

Putting triage theory into practice at
the scene of multiple casualty
vehicular accidents:

THE REALITY OF MULTIPLE CASUALTY TRIAGE



UNIVERSITY OF CANBERRA
NEW INTELLIGENCE



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ABSTRACT

KEYWORDS

Triage, Multiple Casualty, Trauma, Ambulance

OBJECTIVES

This research project investigated the experiences of ambulance paramedics in undertaking pre-hospital multiple casualty triage at the scene of a motor vehicle accident. Key objectives included the investigation of the application of principles and procedures of multi casualty triage systems, the use of situational cues and other contextual factors influencing triage practice. This led to the development of recommendations for the future education of practitioners in the process of multiple casualty triage.

METHOD

A triangulated approach was used to underpin data collection and analysis incorporating demographic data, focus groups and in-depth interviews. Two focus groups, one in each participating jurisdiction, canvassed the issues and concerns of participants in applying multiple casualty triage principles to motor vehicle accident situations. Additionally, focus groups assisted in establishing the interview schedule for the in-depth interviews. The final stage of the research involved in-depth interviews with five participants, who participated in the focus group discussion, to consider their experiences in a detailed way. A thematic analysis of interviews was undertaken following the well-established research practices of human science research.

FINDINGS AND CONCLUSIONS

The research describes an extended and broadened interpretation of the triage process returning to a more authentic definition of triage; as the process of sorting of casualties to determine priority. The findings from this research highlight the need to consider triage as an extended and complex process. Practitioners incorporate evidence-based physiological cues to assist decision-making and the management of the process of triage from call out to conclusion including assessment of contextual and situational variables.

Multiple casualty triage is a process designed to prioritise casualty care at the scene of an incident to ensure care is available to those who need it most urgently and that the greatest number of casualties survive. Pre-hospital ambulance paramedics need to effectively assess each injured person and establish priorities of care and evacuation from the scene. This is an exceptionally difficult task that needs to be completed in a timely manner to improve the chances of survival or at least to minimise the extent of injury and subsequent rehabilitation for the casualties. Triage remains a process that requires expert judgement in a complex and time critical situation to maximise casualty outcomes. Ambulance paramedics are guided in their triage decisions by long-held established protocols.

This project provides an analysis of the practice of multiple casualty triage by ambulance paramedics in the context of motor vehicle accidents. The efficacy of current triage practice, including the adoption of a triage sieve and triage sort process for prioritising casualty care and transport in the pre-hospital situation, has not been adequately investigated. Previous research has focused on validating the physiological or diagnostic underpinning of triage scales (Garner, et al., 2001) or has considered the comparative performance of health professionals in using such scales (Kilner, 2002). There has been no previous work that provides an analysis of the experience of ambulance paramedics in performing triage in real situations and

existing literature is limited to anecdotal accounts of single events.

There is limited evidence concerning the application of current theoretical models to clinical decision-making in real world triage practice.

This research focuses on the experience of applying triage in multiple casualty situations in the real world. It addresses the complex nature of multiple casualty triage and considers the context and situation of decision-making that may affect triage. These aspects do not form part of current triage models, which are based on the use of discrete physiological parameters to assess the acuity of the casualty.

LITERATURE REVIEW

Triage systems have been used for two centuries to categorise and prioritise casualties. In its earliest form, triage sorted the injured into two groups, nobles first and the commoners last, with disregard for the severity of injury. This changed when the French triaged during wartime to assess which injured soldiers were able to return to the battlefield quickest. Triage later developed into an assessment of casualty priority according to their presenting injuries and condition.

DEFINITIONS

For this project triage is defined as the process of sorting casualties and setting priorities for treatment in urgent care situations. This relatively broad definition has its roots in the original meaning of triage, to sort, and invites consideration of an extended and complex process. Triage

tools utilise physiological cues to assist decision-making in determining casualty priority.

The triage process described by Nocera and Garner (2000) “attempts to achieve the greatest good for the greatest number of people” (p 41).

Although definitions for ‘disaster’ exist within the literature, there is no specific definition for what is commonly referred to as a ‘multiple casualty incident’ or ‘mass casualty incident’ (Nocera & Garner, 2000). A suitable quasi-medical definition for a multiple or mass casualty incident is offered as being an influx of casualties in a relatively short period of time that overwhelms current resources (Teese, 1998).

The term used to describe ambulance paramedics and their level of education and training varies throughout the world. Unlike other areas of health care, such as medicine or nursing, there is no international standard or definition to describe the role and responsibility of a ‘paramedic’, ‘ambulance officer’ or ‘Emergency Medical Technician’. This makes identification of like roles, in the pre-hospital care environment complex. For the purpose of this project the term ambulance paramedic has been utilised in its most generic sense to describe pre hospital care practitioners participating in the project regardless of level, clinical title or seniority.

CLINICAL DECISION MAKING

The first ambulance personnel on the scene of an incident make the triage decisions (Kilner, 2002). It has been concluded that this process involves more than simple clinical assessment: the triage person utilises

involves more than simple clinical assessment; the triage person utilises complex cognitive and decision-making processes (Fry & Burr, 2001). Factors such as context, situation, risk, uncertainty and stress, are variables that directly affect the ability, not only to study clinicians' decision-making processes, but also the development of a clinical decision (Shaban, 2005). Ambulance paramedics base their decisions on 'knowing' the best steps and Wyatt (2003) states they are usually not conscious of the steps they take through a decision-making process. This 'knowing' comes from an integration of theory, experience, education, practice, skills and knowledge.

Triaging is often undertaken in a stressful (Sanner, 1983), emotional environment (Fry & Burr, 2001) resulting in a rapid and superficial examination within a few seconds (Hirshberg, et al., 2001). In some circumstances this may result in inaccurate triaging. While the novice will rely on formula and procedure to reach a conclusion, the expert will use a range of cognitive skills to process information. To assist with the clinical decision-making process, an expert practitioner uses an element of flexibility and openness combined with knowledge, experience and an ability to consider multiple approaches to a single clinical presentation (Arbon, 2004; Wyatt, 2003).

Several clinical indicators have traditionally been considered useful in providing data to assist triage decision-making. The ambulance paramedic's assessment of systolic blood pressure is an important cue

for assessment of potential mortality (Garner, et al., 2001; Emerman, et al., 1991; Newgard, et al., 2002; Simmons, et al., 1995). Pulse and respiration are common measures used to identify physiologic changes, however, it has been found that significant changes in the patient's condition are not always reflected in changes to patient vital signs (Zeitz, 2003).

Similarly, it is suggested that the Glasgow Coma Scale is an effective and informative triage tool (Emerman, et al., 1991; Hirshberg, et al., 2001; Norwood, et al., 2002; Simmons, et al., 1995). Various authors suggest that aspects of the Glasgow Coma Scale are important when determining critical injury, such as ability to open eyes (Newgard, et al., 2002) and the ability to walk or motor response (Garner, et al., 2001). The anatomical site of injury has also been put forward as a triage indicator along with other assessment data (Emerman, et al., 1991; Newgard, et al., 2002). For example Emerman, et al. (1991) report injury to the head and thoracic regions is associated with a high mortality rate.

