

GSJ: Volume 7, Issue 9, September 2019, Online: ISSN 2320-9186 www.globalscientificjournal.com

# INJURY / ILLNESS SURVEILLANCE IN PAEDIATRIC EMERGENCY DEPARTMENT

#### Dr.Mazen Mahmoud MD

#### 1-Background

Injury Surveillance Systems involves the establishment of ongoing, systematic collection and analysis of data relevant to injury prevention and trauma management and have a critical role in the effective control of the injuries (1). Injury surveillance may be active or passive .<sup>2</sup> In active surveillance, injury cases are sought out and investigated such as cases of child abuse. In passive surveillance, relevant information is collected in the course of doing other routine tasks. Data for Injury surveillance may come from a variety of sources such as police, doctors, nurses or paramedics. (2)

Injury surveillance produces data that describe (2) :

- 1. The magnitude of a health problem (number of cases, mechanisms and characteristics of injuries)
- 2. Population at risk
- 3. Risk factors
- 4. Trends

The information generated from Injury Surveillance Systems can be used by health planners to create and implement injury prevention interventions, and also in assessing their effectiveness. High-quality data from Injury Surveillance Systems is essential to understanding the cause and set about preventing injury .(3)

The emergency department is recognized as a significant source of data for injury surveillance. ED attendees have their presenting complaint and demographic data routinely recorded, this allows ED data to be utilized to identify at-risk groups for particular injuries and thus facilitate the implementation of prevention strategies. The WHO promotes the sharing and use of emergency (ED) data as a major component in the public health approach to preventing injuries. (2,4)

Injury characteristics trends and mechanisms have been shown to vary greatly between communities, consequently, specific local information is needed to characterize local problems in order to implement injury control measures. Local injury surveillance systems have been identified as essential for the creation and assessment of injury prevention strategies. (3)

www.globalscientificjournal.com

The Council of Europe in 2007 advised member states to establish national injury surveillance and reporting systems to monitor injury trends and assess the impact of injury prevention initiatives. In 2011 the EU funded a 3-year Joint Action on Monitoring Injuries in Europe (JAMIE) project. Its aim was to have a common hospital-based surveillance system for injury prevention in operation in all EU member states by 2015. (5) JAMIE consisted of two ED-based datasets, which captured the aetiology and mechanism of injuries in participating hospitals. Unfortunately, most EU countries including the UK did not continue the JAMIE initiative when it ended in 2014. (6)

IN 2008 The Royal Society for the Prevention of Accidents published a report on the feasibility of establishing a UK-wide injury database. (7) The results of this study led to the initiation of parallel projects to collect injury data on all children (under age 16) attending the emergency department of 3 large UK Hospitals. The pilot projects showed that collecting routine enhanced injury data is feasible with minimal burden on clinicians. (8)

In October 2017 the NHS rolled out the Emergency Care Data Set (ECDS) a new UK data set for urgent and emergency care. The ECDS is designed to bridge the shortfall in ED data due to the rapid and sustained increase in the volume, scope and complexity of emergency care in the UK. The key components of ECDS data are, reason for attendance, chief complaint, acuity and diagnosis. The projected benefits of the ECDS are enhanced communication with GPs, patients and commissioners, a better understanding of vulnerable patients, to aid workforce training and revalidation, improved healthcare analysis, research and audit along with guiding public health initiative such as those to prevent injury .(35)

# 2-The role of the Paediatric Emergency Department in injury surveillance

In the UK, the type 1 paediatric emergency department (PED) is arguably the default presentation location for paediatric injury, and for the majority of minor trauma that can be safely discharged home, it will be the only point of contact for a given presentation. Paediatric emergency departments present a unique opportunity to "strike whilst the iron is hot", and interact with both patients and their families around the time of injury.

Unfortunately, the PED is frequently a place of limited resources and high time pressure, and the value of surveillance activities must be carefully weighed against any impact on patient care. Where specific questions arise, perhaps out of local changes to service provision or through a change in local activity

patterns – such as the opening of a new trampoline park – specific targeted data collection can be used to evaluate the impact on local health. However, such targeted surveillance is likely to require additional time and resourcing where it does not form part of routine clinical practice, and a case for this work will need to be made.

In keeping with the ethos of prioritisation based on clinical need, most routine injury surveillance programmes focus on those who are most severely injured. In the UK, the Trauma Audit Research Network, TARN (7a), records data on all patients presenting to emergency departments with an injury severity score >15, denoting major trauma, and publishes routinely on trends in injuries. It specifically publishes annual updates on paediatric trauma. However, resources for performing TARN data capture are funded through the funding of major trauma networks.

