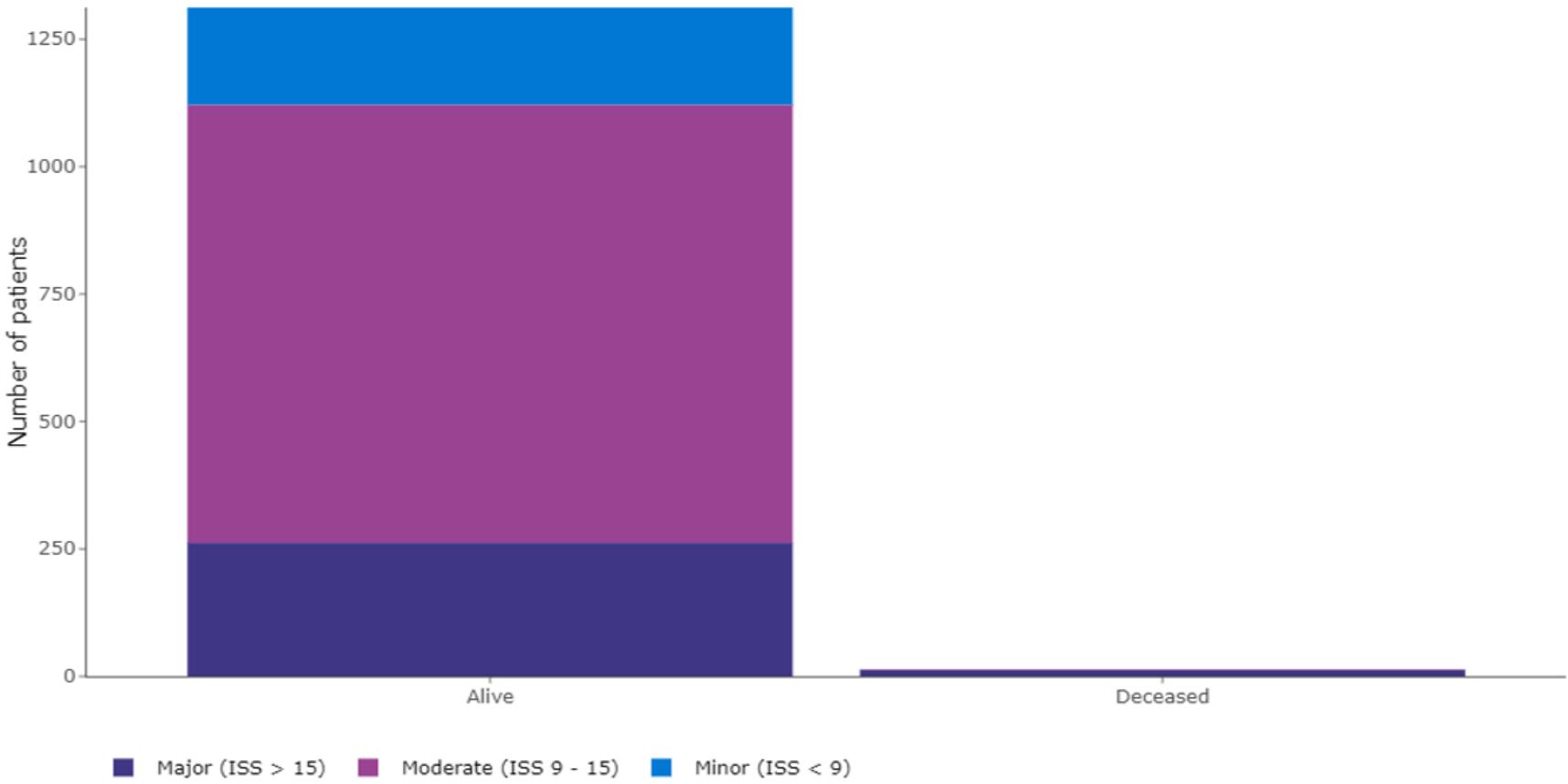
- 19.9% PICU admission rate
- 60.6% PICU admissions are for major trauma
- 57.6% PICU stay less than 3 days
- 88.9% of prolonged PICU stays >15 days were for major trauma

Figure 21.1: Length of stay (LOS), by severity of injury (2018-2023)



- 61.2% admitted to hospital for 3-7 days
- 5.1% admitted to hospital for >30 days
- 15.3% major trauma admitted for >30 days
- 89.9% discharged home

Figure 22.1: Patient outcome by severity of injury (2018-2023)



- 1% (n=14) mortality rate across the 6 years
- Further 4 deaths that could not be coded (rate to 1.3%)
- Major trauma mortality 14.4%
- 85.7% polytrauma with HI (AIS 2-5)
- STAG exclude deaths before hospital arrival, or asphyxiation only deaths e.g. choking, drowning, or hanging.

Additional Recommendations

- Continuation of STAG paediatric Audit
- Paediatric specific report in rolling programme of publications
- Robust PROMs data collection
- Advise accident prevention strategies
- Continued future close collaboration with other PHS workstreams and injury prevention charities.

Questions?