Mechanism of injury is another factor that influences triage decision-making (Huei-Ming, et al., 1999; Newgard, et al., 2002; Scheetz, 2003), where mechanisms such as, the non use of restraints and vehicle rollover, are rated high risk (Newgard, et al., 2002). Amount and location of vehicle damage is used to aid clinical decision-making in triaging at multiple casualty vehicular accidents.

Age is another factor. Paediatric injury severity is particularly influenced by mechanism of injury and non use of restraints. Scheetz (2003) states that the elderly are more likely to be under-triaged following a motor vehicle accident. This is possibly because an ambulance paramedic downplays the importance of physiological changes or the impact that the mechanism of injury has in the older patient (Huei-Ming, et al., 1999).

TRIAGE SYSTEMS

In the majority of circumstances ambulance paramedics provide a one-to-one assessment and management of casualties utilising the 'danger, response, airway, breathing, circulation' action plan. However, it is uncertain if these principles are applied in the case of a mass casualty incident where there is a greater casualty need than available resource. In the situation where there is more than one casualty, it is assumed ambulance paramedics will triage as a matter of routine. Formally, they will undertake an initial triage of casualties, called triage 'sieve', to identify priorities and number of casualties. Triage 'sort' provides a secondary triage to reassess, re-triage and to assign transport priorities (Kilner, 2002). To assist with triage in mass casualty incidents, a number of triage systems have been proposed and implemented. These systems allocate priority based on potential casualty outcomes and survivability, as opposed to diagnosis, in an effort to ration medical care and resources (Tonkin, 1997).

Most recently multiple casualty triage has been highlighted by the

release of a draft Australian Standard for multi-casualty triage (Standards Australia Limited, 2004). The initial sieving of casualties, proposed in this standard, is based on separating victims who can or cannot walk, as suggested by Garner, et al. (2001). This is followed by an examination of the central nervous system response, using the 'eyes opening' component of the Glasgow Coma Scale, an approach that is generally accepted as an effective tool for triaging and a key cue to assist ambulance paramedics' perception of casualty need (Emerman, et al., 1991; Hirshberg, et al., 2001; Newgard, et al., 2002; Norwood, et al., 2002; Simmons, et al., 1995). Other aspects of triage are performed based on respiratory activity and presence of a radial pulse (Emerman, et al., 1991; Simmons, et al., 1995).

INJURY SCORING SYSTEMS

There are several systems that rate the severity of trauma to a person, such as the revised trauma score (RTS), pre-hospital index (PHI), Trauma Triage Rule (TTR) and the 'circulation, respiration, abdomen, motor, speech' (CRAMS) scale. These systems are often used to assess whether an Emergency Department needs to activate their trauma team. There is conflicting opinion about the clinical accuracy of injury scoring systems in relation to triage. The use of a standardised scoring system, such as the RTS and CRAMS has been shown to cause significant under-triaging, while the use of mechanism of injury caused over-triage (Knudson, 1988). It is interesting to note that the Glasgow Coma Scale, RTS, PHI and CRAMS were not designed for implementation in the pre-hospital environment (Fries, et al., 1994;

Norwood, et al., 2002). Emerman, et al. (1991) describes the clinical decision-making process of ambulance paramedics as being as accurate as some of the injury scoring systems, such as RTS, PHI and CRAMS.

A standardised triage exercise was undertaken by Kilner (2002) to compare the triage skills of doctors, nurses and ambulance paramedics. This concluded that doctors and nurses perform best in triaging at multiple casualty incidents; with ambulance paramedics scoring only marginally lower. However, Fries, et al. (1994) state that ambulance paramedics have a greater sensitivity to the seriously injured casualty than the TTR and suggest, for greatly improved accuracy, combining the TTR with the ambulance paramedics clinical judgement.

PRE-HOSPITAL TRIAGE

The pre-hospital environment contains certain variables that are different to those found in the relatively controlled environment of a hospital. Such dynamic conditions are not ideal to undertake a casualty assessment (Shaban, et al., 2004). Haynes, et al. (1986) states the first emergency vehicle arriving at a multiple casualty incident is usually overwhelmed by the extent of scene and injuries. Ambulance paramedics are required to make rapid decisions within seconds of arriving at a multiple casualty vehicular accident scene (Kilner, 2002). During the initial stages of a multiple casualty incident, there may be a brief stress reaction of bewilderment and indecisiveness, followed by rapid activity (Sanner & Wolcott, 1983). Added to this, is the emotional

stress placed upon the individual attempting to perform triage (Nocera & Garner, 2000).

HOSPITAL TRIAGE

Emergency Department triage nurses work in an environment of uncertainty and their decisions are often based on inadequate, ambiguous or misleading information (Gerdtz & Bucknall, 1999, cited in, Fry & Burr, 2001). In the Emergency Department during normal conditions, nurses rate the role of 'triage nurse' as being one that produces significant anxiety (Fry & Burr, 2001). It appears that clinician decision-making is based on a number of non-verbal cues. However, the exact nature of these cues is not clear. Emergency Department triage nurses use cues of physical appearance, signs and symptoms, casualty history, casualty age and 'gut' sense of urgency, while highlighting that the specific vital signs of blood pressure, oxygen saturation and ECG results are primary factors (Arsianian–Engoren, 2000). Intuition, assessment skills, casualty appearance and communication skills are four major factors in nursing triage (Cone & Murray, 2002).

The triage process of the Emergency Department triage nurse is a cognitive process that includes the skills of negotiation, clinical reasoning, judgment pattern recognition, probability, heuristics and decision-making (Fry & Burr, 2001). The inclusion of the term 'judgment pattern recognition' is relevant because it implies the ability of the clinician to make a judgment based on previous decision making

experiences and knowledge. Certainly, there is evidence that clinician injury severity perception is based on additional cues that clarify the perception of the patient's need (Simmons, et al., 1995). Previous experience is a source of knowledge. Ambulance paramedics' clinical decision-making is based on generalised or explicit knowledge and context specific knowledge (Wyatt, 2003). Factors such as, clinical experience, domain-specific knowledge, the collection and evaluation of clinical data from the incident and the synthesis of this information underpin clinical decision-making (Lord, 2003).

SUMMARY

The process of triage is complex and may be influenced by characteristics of the incident itself and of decision-making as a phenomenon. The literature focuses, predominantly, on the physiological parameters that need to be considered in assessing patient acuity and triage as a process. This research considers the contextual and situational influences in triage and provides an analysis of the experience of applying triage in multiple casualty situations in the real world.