There is good evidence that passive surveillance can be delivered with minimal impact to clinical services (8), where the data collected forms part of normal clinical practice and would form part of normal clinical documentation. This passive surveillance is essential both for recognising the need for targeted surveillance, and for building a business case to resource this activity.

Historically in the UK, under the Accident & Emergency Commissioning Data Set in the UK (CDS type 010), and its antecedents dating back to the 1970s, only 5% of emergency department patients had a meaningful reason for attendance recorded, and following completion of evaluation in the department, 74% of patients had vague symptomatic descriptions or invalid diagnoses that do not match to a recognised SNOMED diagnosis.(8a) Under these systems, emergency departments often found themselves under remunerated for the work they did for patients.

Tying routine data collection to funding and remuneration for departments provides an intrinsic incentive to departments to optimise their passive surveillance, and improves communication with primary care. In England, the Emergency Care Data Set (ECDS) was introduced in type 1 departments in October 2017, and Type 3 departments in October 2018. This follows on from an evaluation by the Health Select Committee in 2013 that reported "The system cannot accurately analyse the cause of the problem, still less resolve it, if it continues to 'fly blind'. More accurate information about the causes of rising service pressures is not simply a management convenience; it is fundamental to the delivery of high quality care." The ECDS is designed specifically to improve communication with GPs and patients, communication with service commissioners, understanding vulnerable patients, healthcare analysis, research and audit, and public health. Injuries are only a part of this data set, but contribute a significant proportion of presentations.

Active surveillance within the PED is possible without significant time penalty where it is applied specifically to appropriate subsets of patients. National legislation on child protection in the UK, via The Children's Act 1989 and the Children Act 2004 (8c&8d), mandates safeguarding reporting for suspected cases of child abuse or non accidental injury amongst other presentations, and as such forms part of normal clinical practice. The PED does not, however, action safeguarding reports – its role is in the recognition of children at risk.

In systems with better developed minor injury unit networks (type 3 department's in UK parlance) or general practitioners offering extended services, patients may present elsewhere, with the result that presentations may be more widely geographically spread. Patient pathways that bypass the emergency department may lead to presentations direct to specialist care, such as GP referral to orthopaedics. Patients seen elsewhere in the healthcare system cannot be tracked by a PED based surveillance programme.

Paediatric emergency departments (PED) are limited in what they can capture. The ECDS, for example, does not collect data on certain patient populations from whom it is difficult to collection, including people who do not speak English; homeless people; people with mental illness; people with dementia; people who leave without being seen.

The analysis of data gathered within emergency departments may form part of good clinical practice as defined by the GMC, and is often part of a training requirement for doctors in training programmes. The Royal College of Emergency Medicine produces a series of annual audits, which form part of the governance of emergency care in the UK and their completion is therefore remunerated by commissioning bodies. However, much routine surveillance may be of limited value to a given department, and can require a great deal of time. Centralised data analysis, made possible by a high quality, consistent data set, allows for wider scale tracking of public health trends – and can be outsourced by departments to public health or injury prevention bodies such as the Royal Society for the Prevention of Accidents without impacting on departmental capacity.

In summary, the role of the Paediatric Emergency Department in injury surveillance can be summarised in three points:

- Surveillance should be embedded as part of good clinical practice in terms of clear, consistent documentation to an agreed external standard, such as the ECDS
- 2. Surveillance should be linked to departmental remuneration to maximise participation
- 3. Local analysis of high risk areas should be undertaken as directed by external, national level comparative audits, and should be undertaken discretionarily where problems are identified by routine surveillance, or where deficiencies in performance are identified by peer comparison.

#### 3-Injury Surveillance: who is involved, when, and how?

Injury surveillance is a coordinated program involving many elements including health care practitioners, non-medical hospital staff, government officials (department of public health, national health department, and social welfare), nongovernmental agencies (insurance companies, educational institutions or legal institutions agencies) and international agencies . (2,9,10)

Depending on the necessity and available resources, surveillance is classified into two types (2):

- Active surveillance involving an active investigation of injury cases. This kind of surveillance required more resources and fund.
- Passive surveillance involving a data collection within routine PED task.

In PED, doctors, nurses, paramedics, and registration staff act as on-site investigators and are mostly involved in passive surveillance system by filling out various legal, administrative as well as medical forms. The information collected from those forms is useful for surveillance system .(2,11)

Possible data sources in PED (11,12):

- Emergency department logs
- Trauma register
- Treatment records
- Physician-administered questionnaire
- Emergency medical service run sheets
- Billing records,
- Administrative records

PED doctors, nurses, paramedics, and registration staff could be involved in the data collection process, especially in collecting the core data set such as (2) :

- 1. Demographic: identification, age, sex, or as additional data ethnicity
- 2. Intent (unintentional or resulted from violence or intentional injury);
- 3. Place, date and time where the injury occurred
- 4. Activity or event being undertaken when the injury happened
- 5. Mechanism or cause of injury
- 6. Nature of the injury

PED Physicians could add optional data for the core data set by adding a summary of the injury or detailed information on the severity of the injury.

#### Resources :

- Trained personnel with sufficient expertise to complete forms, extract and process the data as well as produce reports; equipment and supplies (e.g. computers, electricity supplies to run computers, data processing software, handwritten forms, ).
- Suitable private areas; trained personal and suitable comfortable area to perform interview especially agitated parents or victims of violence or sexual assault.

#### Data collection:

In PED, filling out and completing the surveillance form during triage, registration, and injury treatment is the primary duty of the emergency physicians or the triaging officer. However, if physicians unavailable to filling out the form, nurses, paramedics, and registration clerk could complete the form and physicians could review the completed form. The surveillance form could be a handwritten or computerized data. (2,10)

Another possibility to obtain surveillance data is by asking the patients to complete the surveillance form on their own. However, this is not appropriate due to the lack of understanding of the mechanism of injury.

The use of standard classification and codes in data collection simplified the data processing and ensured that data collected can be compared and collated with other data collection to provide better and accurate injury surveillance in regional, national and international level.

The currently accepted classifications and codes are (2) :

- International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)
- International Classification of the External Causes of Injury (ICECI).

To ensure the optimal data collection and processing, whoever fills out the surveillance forms, extracting data and processing them, either PED physicians, PED nursing staff, paramedics or registration clerk should be provided with adequate background information and specific training for surveillance and injury coding .(2,12,13)

If the form has not been pre-coded, member of PED staff should be specifically assigned to extract and code data from the completed surveillance forms to simplifies data processing.

#### Data processing (2):

- Electronic data processing: this way of data processing if preferable in PED where the staff have computer knowledge and already use computers for other tasks, such as the registration of patients and administrative reports. The availability of various data processing software simplifies the tasks
- Manual data processing: a simple, cheaper way of data processing by using a simple method such as card-based system, however this method is time consuming.

# 4-issues related to Injury/illness surveillance systems

# Issues in selecting data sources: (2,14)

- Every organization usually collect data on injuries using their own definitions and categories.
- Quality of that data might be unreliable in many organizations data collection methods capture some, but not necessarily all, injury cases.
- Data might be processed manually and collected as hard-copy records, therefore, access to such records is usually not easy because of restrictive rules and failure to recognize how useful data can be for surveillance.
- Lack of enough suitable computers may lead to difficulties in accessing, analysing and distributing data.'
- Sometimes the available data are not representative, which not necessarily reflect the condition in the entire population (peoples who live in good cities have better access to treatment centres than the others in rural places.)

In general, there are three major issues in considering alternative sources of surveillance data:

- 1. Costs of data sources,
- 2. Sustainability of data sources,
- 3. Whether the system meets its targets.

#### Issues in evaluating and Assess available resources: (15,16)

- Sources of data usually have a different group of advantages and disadvantages, some sources may give relatively complete and reliable information than that from the other sources.
- Differences in definitions and categories of data might exist between data sources and there may be needed for necessary changes in the system to produce exactly what we need in surveillance
- Some sources of data have records that more representative of the injured patients than others.
- Some sources restrict access to patient's data, depending on whether or not there are legal, jurisdictional or ownership issues.
- Some sources may have issues in recording, storing and retrieving information attached to some data of injury cases.
- Lack of appropriate equipment and/or enough trained staff who handle any new tasks that may be required for surveillance?
- Lack of funding to purchase appropriate equipment or employ additional staff or trainers.
- Absence of an appropriate environment for physicians, injured patients, and their families who are involved in the early stages of the surveillance, which must be a calm and comfortable environment and free of emotional distress that helps injured people and their families to provide appropriate information.

# 5-Legal, quality related, practical, analytic and ethical aspects of Injury surveillance.'

This section looks at:

- The legal basis of data handling in relation to injury surveillance
- Aspects of data collection which promote reliability, validity and completeness of data
- Practicalities of data collection
- Analysis of data
- Ethics of injury surveillance

119

These issues are explored through a case study of the **Scottish Trauma Audit Group** a National Audit project in Scotland however the same principles can be applied to injury surveillance co-ordinated through individual emergency departments or through regional groupings.

# Legal basis of data collection and management in the National Health Service

The current relevant legislation at a National/European level is the General data Protection Regulation (GDPR) which came into force in the European Union in May 2018.

A UK Data protection Bill (2018) mirroring the GDPR is currently passing through UK Parliament, and this will mean that a similar legal framework will apply in the UK after Brexit. (17)

A new legislative framework was required because of the advent of the internet, social media and the existence of 'big data'.