This research utilised a qualitative, exploratory and descriptive design. The research employed the established methods of human science research, utilising focus groups and in-depth interviews of ambulance paramedics as a means for data collection (Denzin and Lincoln, 2000).

AIMS

The principal aims of the project were to:

- i. Analyse thematically the experience of ambulance officers in the application of multiple casualty triage in motor vehicle accident situations.
- ii. Describe the practical application of triage theory in real life multiple casualty situations.

The project was designed to explore the application of existing triage processes and to make recommendations for the future training of ambulance and other health care professionals in multiple casualty triage.

SETTING

This was a multi-centre project conducted within the Australian Capital Territory and South Australian ambulance services.

**POPULATION
AND SAMPLE**

The population studied were ambulance paramedics. The sample for this research project was comprised of ambulance paramedics who had acquired real-world experience of pre-hospital multiple casualty vehicular accident triage. Multiple casualty vehicular accidents were defined as a single accident involving at least four casualties.

ETHICS

Both the Australian Capital Territory Ambulance Service and South Australian Ambulance Service do not have ethics committees, therefore both ambulance services deferred to the Australian Capital Territory Human Research Ethics Committee (ACTHREC). ACTHREC approved the project. Confidentiality and informed consent were the principal ethical considerations for this project. All participants had the project aims fully explained to them and were provided with a participant information sheet [Appendix B] prior to requesting their signed consent to participate [Appendix C]. The information sheet outlined aspects of the project, reiterated that participation was voluntary and confidential and that the final documentation would be presented in a manner that did not identify the participants.

At the start of the focus group discussion, and prior to in-depth interviews, participants were provided with contact details of their local peer-support network in addition to professional counselling services. The Australian Capital Territory Ambulance Service and South Australian Ambulance Service both have excellent peer-support networks that augment their professional counselling services. The peer-support network is the 'first stop' for employees who wish to discuss their reactions to traumatic events. Furthermore, each of the ambulance services has access to their own external professional counselling services.

DATA COLLECTION

Focus groups and in-depth interviews were used as the data collection method for this research project. Focus groups are a commonly used method of canvassing specific groups of people in order to identify common issues or themes in the area of research interest (Gibbs, 1997). They are particularly useful for accessing different perspectives within common groups (MacDougall & Baum, 1997) and for compiling aggregate representations of a variety of experiences 'from the field' (Van Eyk & Baum, 2003). Two focus groups were conducted, one with the Australian Capital Territory Ambulance Service and one with the South Australian Ambulance Service. A call for participants was made within each ambulance service and participants volunteered to attend the focus group. Focus groups were utilised to explore the issues and experiences of ambulance paramedics in decision-making and management of multiple casualty triage situations. Basic demographic data was collected at the beginning of the session including experience and training in triage. The researchers facilitated each focus group utilising pre-determined questions in a semi-structured manner, in which the participants dictated the direction of the discussion. This approach ensures that participants are free to discuss matters that they believe are relevant and avoids constraining participants to pre-determined sets of questions.

Participants for in-depth interviews were selected from volunteers within the focus group sessions. The in-depth interviews with individual ambulance paramedics utilised a semi-structured format, particularly

pertaining to the areas of interest and specific issues identified from the two focus group sessions. The interviews explored individual ambulance paramedics' experiences of complex triage situations in detail.

DATA ANALYSIS

Focus groups and in-depth interviews were audio-recorded and the recordings transcribed verbatim for thematic analysis of common themes and particular issues and concerns. Details, including information about the nature of the incident(s) discussed, the relative experience of ambulance paramedics, and the triage process utilised within their agency, were subjected to descriptive analysis. The chief investigator, co-investigators and research assistants individually and collectively analysed the data to identify themes. This method increases the validity and rigour of the data analysis process.

The results provide a thematic analysis of the experience of ambulance paramedics in the application of multiple casualty triage in motor vehicle accident situations. In addition this section describes aspects of the practical application of triage theory in real life multiple casualty situations by ambulance paramedics.

DESCRIPTION OF PARTICIPATION

AGE AND GENDER

The average age of the participants was 38.6 years, ranging from 28 years to 50 years. One of the participants was female, whilst the remainder were male.

EDUCATION BACKGROUND

All participants had education in the field of pre-hospital care. This level of education ranged from Diploma to Bachelor Degree.

EMPLOYMENT HISTORY

Of the fourteen participants, the South Australian Ambulance Service employed twelve, whereas the Australian Capital Territory Ambulance Service employed two.

The New South Wales Ambulance Service at some point had employed all of the Australian Capital Territory Ambulance Service participants. Whereas, only one of the South Australian Ambulance Service Participants had been employed in another State or Territory.

Previously three participants had been employed as either a Registered or Enrolled Nurse prior to their employment within an Ambulance Service. The length of employment within nursing in all three cases was five years, in areas of emergency, intensive care, coronary care and general wards.

Six participants stated they had previous experience within another emergency service, either in an employed capacity or as a volunteer, prior to employment with an ambulance service. Of these six participants, three had been engaged with multiple emergency service agencies. Three stated they had experience with the Rural Fire Service; two had experience with the Volunteer Rescue Association; one with the Coast Guard, one as an employee of the Police Service, one as a St John Ambulance Volunteer and one with the State Emergency Service.

**EMPLOYMENT
ENVIRONMENT**

Of the fourteen participants, nine stated that they worked within the metropolitan environment; two worked in the rural environment and three considered their employment to consist of both metropolitan and rural aspects.

**MULTIPLE
CASUALTY
EXPERIENCE**

Participants were asked to estimate their involvement with multiple casualty vehicular accidents. All participants stated they had been involved with a minimum of twelve multiple casualty vehicular accidents during their employment. Within the previous two years, participants stated an involvement with an average of over seventy multiple casualty

vehicular accidents. This ranged from only attending one multiple casualty vehicular accident to attending two hundred.

THEMATIC ANALYSIS

This project has conceptualised triage as a process, characterised by a series of stages, influencing factors, choices and decision-making. The key themes identified from the data are:

- Doing triage;
- Making choices;
- Using experience.

Each stage in the triage process has certain features that appear to influence triage decision-making and this thematic analysis provides a description of these features. These stages include: pre-event, scanning the scene, sweeping the scene, casualty assessment and post-event.

DOING TRIAGE

PRE-EVENT

The pre-event stage is described as the stage from when the ambulance paramedic is dispatched to the scene of a vehicular accident to when they arrive at the scene. Participants described various thought processes in the anticipation of a multiple casualty vehicular accident. In particular, building a mental picture of the scene, defining roles and the activation of an intrinsic switch in preparation for the incident.

BUILDING THE SCENE

Participants stated that building a mental picture of the potential scene is

important in preparation and in anticipation for potential injuries and casualty management.