Personal data	Name, address, date of birth, computer IP address,				
	genetic data are examples of personal data.				
Drocossing	Storing analysing passing data on to others				
FIOCESSING	Storing, analysing, passing data on to others				
Pseudo anonymised	Identifiable data replaced with a code eg in health				
data	audit/research: this data still falls under GDPR. The				
	handling of this data depends on what safeguards are				
	in place to prevent relinking of data to the individual,				
	the environment in which it is held and the use to				
	which it is put. The more identifiable data is, the more				
	safeguards should be in place.				
Rights over personal	GDPR strengthens an individual's rights over data. This				
data	includes rights to information about how your data is				
	processed, and the right to erase, move and correct				
	data.				
Data controllers	Will be more accountable for what they do and how				
	they protect data. Responsibility, transparency and				
	fairness are important principles.				
Lawful bases for	1. Consent: this must be freely given, specific,				
processing personal	informed, unambiguous and affirmative (no tick				
data	boxes)				
	2. Public interest: processing done for societal				
	benefits, not for commercial or private gain				
	3. 'legitimate interests' eg when data is used in a way				
	that individuals might reasonably expect, that any				

#### Aspects of GDPR

	processing is necessary to achieve the aim, and that use is balanced against individual interests.
Special category data	Health data is included in 'special category' data, along with eg ethnic origin, sexuality, and is more tightly controlled. A lawful basis is required under two sections of the regulations (Article 6 and Article 9). Special provision is made for research and substantial public interest. The most likely condition for healthcare research will be that processing is 'necessary for scientific research in accordance with safeguards'

Table 1: Aspects of GDPR. (18)

Although the GDPR is complex, it is underpinned by seven principles which those acquiring and handling personal data eg for the purpose of quality improvement in healthcare, should be aware of. These are shown in Box 1 below.

C	Lawfulness, fairness and transparency Purpose limitation	J
	Data minimisation	
	Accuracy	
	Storage limitation	
	Integrity and confidentiality (security)	
	Accountability	

Box 1. Underlying principles of GDPR. (18)

Implications for healthcare research and quality improvement The requirements in GDPR mirrors current good practice in research so should not have a major impact on research. Patient data is also used in the NHS for planning health services and improving and evaluating many aspects of healthcare. Public attitudes to data sharing were affected by the care.data project which planned to extract GP data into a central database, in this project the option to opt out was not clear and the information given to patients not transparent. This project was halted in 2016. While the data sharing would have been useful for healthcare providers and planners safeguards around it were inadequate, and opportunities for patients, healthcare planners and providers were lost .(19)Dr Godlee pointed out in this letter that more robust arrangements, allowing appropriate and safe use of healthcare data were in place in Scotland allowing large scale collection of data to be done in an effective and acceptable way.

The Scottish Trauma Audit Group Case study below identifies some of the features of these relating to organisation, data protection and governance.

#### Case study

An example of i data collection about injury in the emergency department is the collection of trauma data in Scotland by the Scottish Trauma Audit group. This case study aims to illustrate legal issues around data collection and storage, practicalities of data collection, data analysis and ethics of injury surveillance.

#### Scottish Trauma Audit group.

#### Description

The Scottish trauma Audit Group (STAG) was set up in 1991 and reformed in 2011 as a result of a review of Trauma services by the Trauma subgroup of the National Planning Forum. STAG's activities have expanded in line with the development of Major Trauma Centres, and a major trauma network in Scotland, and 27/30 acute hospitals are now contributing data, with the emergency departments of these hospitals collecting initial data for central processing. (20)

#### How does STAG fit into the NHS Scotland structure?

STAG is a National Audit within the Scottish Healthcare Audit programme at the Information Services division (ISD), which is in turn part of the National Services Scotland (NSS). Other audits siting within ISD include Audit of Critical care in Scotland and the Scottish hip Fracture Audit.

#### Data protection within ISD

ISD comply with data protection in a number of ways.

Patient Information about data	An information booklet is available		
collection and processing	describing the way personal		
	information is used is available		

Registration	NSS is registered with the
Registration	NOO IS TEGISTETED WITH THE
	Information Commissioners office
	(ico.gov.uk)
Access	Health Service users can find out
	whether personal data is held using a
	subject access request
Data protection adviser	Responsible for monitoring and
	advising on data protection and the
	use of personal information
Caldicott Guardian for NSS	A leadership role in protecting the
	confidentiality of patient information

Table 2: Information governance at Information Services Division. (21)

STAG is overseen by the STAG steering Group which has multidisciplinary representation from most of the Scottish health-boards. Priorities and key performance indicators for STAG are determined by the Scottish Trauma network steering group. (20) The audit seeks to include data on every patient in Scotland who undergoes a significant injury, and its purpose is to improve the care of trauma patients in Scotland.

#### STAG Data collection in the ED

Clinicians prospectively collect relevant data in the course of caring for a trauma patient. Trained Local Audit Co-ordinators (LAC) employed for this purpose and with time to accomplish the task use locally suitable case ascertainment methods to identify these cases and retrospectively collect data from the whole patient journey. This is entered electronically using a bespoke networked platform which highlights missing data and data required as the patient passes through the system. Guidance on collection of data and handling of missing data is provided updated and compliance checked at the quality assurance (QA) stage.

#### Security and confidentiality of patient data in STAG

Governance measures regarding data protection in ISD are shown above. Practically patient data are assigned a STAG number which is then linked to the data stored. Only data relevant to treatment of trauma is stored and this is used only for the purpose of local or national healthcare improvement projects or in research. Personal information is never published, and access to identifiable data is time limited and limited to certain authorised staff. The data is shared with clinical teams, the Scottish Trauma Network and the Scottish Government, and the Scottish audit Group controls access to the data. A patient Information leaflet detailing the purpose of the audit and the use to which the data will be put is available. The option to opt out is clearly available. (22)

Measures to ensure quality of data are shown in Table 1 below.

Aspect	Meaning	STAG mechanism		
Accurate	Correct input of data and reflect situation exactly	Guidance/training/support/dedic ted time for Local Audit Co- ordinator Defined dataset Bespoke data collection platform Electronic data entry directly linked to details of inclusion criteria		
Available accessible	pata can be retrieved rapidly	collection/storage/retrieval		
Complete	No missing data	Guidance for LAC Paid for time taken data seeking and entering Does not rely on busy clinicians All patient groups included with multiple methods of case ascertainment eg ED computer system, ward and theatre intelligence, Aim for all acute hospitals to be included Link to Scottish Ambulance service and hospital data to check completeness. Collection of data throughout journey. Revision of data set as audit progresses- responsive to locality suggestions		
Relevant	Meets intended purpose of data	Clear KPIs developed by Scottish Trauma Network Steering Group and mapped to data collection points.		

Ensuring quality of data

		Development of patient reported		
		outcome measures assessed at		
		discharge C and 12 months		
D. I. I.I.				
Reliable	Data the same no	Quality Assurance (QA measures)		
	matter who	LAC guidance		
	collects the data.	Measures of inter-rater testing		
Timely	Data recorded	Clinicians record data in notes		
	contemporaneou	prospectively but LAC populate e-		
	sly with patient	STAG retrospectively		
	care and results	LACs prompted by 'traffic light		
	available in time	system' to seek and enter data in		
	to make decisions	a timely way		
	about patient	Monthly validation by LACs		
	care	Report published annually		
Validity	Data represents	QA processes locally		
	exactly what they	Central validation (computer		
	are intended to	based)		
	represent	QA visits to site with review of 10		
		randomly cases to validate		
((		LAC validation prior to publication		
Lack of Bias	No bias in	Clear criteria for inclusion		
	selection of cases	Robust case ascertainment		
		methods		
		Cross referencing with hospital		
		and Scottish ambulance service		
		Use of defined eligibility criteria		
		and systematic coding of data		
Purnose/develonme	Clear nurnose of	Trauma steering group defined		
nt of standards	audit io	key performance indicators and		
	confirming	nurness of audit		
	current good			
	improving			
	practice,			
Data analysis and	Enables clinical	Annual report with hospitals		
presentation	staff to see if	numbered and data presented in		
	patient care is	funnel plots. Hospitals with KPI		
	consistent with	outside two standard deviations		
	audit standards			

	are supported to explore data and

target improvements.

Table 1: Aspects of data quality in clinical audit mapped to processes in STAG. (23)

#### Practicalities of data collection

Early injury surveillance efforts identified inconsistent and incomplete data entry when this relied on busy clinicians with varying available time and commitment to the projects. (24) Problems associated with ease of use of paper data collection forms were also identified. (25) For children some injury surveillance systems include data entered by parents and carers,(26) however this may also produce inconsistent data, particularly where non-accidental injury is concerned. (27) The net result of these practical problems was collection of incomplete unreliable data on which action could not confidently be taken.

The practicalities of data collection in the STAG example are shown above. Important features which address practical challenges in data collection include:

- Bespoke electronic systems for ease of data input storage and analysis
- Paid local audit co-ordinators
- Robust quality assurance extending from the national audit group to local audit co-ordinators
- Clear oversight with development of evidence based key performance indicators and patient reported outcome measure with linked data collection points
- Focus on major trauma leading to inclusion of relatively small numbers small numbers

#### Analysis of data

The starting point for useful analysis of data is collection of complete, timely, valid and reliable data as described above.