On the way you think of where it is, what's the time of the day, what's the weather, what's that particular bit of road that you know about

(Focus Group 1)

Knowledge of the area was mentioned frequently among participants in building a mental picture of the scene. In particular, participants discussed the time of day, general knowledge of the area and the information that they had received from the communications centre.

You get a night prang in the metro area and it can be high speed where you get it in peak hour you know it's slow speed

(Focus Group 1)

Participants stated that the knowledge of speed limits in particular areas where vehicle accident occurs impacts on building a mental picture.

40 k zones versus a 100 k zone or an 80 k zone your whole thought pattern's totally different

(Focus Group 1)

It's in a zone, in a specific area that you may know and you think no, things don't happen lightly in that area

(Focus Group 2)

However, it is important that ambulance paramedics, when building a mental picture, do not make assumptions about the vehicular accident and potential casualties.

A quite leafy suburb and you think this is going to be a parking accident and it was 100 k's into a tree. It doesn't happen very often but fairly predictably every now and again you'll get proven really wrong when [making] those assumptions

(Focus Group 1)

The information provided by the communications dispatch centre provides the ambulance paramedic with valuable information to assist with building a mental picture of the scene.

The way that they [communications officers] get primed up also gives you then this is serious or not serious so you rely a lot on that initial information that comms have got

(Focus Group 1)

Participants stated when a call for medical assistance originated from emergency service agencies such as the police, the likelihood of a seriously injured or critically ill casualty was minimal. This was principally because; if a seriously injured or critically ill casualty were at the scene of an accident, bystanders would call the ambulance service first, rather than an alternative agency.

It's how the call's originated ... if you're going from a call from police it's probably going to be nothing because if there's injured people they're going to call an ambulance

(Focus Group 1)

Additionally, participants highlighted that the severity of the accident can be determined by the number of telephone calls that originate from the vehicular accident scene by first responders or passing motorists.

If they've had a lot of calls on it, you could also think there could be something in this

(Focus Group 1)

I certainly go on the amount of calls that come in

(Focus Group 2)

DEFINING ROLES

I find that talking time [on the way to an accident], it gives me time to put things into perspective so that I know what that other person is thinking and they know what I'm thinking, we know what is expected of each other

(Interview 4)

Participants stated that during the pre-event stage discussion occurs between ambulance paramedics travelling to the scene. This discussion involves identifying individual roles, in particular the notion of identifying the role of a commander and a clinician was frequent within the focus groups and interviews with participants.

If I'm assuming the role of commander that means that it's my responsibility to have an overall picture of the scene, find out who's been involved. Look at the severities of the injuries, so doing a quick triage on all of them [the casualties].

(Interview 4)

The participants stated that the use of vests stating particular roles such as 'commander' was useful for agencies not associated with the ambulance service. In particular, it was noted that not wearing such identifiable markings caused confusion amongst other emergency service personnel.

If you speak to fire and police their biggest bugbear when they go to things is not knowing who's in charge ... it's a failing of us because we just don't like putting vests on

(Focus Group 1)

Even bigger failing now that we all wear the same vests. There's no distinguishing between a commander or a clinician, bar a piece of velcro on the back that you have to turn around to see

(Focus Group 1)

In contrast, the decision to allocate a commander and clinician role was not always considered a necessity.

You don't end up with a true triage [or scene clinician] and a true scene commander because quite often if it's five patients your scene commander's going to do both

(Focus Group 1)

You've got to come back to reality and the reality is you can probably have about two people who can manage the scene and everyone else has got to lift stretchers, got to put bandages on, put IVs in and treat patients

(Interview 1)

SWITCH ACTIVATION

Participants described the activation of an internal or intrinsic switch, which results in a heightened awareness and preparedness for the potential situation. This switch occurred during the pre-event phase or on initial arrival on the scene.

"... got a heightened sense of presence ... almost like a seriousness scale..."

(Focus Group 1)

"you almost switch on just by [knowing] the location"

(Focus Group 1)

"I say the switch is probably switched on for personally just looking at the mechanism (of injury)"

(Focus Group 1)

DOING TRIAGE

SCANNING THE SCENE

On arrival at the scene, ambulance paramedics described undertaking an additional series of steps that has not previously been described in the triage process. Participants described an initial scan to determine mechanisms of injury at the site, number of casualties and the severity

of injuries. This scan takes place prior to any contact with casualties.

When I get out [of the ambulance] I grab my equipment and I stand and I do a complete scan from where I'm standing right through the incident to the other side of the incident...the initial scan is the important factor on my part because it gives me an understanding of what's gone on.

(Interview 3)

In initially determining priorities of action, participants utilised a number of defining features. These features included determining who is trapped or not trapped.

If they are still sitting in the car it generally means that they're sicker.

(Interview 4)

Some people may not be able to get out of the car because they're infirm but then again that adds to their potential to go downhill so I guess we'd probably look at that. If they still sat in the car, either they're trapped or not very well.

(Focus Group 1)

Similarly, if casualties are lying on the side of the road or in the middle of the road, in some cases they are deemed to be more unwell and therefore would receive the ambulance paramedics' attention sooner than those casualties that are standing on the side of the road.

A cigarette's a pretty good diagnostic tool ... if someone's standing by their car having a cigarette then [they are well].

(Focus Group 1)

Another factor that will influence decision making is the mechanism of the accident and the subsequent vehicle damage.

How banged up it is [the vehicle] gives you a good idea as to the mechanisms involved and the energy involved and how has that

transferred into the patients and how they coped with that
(Interview 4)

...as you're rocking up there's not a whole lot of damage to the car, you're going, 'I'm not going to carry anyone here'
(Focus Group 1)

DOING TRIAGE

SWEEPING THE SCENE

The next phase is a sweep of all the casualties. Following the initial scan of the accident scene, participants describe undertaking a sweep of the scene to determine who is the 'crookest'. In the sweep, participants describe a superficial scan of each individual casualty at the scene.

Say we have got a major MCI where we've got multiple patients and basically you have to get out and you have to physically walk around, you've got to keep your hands in your pockets
(Interview 5)

You can just scan an accident and say that's the one [the sickest casualty] and you go to it and it's very hard to define and try and give a rationale to especially a student or anyone else why I picked that one
(Focus Group 1)

This sweep assists in the development of the initial situation report.

You need to do an initial sweep so you can get an initial report out that is pretty much concise of what you've got
(Focus Group 2)

If you go to something bigger that sweep becomes more important. The more patients the more important it becomes
(Focus Group 2)

DOING TRIAGE

CASUALTY ASSESSMENT

The sweep is followed by an assessment, more closely aligned to the traditional primary survey, and basic intervention, to determine if the decisions and assumptions drawn from sweeping the scene are correct.

It's then usually a repeat process of going back to the people that are more serious, I usually go down the list and revisit everybody and make sure that, yes, my suspicion or concern is correct.

(Interview 2)

Participants described using various techniques to determine the severity of injury and illness. This was described using a systematic approach. Initially, participants stated that they focus their attention on casualties who are quiet as it can be a determinant of a casualty's level of consciousness.