Electronic processing systems can be set up to produce reports which can reflect the data of individual EDs and compare it against national regional and other individual ED data. Before data is collected, the way it will be analysed for basic reports should be determined. The database can also be queried to provide higher level reports which may synthesise information for a particular purpose. (2)

Electronic data processing systems will allow exploration of the epidemiology of injury and its relationship to age, sex and mechanism of injury. Outcomes such as death and functional ability can be explored through mortality data and patient reported outcome measures respectively. The latter is particularly important in children for whom trauma can have long lasting effect on development and function, and where intervention to prevent trauma, or to manage it effectively is particularly important. (27)

Data should be analysed in a timely way and disseminated to all stakeholders. Regular feedback of analysed data to staff will promote compliance with the audit and encourage adherence to key performance indicators. In the case of STAG, data is also available to legislators (the Scottish Government) and health planners (Scottish Government Health Department) as well as to local audit coordinators and senior clinical staff. This is so effective action can follow. For example, if hospital performance in KPIs is out with 2 standard deviations of the national average then the hospital can be supported to explore and improve this. In addition, Scottish data allows calibration of probability of survival from trauma using Scottish data, against which local performance can be judged more accurately. (20) Finally, successful injury prevention activities rely on legislation as well as patient/carer behavioural change, (28) so direct linkage to the legislature is crucial. (29).

#### Presentation of data

This can be in the form of dashboards. An example is shown below from STAG which relates injury severity to mechanism of injury in Scottish children experiencing trauma.

Figure 17: Paed	diatric mechanism of	injury by severity	of trauma (2017)			
	Major (ISS > 15)		Moderate (ISS 9 - 15)		Minor (ISS < 9)	
	N	%	N	%	N	%
Fall < 2m	5	17.2%	27	35.5%	1	5.3%
Fall > 2m	5	17.2%	7	9.2%	3	15.8%
MVA	7	24.1%	16	21.1%	7	36.8%
Other	11	37.9%	9	11.8%	4	21.1%
Sport	1	3.4%	17	22.4%	4	21.1%

N = number of patients

Note: Other includes assaults, uncertain and not recorded

Fig 1. From STAG annual report: injury severity and mechanism of injury in paediatric trauma (MVA= Motor vehicle accident)

The dashboards are presented in a similar way each year allowing comparison across the years as well as across the nation.

Data can also be presented in a visual way allowing better understanding of trauma among clinicians. The example below shows information from a single large US ED injury surveillance project about the relationship between age and mechanism of injury. The method of presentation clearly enhances understanding and may allow more effective action to prevent injury and enhance its effective management.



Figure 2. Mechanism of injury versus age and number of cases. (25)

#### Ethics of injury surveillance

Ethical concerns about injury surveillance include:

- Management of sensitive personal data
- Confidentiality
- Potential loss of trust in the clinician /patient relationship
- Competing priorities of data collection and clinical management

The principles of management of data within the legal framework of GDPR is discussed above.

Breaches of confidentiality are most likely when detailed clinical information is linked to patient identifiers such as date of birth, address, or date of injury. Approaches to preventing data breaches include anonymising data by assigning a study number to a dataset and removing patient identifiers, limiting access to identifier linked data to the smallest possible number of investigators, and storing data within password protected encrypted files. Keeping datasets to the minimum required for effective audit and storing information for the shortest possible periods will also reduce the opportunity for breaches of confidentiality.

The paediatric emergency department is a safe haven for injured patients where care can be given freely within the constraints of child protection. Concerns about trust are most likely among vulnerable patients such as refugees, ethnic minorities and those with mental health problems. (30) Jeopardising trust through intrusive data collection may discourage presentation of children with injuries to the ED and potentially to worse outcomes.

Safeguards against loss of trust include: Careful data handling and anonymising of data (above), patient information about how the information will be used, the option to opt out, and collection of the minimum amount of information consistent with the stated aims of the injury surveillance project. Clinicians understand that patients and their families present for care, not for data collection purposes, and that questions asked should not obstruct or dilute the care required. Where collection does not depend on frontline clinicians, but on paid audit co-ordinators, such difficulties will be less common.

#### <u>Summary</u>

Collection and processing data for paediatric injury surveillance in the ED requires close attention to practical issues: who will collect the data, and how, for example on paper or electronically? Ensuring the quality of data collected, matching it carefully to the purpose of the audit, and presenting the data in a way which is useful for clinicians, health planners and legislature are all essential facets of injury surveillance in the emergency department. Finally, the principles and legal requirements of data protection must be followed. Evaluation frameworks are available for injury surveillance systems and should be consulted. (31) The case study describes a National Injury surveillance programme, focussing on severe injury, however the principles of injury surveillance apply to any type of programme whether it be based in a local ED, regionally or nationally.