Loudest versus quiet or conscious versus unconscious to begin with.

(Focus Group 1)

What I'm looking for are a couple of things, are they conscious or unconscious; is there evidence of life-threatening haemorrhage or not; and their breathing.

(Interview 5)

The primary survey initially done may be in the manner of asking a few key questions of the casualty, such as;

"Can you cough, where does it hurt?"

(Interview 3)

Or the primary survey will include response, airway, breathing and circulation.

Someone who is failing the primary survey is sicker than someone who is not.

(Interview 3)

Using you're whole clinical knowledge ... as to what is going to take a priority ... run through your DRABC ... your airway has got to take priority.

(Focus Group 2)

DOING TRIAGE

POST-EVENT

The final stage in the triage process is the post-event stage. Participants describe a number of activities that occur following a vehicular accident and transportation of casualties to the relevant facilities. In particular, participants discussed their experience of reflection and criticism.

Retrospectively I critique every major job that I do and work out what went right, what didn't go right and try and work out why, and then put strategies in for next time that happens, I should have done this, this and this because I reckon that may work

(Interview 3)

I guess it's an endemic cultural thing within the ambulance service to do the war story as part of the diffusing mechanism of the job.

(Interview 2)

We didn't have peer debriefers, we didn't have CISM, we didn't have anything in those days. We went back to the station and we talked about the job amongst ourselves. And I'm sorry, but I believe that did me better than what happens these days, because we all talked about it

(Interview 5)

The participants discussed the criticism they receive from the hospital staff.

They still like to use their restrospectoscope a fair bit and say, well, I wouldn't have tagged it that way. My impression is that they generally don't have a lot of empathy for what we've had to deal with and the lack of order and stuff and we'll find situations

where decisions could have been made different.

(Focus Group 1)

A lot of comments that come back are the ambos have got just about every single one of these wrong but the hospital staff don't recognise that the sieve is different to the sort. I don't think a lot of ambos recognise that either.

(Focus Group 1)

MAKING CHOICES

Participants stated that triage involves complex decision-making and choices that may impact on individual casualties or team resources.

Such choices include; resource provision, prioritisation in association with age, and the traditional triaging process.

MAKING CHOICES

RESOURCE PROVISION

Participants describe issues surrounding sufficient resource provision for multiple casualty vehicular accidents, relating to two themes of engaging with the communications or dispatch centre, and providing regular and timely situation reports. This communication was considered important because it ensured that additional resources sent to the scene were appropriate and arrived in a timely manner.

As soon as a job goes down I want to know what crewing we've got in the area and what's available and I want to know now and it's more to get the comms guy thinking and I'll probably suggest in the role that we just start piggy-backing them [ambulance crews] around, start moving them forward ... we have a process where you can send one ambulance per patient plus one extra.

(Interview 1)

I think an initial sit rep is very, very important, not only for us but for comms. I mean they're blind ... just an initial sit rep to get even more vehicles coming or thanks, we've got all the resources we need.

(Focus Group 2)

MAKING CHOICES

AGE

Interviewed participants were given a number of scenarios where decisions were to be underpinned by the age of the casualties. Several participants stated that they have previously made clinical decisions based on the age of the casualty.

Kids are another one, and you tend to try and triage those a bit different than adults because you don't get a lot of kids and they do emotionally get you especially if you've got kids

(Interview 3)

I'd try and get them both going first if I could. If there's going to be quite a long delay between the two, a five year old to look really sick is normally really sick, comparatively more sick than a 45 year old. And that's the way we've trained. So he would probably go first.

(Interview 2)

The paediatric hasn't even seen life, the 40 year old has.

(Interview 5)

Conversely, participants stated that age didn't impact of their clinical decision-making.

I don't think you can make ethical judgments based on age. It really does just depend on the clinical setting at the time. It's that whole playing God thing. I try not to get trapped into the, it's a child we've got to drive faster.

(Interview 4)

I'll do exactly the same thing I would if it's a 75 year old or a five year old. Because a 75 year old deserves our attention just as much as a five year old does.

(Interview 4)

MAKING CHOICES

APPLICATION OF TRADITIONAL TRIAGING PROCESSES

Following the scan of the scene and the sweep of the patients to obtain a base line of every casualty's condition, participants describe the use of

triage tags and the practicalities of establishing a triage area.

TRIAGE TAGS

Mixed comments were voiced with regards to the use of triage tags.

Overall the findings suggest that triage tags are only used when an excessive number of casualties are present. The decision point, based on a quantifiable number of casualties, varied between participants.

I probably wouldn't use the triage tagging system until I've got quite a number of patients... I would probably start using it after about 12 patients when I physically just couldn't remember each patient individually as a way of just marking them and recognising how sick they were when I first got to them as opposed to when I come back to them.

(Interview 4)

If you get overwhelmed the tags are a good thing to have

(Interview 5)

I think that you probably can handle one handful of patients, but when you start to get two handfuls of patients you've got to have a process.

(Interview 1)

As far as the tags go, even if you've got 10 patients, from my experience you can generally and ought to be able to stand back ... so that when the next cars come in you don't need to look at who's got what coloured tag.

(Focus Group 1)

I walk up to two buses head-on I think I'll be going the tags.... that's more people than you can fit into your mind.

(Focus Group 1)

Practically you're keeping an eye on all the patients you can say ... I'm getting worried about him, instantly in my mind his triage category has changed as opposed to ... fold it ... then put it back in ... and now he's got a different colour and now I'll go back to what I was thinking about. That's a half minute operation versus a mental sort of a split second, now I'm worried about him

versus I wasn't before.

(Focus Group 1)

Additionally, participants stated that they utilised triage tags when additional resources are distant from the accident scene.

I've only used them [triage tags] probably three times in my entire 20 years, and out of that was I had time sitting there waiting for ambulances to come that were 20 minutes down the road. I can do something here, they're not all that crook, I'll put the tags on and make it look good.

(Focus Group 1)

You know, I just know in the rural setting you use your tags and you've got to work with the triage system because you know for 40 minutes it's you and your partner, or maybe just you, and that's it.

(Focus Group 2)

[In the metropolitan environment] by the time we even got the tags out of the car we're going to have cars [ambulances] on top of us. It's going to be quicker to do a, look, you've got one patient over there still in the vehicle ... because we're not going to get around and tag them.

(Focus Group 2)

TRIAGE AREA

Participants state that a formal designated triage area at vehicular accidents is hard to establish and not always possible to maintain.

It's not as simple as just how you categorise them too because all patients and that don't land neatly on the road and they're all there together.

(Interview 5)

The carnage was strewn over a kilometre or so, so the triage area was going to be massive.

(Focus Group 2)

USING EXPERIENCE

PREVIOUS EXPERIENCE

Participants describe previous experience as underpinning triage clinical decision-making.