Investigators planning injury surveillance should also heed the words of former CDC Director William H. Foege: "The reason for collecting, analyzing, and disseminating information on a disease is to control that disease. Collection and analysis should not be allowed to consume resources if action does not follow. (32)

The planning of the injury surveillance activity should also have implicit within it planning for disease (or injury) reduction action to follow.

#### Position statement

The details of how injury surveillance is conducted are summarised above. Injury is a major cause of death and morbidity in children across the world. (33) In many injuries preventable causes can be identified. (28) As a result of this injury surveillance and injury reduction are seen as key public health activities. (34) The central role of the ED in injury management ensures its pivotal role in collection of injury surveillance data. Good practice in collecting complete valid and unbiased data should be followed as outlined above, whether data is being collected locally, regionally or nationally. Ethical and legal considerations around processing of data need to be integral to data collection. Analysis and timely presentation of data to clinicians, health planners and the legislature are essential to ensure that opportunities are taken to reduce injury or improve the management of injury. If this is not done, then injury surveillance will consume resources without producing benefit. (32)

#### **References :**

1-Vimpani G. Injury surveillance: a key to effective control of childhood injuries. Australian Paediatric Journal 1989;25:10–13.

2-Holder Y, Peden M, Krug E, et al. Injury Surveillance Guidelines. Geneva: World Health Organisation, 2001.

3-Graitcer PL. Development of state and local injury surveillance systems. Journal of Safety Research 1987;18:191–8.

4-Butchart A, Brown D, Khanh-huynh A, et al. Manual for estimating the economic costs of injuries due to interpersonal and self-directed violence. Geneva: World Health Organisation and Department of Health and Human Services, Centers for Disease Control and Prevention, 2008.

5-Council recommendation on the prevention of injury and the promotion of safety. 31 May 2007. www.eurosafe.eu.com/csi/eurosafe2006.nsf/wwwVwContent/l4councilrecommendation.htm

6-ANEC, BUEC, BUSINESSEUROPE, CEN, CENELEC, EuroCommerce, et al. The need for a pan-European accident & injury data system. 14 March 2013. www.anec.org/ attachments/Joint%20call%20for%20a%20pan-European%20accident%20&%20injury% 20data%20system.pdf.

7a- Trauma Audit Research Network, <a href="https://www.tarn.ac.uk/">https://www.tarn.ac.uk/</a>

7-Ward H, Healy G. Feasibility of establishing a UK wide injury database. 2008. www.rospa. com/homesafety/info/feasibility-study-final-report.pdf.

8-Slater W, Weld S, Harris S, Pfeiffer C, Maconochie I, Hughes T. Findings from a pilot to assess the feasibility of enhanced injury data collection in emergency departments. South West Public Health Scientific Conference, 5 February 2014.

8a-Royal College of Emergency Medicine Emergency Care Data Set update sheet, <a href="https://www.rcem.ac.uk/docs/Informatics/ECDS%20Flyer.pdf">https://www.rcem.ac.uk/docs/Informatics/ECDS%20Flyer.pdf</a>

8b-The Emergency Care Data Set, NHS England. <u>https://www.england.nhs.uk/ourwork/tsd/ec-data-set/</u>

8c-Children Act 1989, http://www.legislation.gov.uk/ukpga/1989/41/contents

8d-Children Act 2004, <u>http://www.legislation.gov.uk/ukpga/2004/31/contents</u> 9-Lakshmi, P. V. M., Tripathy, J. P., Tripathy, N., Singh, S., Bhatia, D., Jagnoor, J., & Kumar, R. (2016). A pilot study of a hospital-based injury surveillance system in a secondary level district hospital in India: lessons learnt and way ahead. Injury epidemiology, 3(1), 24.

10-Garrison, H. G., Runyan, C. W., Tintinalli, J. E., Barber, C. W., Bordley, W. C., Hargarten, S. W., ... & Weiss, H. B. (1994). Emergency department surveillance: an examination of issues and a proposal for a national strategy. Annals of emergency medicine, 24(5), 849-856.

11-Brenner, R. A., Scheidt, P. C., Rossi, M. W., Cheng, T. L., Overpeck, M. D., Boenning, D. A., ... & Boyle, K. E. (2002). Injury surveillance in the ED: Design, implementation, and analysis. The American journal of emergency medicine, 20(3), 181-187.