You get very intuitive, you get very left lateral thinking. You bring in the experience from what you've done in other accidents and how successfully that has run to set up a plan and work from a plan.

(Interview 3)

You start making assumptions based on past experiences and variables that you've come across before. You do have to have that as a paramount foundation as to how to perform your role but I think experience is just untold.

(Focus Group 1)

The difference between skills, knowledge and wisdom. Wisdom is applied with experience.

(Interview 3)

Participants stated, when undertaking their initial sweep of the scene to prioritise casualties, previous experience plays a role and therefore which casualty receives a higher triage status is based, at least in part, on previous experience.

So the first priority obviously is those that look sick.

(Interview 2)

Looked sick, was sick ... looked sick, must be sick.

(Focus Group 1)

Categorised in terms of not very sick, or could be sick, or are sick.

(Interview 4)

USING EXPERIENCE

INSIGHT

The participants stated that this experience is combined with an element of 'gut feeling' or insight.

There's something intrinsic that says, due to a process and variables as you approach that patient they are 'x' amount sick.
(Focus Group 1)

It's your instinct as an ambo to go to somebody who is crook.
(Focus Group 2)

I mean a lot of these decisions are made on my gut instinct, who I feel needs to go. I can't tell you who exactly who I would tend to lead towards but I would tend to cope with the nature of the injury.
(Interview 2)

USING EXPERIENCE

EDUCATION

The participants stated that educational tools and matrixes assist new and inexperienced ambulance paramedics in the development of triage clinical decision-making because such tools are prescriptive. However, participants highlighted that for an experienced ambulance paramedic, tools, such as matrixes, are not commonly used because clinical decision-making is based on experience.

To actually go in and triage and look around, it's just something that you can get taught partially in the classroom about multiple casualty, you can only pick it up from time and experience.
(Interview 5)

A number of themes emerged regarding the experience of ambulance paramedics in the application of multiple casualty triage in the context of motor vehicle accidents. Our definition of triage was extended and broadened through analysis of the key themes arising from the research. The participant ambulance paramedics describe a process that is grounded in the need to apply the theory that underpins effective triage to the real world of their clinical practice. The triage process described in this research reflects more closely the original application of the term and expands beyond the practices described in theoretical models outlined in the literature, such as triage sieve and sort, which are based on the assessment of physiological indicators, to capture more broadly the processes and decisions inherent in 'sorting' casualties in real and complex situations. The interpretation of triage, developed in this research, as an extended and complex process is also supported by Fry and Barr (2001) who argue that triage utilises complex cognitive and decision-making processes.

The practical process of triage described in this research includes a number of sequential steps, utilising non-physiological cues in conjunction with established triage tools for the prioritisation of casualty management. A combination of ambulance paramedic experience and explicit knowledge affect this decision-making process. This process is extended; commencing prior to the ambulance call out and completing

when the scene is cleared and informal debriefing within the crew has commenced.

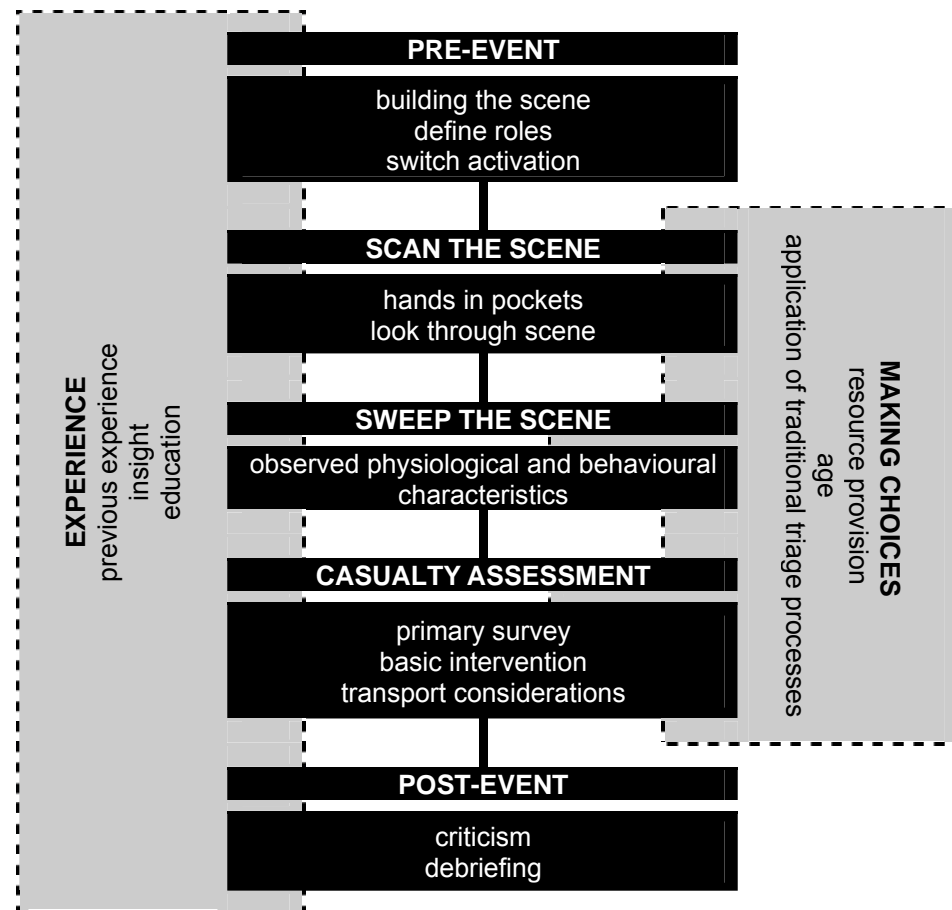


Figure 1: Triage Process Concept Map

The findings of this study identified that interpretation of a number of non-physiological cues is utilised in the stages prior to contact with casualties to determine provisional casualty acuity. This is followed by a form of ‘non-touch’ triage to review each casualty to determine the first casualty priority list. This notion of a superficial and rapid triage assessment is supported by Hirshberg, et al. (2001). It is during this time that ambulance paramedics commence the sorting process. Non-physiological cues such as, an understanding of the environment and its

relationship to the possible severity of an accident, exploring who is trapped and who is not trapped and noting of the mechanisms of injury potentially associated with the vehicular accident are undertaken during this process. It has been argued by Newgard, et al. (2002) that mechanism of injury is a contributing factor to prioritising vehicular accident casualties. Additionally, it was identified that priorities for care are based, at least in part, on the behavioural patterns of the casualties. For example, a casualty who is standing on the side of the road smoking a cigarette is provisionally assessed as a low priority compared to casualties who have remained inside a vehicle.

Throughout the described triage process, it seems that cues based on visual assessment of the context of the accident and situation or behaviour of the casualties, or a non-touch triage, dominated the physiologically based cues or clinical assessment data that typically underpin the various existing triage tools. Existing tools focus on a casualty's physiological condition, such as, central nervous system response and circulation characteristics. Arsianian-Engoren (2000) outlined that physiological signs were a primary factor in determining triage priorities. Participants suggested that the relative reliance on measurable clinical indicators was associated with the level of experience of the ambulance paramedic; with less experienced practitioners using clinical assessments in a more deliberate and conscious fashion. This may of course be explained to some extent by the tendency for experienced practitioners to move through decision-

making situations rapidly and with less awareness of the steps that they have taken to reach a clinical decision (Arbon 2004).

Participants described minimal use of existing triage tools, for example triage tags and the designation of a triage area, in real life triage. However, they argued that these concepts provided a theoretical underpinning for the application of their own triage process(es). This research demonstrates that a gap exists between what is practiced and what is taught as theory. This gap highlights the potential value of a review of triage teaching practices. It is, however, recognised that practice guidelines and clinical tools provide a useful foundation and guide for inexperienced staff (Zeitz 2003).

A theoretical basis was described as being important for the education of novice ambulance paramedics and for service providers who apply triage principles at irregular intervals, such as student or volunteer ambulance personnel. There may be opportunities to enhance the current educational focus on training in the use of triage tools with greater discussion of the more experientially based and practical model suggested by this research; especially for novice ambulance paramedics, students and volunteers.

This study found that factors such as experience and needing to make various choices rapidly impact on the triage process. Additionally, previous experience in multiple casualty vehicular accidents together

with insight and level of education determine the way the triage process is undertaken. Best practice incorporates components of clinical decision-making based on evidence, clinical expertise and patient need (Zeitz, 2003). Wyatt (2003) acknowledged that the triage process evolves through experience and education. Variables in decision-making including choices regarding resource provision, application of traditional triage processes, such as, the use of triage tags, and taking into account the presence or absence of children or aged casualties, impact on the triage process. This study, for example, demonstrated that ambulance paramedics might triage a younger person higher than an older person if both had similar injuries. This was a finding supported by Scheetz (2003) who stated, casualties are triaged differently depending on their age.

LIMITATIONS

The cohort of ambulance paramedics who participated in this study has considerable experience in undertaking triage at the scene of multiple casualty vehicular accidents. The triage practice of other cohorts, such as student ambulance officers or volunteers was not explored and further research could be undertaken within these other cohorts to assist in validation of the findings of the current study. The participants were recruited from two states, South Australia and the Australian Capital Territory. However, a number of participants had been ambulance paramedics in New South Wales. Therefore the cohorts were limited and gave access to the experience of triage practice in these

participating state and territory ambulance services. It has been assumed that triage practice is relatively uniform within the profession across these jurisdictions.

Limitations in the methodology of this study have been outlined in the methodology section of the report. These limitations include the inability to generalise the findings of the study beyond this cohort of participants and limitations associated with the use of focus groups and interviews. In particular, the ability for one participant to dominate discussions and the possibility that participants volunteer for the research because they have something of particular interest or a strongly held set of beliefs about triage practice.

KEY FINDINGS

This research has focussed on contextual and situational influences on the triage decisions made by ambulance paramedics responding to multiple casualty vehicle accidents. The recommendations are based on the key findings of the study. Several features of the findings are summarised here:

- Triage can be understood as an extended and complex activity that is directed at management of a multiple casualty incident with the aim of providing the best possible care (and outcomes) by prioritising access to care and care resources. Triage has, previously, been defined more narrowly as an activity aimed at determining patient acuity and as an aid to prioritisation.

- Triage practice commences at the station, or at the time of receipt of a call, and ambulance paramedics begin to construct their understanding of the incident and to make decisions from this point through the period of management and disposal of casualties and during the recovery or debriefing phase (where decisions may be made that will influence future practice).
- Ambulance paramedics know and understand the triage process but utilise it as a foundation for their practice rather than as a strict regime. Different incidents in different locations and different levels of experience, for example, will elicit more or less rigorous adherence to triage protocol especially with respect to the use of physiological cues to aid decision-making.
- A wide range of influences affect the triage decisions of ambulance paramedics including the skill mix and experience of the ambulance crew(s), the role on scene of the practitioner, the experience of the ambulance paramedic, the location of the incident, the availability of support services and so on.
- The roles of scanning and sweeping the scene have been de-emphasised in descriptions of triage practice previously. An important feature of triage practice is the provisional decisions on prioritisation that are made during this initial assessment of the scene and in a 'hands-in-pocket' fashion. Further, ambulance paramedics utilise systematic assessment (primary and secondary assessment) of casualties and specific physiological data in a sophisticated fashion and do not (simply) follow a

proscribed formula applied to all incidents or casualties in the same way.

RECOMMENDATIONS

- Further research and synthesis of existing literature is required; especially through use of grounded theory methodology, to develop middle level theory explaining the process of multiple casualty triage with greater clarity.
- There exists a need to measure the effectiveness of established triage tools in relation to their impact on casualty outcomes and their efficacy in supporting practitioners in real world triage practice.
- Further exploration is required to determine how practitioners learn triage. How useful are the current tools and what contribution can be made by experiential learning, including scenario based education?
- There exists opportunities to explore the application of the triage process in other scenarios; other than motor vehicular accidents, and by other practitioners.
- Further research is needed to explore the nexus between physiological and non-physiological metrics and physical assessment. What defines the concept of 'looks sick'?

CONCLUSION

Triage is defined as the process of sorting casualties and setting priorities for treatment in urgent care situations. The process extends from call out to conclusion and incorporates contextual and situational variables.

This project analysed thematically the experience of ambulance officers in the application of multiple casualty triage in motor vehicle accident situations. In addition the research described the practical application of triage theory in real life multiple casualty situations. The project explored the application of existing triage processes in real world practice. This has resulted in the development of a set of recommendations for the future development of triage practice and training of ambulance and other health care professionals in multiple casualty triage.