12-Williams, J. M., Furbee, P. M., Prescott, J. E., & Paulson, D. J. (1995). The emergency department log as a simple injury-surveillance tool. Annals of emergency medicine, 25(5), 686-691.

13-Ferguson, R. W., Shields, W., Cookson, M., & Gielen, A. C. (2013). Utilizing e-coded data for nonfatal injury surveillance in the pediatric emergency department setting: a literature review and recommendations. Pediatric emergency care, 29(7), 801-805.

14- CDC Surveillance Update. Atlanta, GA, Centers for Disease Control and Prevention, 1988.

15- Klauke DN, Buehler JW, Thacker SB et al. Guidelines for evaluating surveillance systems. Morbidity and Mortality Weekly Report, Series 5, 1988, 37:1–18.

16-Sethi D, Krug E. Guidelines for surveillance of injuries due to landmines and unexploded ordnance. Geneva, World Health Organization, 2001.

17-An introduction to the GDPR- and what it means for patient data. Welcome Trust, London. (March 2018, accessed June 2019) Available from: <u>https://understandingpatientdata.org.uk/news/gdpr-and-patient-data</u>

18-Guide to the General Data Protection Regulation. Information Commissioners Office. London. (Accessed June 2019) Available from: <u>https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/</u>

19-Godlee F. What can we salvage from care.data? BMJ. 2016;354.

20-Audit of trauma in Scotland. ISS, Edinburgh. (November 2018, Accessed June 2019) Available from: <u>https://www.stag.scot.nhs.uk/Publications/main.html</u>

21-NSS Data Protection Notice. NSS, Edinburgh. (Accessed June 2019) Available from: <a href="https://nhsnss.org/how-nss-works/data-protection/">https://nhsnss.org/how-nss-works/data-protection/</a>

22-STAG patient Information Leaflet. Scottish Trauma Audit group. (Accessed June 2019) Available from: <u>https://www.stag.scot.nhs.uk/docs/2018/STAG-patient-information-leaflet-web-180815.pdf</u>)

23-Guide to Ensuring Data Quality in Clinical Audits. HQIP, London. (November 2011, Accessed June 2019) Available from

https://www.hqip.org.uk/wp-content/uploads/2018/02/hqip-guide-to-ensuring-data-quality-inclinical-audits.pdf

24-Adirim TA, Wright JL, Lee E, Lomax TA, Chamberlain JM. Injury surveillance in a pediatric emergency department. American Journal of Emergency Medicine. 1999;17(6):499-503.

25-Beattie TF. An accident and emergency based child accident surveillance system: is it possible? Journal of Accident & Emergency Medicine. 1996;13(2):116

26-Mackenzie SG, Pless IB. CHIRPP: Canada's principal injury surveillance program. Injury Prevention. 1999;5(3):208

27-Boenning DA. Initiating a surveillance system for childhood injuries. American Journal of Emergency Medicine. 1988;6(4):375-7.

28-Toblin R, Brenner R, Taneja G, Rossi M, Collins M, Mickalide A, et al. Preventing Young Children's Injuries: Analysis of Data from a Population-Based Surveillance. Maternal and Child Health Journal. 2011;15(Supplement 1):35-41

29-Current practice and innovative approaches to prevent childhood unintentional injuries: An overview and synthesis of international comparative analyses and surveys of injury prevention policies, legislation and other activities. National Institute for health and care excellence (October 2010, Accessed June 2019) Available from:

https://www.nice.org.uk/guidance/ph29/evidence/review-1-international-comparative-analyses-ofinjury-prevention-policies-legislation-and-other-activities-pdf-428680477

30-Health Equity, Trust and Data Collection in the Emergency Department. Access and Equity in the ED: who speaks for the most vulnerable? In: Emergency Medical Cases. (August 2015, accessed June 2019) Available from: <a href="https://emergencymedicinecases.com/health-equity-trust-data-collection-emergency-department/">https://emergencymedicinecases.com/health-equity-trust-data-collection-emergency-department/</a>

31-Williamson Ann M, Mitchell Rebecca J, O'Connor R. The development of an evaluation framework for injury surveillance systems. BMC Public Health. 2009;9(1):260.

32-Horan JM, Mallonee S. Injury Surveillance. Epidemiologic Reviews. 2003;25(1):24-42.

33-World report on Child Injury prevention. WHO, Geneva. (2008, accessed June 2019) Available from:

https://apps.who.int/iris/bitstream/handle/10665/43851/9789241563574\_eng.pdf;jsessionid=3752 7223B1C61D2B20B4C162516395AD?sequence=1

34-Sleet DA. The Global Challenge of Child Injury Prevention. International journal of environmental research and public health. 2018;15(9).

35-(https://www.rcem.ac.uk/docs/Informatics/ECDS%20Flyer.pdf)