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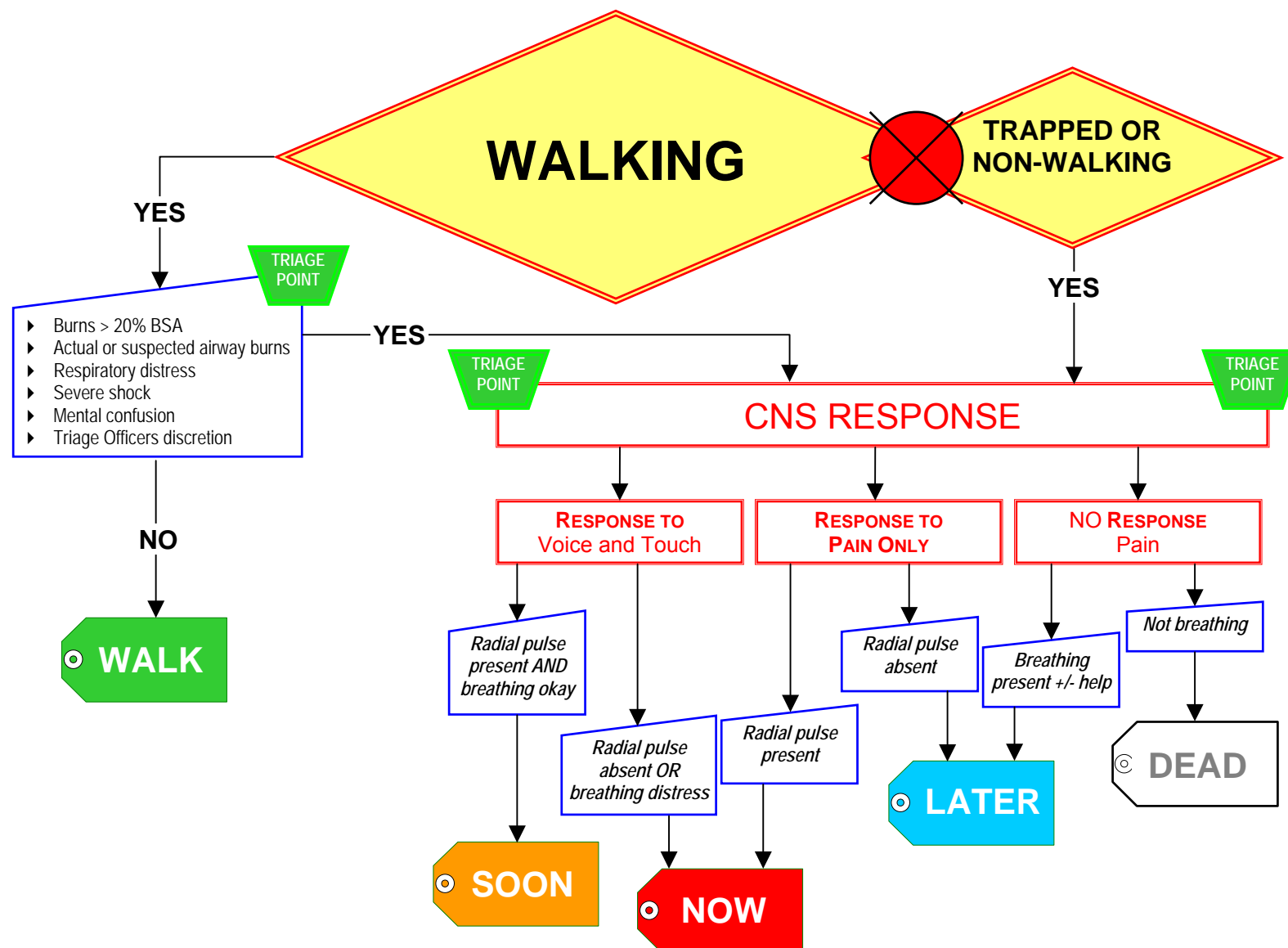
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Multi-casualty triage – putting triage theory into practice at the scene of multiple casualty vehicular accidents: the reality of multiple casualty triage.



INTRODUCTION

This project aims to provide an analysis of the issues associated with the application of multi-casualty triage by ambulance officers in the context of motor vehicle accidents. The efficacy of recent changes to triage practice, including the adoption of a triage sieve and triage sort process, for prioritising patient care and transport in the pre-hospital situation, has not been adequately investigated. The focus of the study is the experience of ambulance officers in applying the theory and protocols associated with out-of-hospital triage to real multi-casualty events. There has been very little previous research into triage practice and the work that has been done focuses on determining the physiological or diagnostic categories that should be used to determine patient priority, or the relative success of patient care staff in interpreting and applying triage scales to theoretical scenarios.

YOUR INVOLVEMENT

The project consists of focus groups and in-depth individual interviews. The research assistant and/or one of the investigators will discuss the project with you prior to asking you for signed consent to participate. The focus groups will consist of 8 to 10 people and will last for approximately 90 minutes. Each group's discussion will be audio-recorded and the recording transcribed verbatim for analysis of common themes and experiences and particular issues and concerns.

Key informants will be identified through the focus groups and asked if they wish to participate in follow-up interviews to gain a richer understanding of ambulance officers' experiences and issues in multiple casualty triage.

CONFIDENTIALITY

The researchers are committed to maintaining your privacy and confidentiality at all times, and are required to do so by national ethical research standards. All identifying information will be removed from the data prior to analysis and publishing of results, and all data will be kept in a secure location.

CONTACTS

Should you wish to discuss the study or ask any questions about it at any time, please contact the Chief Investigator, Professor Paul Arbon, on 02 6244 2333, or email on paul.arbon@act.gov.au.

Your Peer Support Network is available if you would like to talk about any issues that may arise after discussing a response to a MCI. Your local Peer Support Officer is always available and can be contacted via the ACTAS Corporate Page: 02 62690950. The ACTAS Chaplin, Neil Roberts is also an important part of the CISM Staff Support network and is available by Corporate pager. Alternatively, ACTAS Peer Support Manager may be contacted on: 6207 9987.

Should you have any problems or queries about the way in which the study was conducted, and you do not feel comfortable contacting the research staff, you may contact the ACT Health Human Research Ethics Committee Secretary on Second Floor, North Building, London Circuit, Canberra City, ACT 2601, or on phone number 02 6205 0846.

Thank you for your interest in this study.

Consent Form to Participate in a Research Project



I, _____
(name of participant)

of _____
(street) (suburb/town) (state & postcode)

have been asked to consent to participate in a research project entitled:

Multi-casualty triage – putting triage theory into practice at the scene of multiple casualty vehicular accidents: the reality of multiple casualty triage

In relation to this project, I have read the Participant Information Sheet and have been informed of the following points:

1. Approval has been given by the ACT Health Human Research Ethics Committee (ACTHREC).
2. The aim of the project is to analyse the issues associated with the application of multi-casualty triage by ambulance officers in the context of motor vehicle accidents.
3. The procedure will involve participation in a focus group and possible participation in a one-to-one interview.
4. Should I have any problems or queries about the way in which the study was conducted, and I do not feel comfortable contacting the research staff, I am aware that I may contact the ACT Health Human Research Ethics Committee Secretary on Second Floor, North Building, London Circuit, Canberra City, ACT 2601, or on phone number 02 6205 0846.
5. I can refuse to take part in this project or withdraw from it at any time without affecting my employment.
6. I understand that the results of the research will be made accessible and that my involvement and my identity will not be revealed.

After considering all these points, I accept the invitation to participate in this project.

I also state that I have/have not participated in any other research project in the past 3 months. If I have, the details are as follows:

Date: _____

Witness: _____
(Please print name)

Signature: _____
(of participant/volunteer)

(of witness)