

**A Uniform Triage Scale in Emergency Medicine**  
*Information Paper*

Triage: sorting, sifting (Webster's New Collegiate Dictionary) from the French verb *trier*- "to sort."

Triage has long been considered a simple frontline sorting mechanism in hospital-based emergency departments (EDs). However, evolution in the practice of emergency medicine during the past two decades necessitates a change in how this entry point process is performed and utilized. Many triage systems are in use in the US, but there is no uniform triage scale that would facilitate the development of operational standards in EDs. A nationally standardized triage scale would provide an analytic basis for determining whether the health care system provides safe access to emergency care based on design, resources, and utilization. The performance of EDs could be compared based on case mix and acuity, and expected standards for facilities could be defined. Planners and policy makers would have the tools and the data needed to make rational improvements in the health care delivery system.

This paper on triage will acquaint the reader with the history of triage, and provide an overview of the Australian and Canadian systems which are already in use on a national level. The reliability of triage is addressed, and the Canadian and Australian scales are compared. Future implications for a national triage scale are described, along with the goals and benefits of triage development. While there is some controversy about potential liability issues, the many advantages of a national triage scale appear to outweigh any potential disadvantages.

### **History of triage**

The first medical application of triage occurred on the French battlefield where sorting the victims determined who would be left behind. There were no further medical applications of the triage concept until World War II.

In the 1960s, health care delivery systems in the US and elsewhere evolved into a dramatically changed health industry that was distinctly hospital-focused. Patients, now covered for health-related services for the first time by third party payors, began to present themselves to hospitals in growing numbers. Patients with acute problems were directed to an area of the hospital designated as the "emergency room."

As a result of increasing numbers of patients presenting simultaneously, a process of triage quickly assumed a central role in attempting to identify patients who needed to be seen on a priority basis, rather than just first-come, first-served basis. In the US, a simple 1, 2, 3 classification assignment system was used most often for triage. The goal of this process was simple: to ensure that unstable or potentially unstable patients would be seen rapidly, and that those deemed not likely to deteriorate would wait safely for care. Early ED triage systems used a health care provider, most often a nurse, to make the triage decision.

By the 1980s, emergency services had become an important service site for patients accessing the system. The US Congress became concerned about widespread reports of "patient dumping." This led to the passage of the Emergency Medical Treatment and Active Labor Act (EMTALA), which has had a profound regulatory impact on all aspects of emergency care. With the adoption of EMTALA regulatory standards, the US Health Care Financing Administration (HCFA) made it clear that the triage examination in the ED was distinct and different from the mandated medical screening examination as defined by the statutes and accompanying regulations.<sup>1-3</sup>

In the US triage classification systems have also been utilized for a number of other purposes, including: 1) retrospective review to analyze a variety of QA issues, such as correlating assigned triage classification with final disposition and waiting times<sup>4</sup>; 2) mechanisms to look at issues regarding costs of delivery of emergency health care<sup>5-7,8</sup>; and 3) efforts by government agencies to analyze the inappropriateness of care delivered in EDs.<sup>9</sup> Perhaps most interestingly, triage systems have been used concurrently by institutions<sup>10,11</sup> and retrospectively by third party payors<sup>12</sup> to deny access to or payment for ED care. These types of denial decisions using existing triage classification approaches have engendered concerned responses.<sup>13</sup> Some assumptions regarding ED overutilization have been attributed the common triage parlance (emergent, urgent, nonurgent) that implies completion of the EMTALA medical screening examination at triage. This assumption is misleading and prejudicial against an understanding of the prudent layperson utilization of the ED.<sup>14</sup> Three-level triage systems also have been criticized regarding their effectiveness<sup>15</sup> and their reliability.<sup>16,17</sup> In 1995, the US Emergency Nurses Association (ENA) published a manual, *Emergency Department Patient Classification Systems*, that promotes a 4-level scale.

In the 1970s, a group of ED personnel in Ipswich, Australia began to look at the issue of sorting the increasing number of patients coming to their ED, particularly those arriving by way of the ambulance system. They evaluated a number of triage scales, including ones with more than three levels. The Ipswich Triage Scale was developed and subsequently adopted for local use as a 5-level triage and acuity scale. This triage scale gained popularity in Australia beyond the community in Ipswich. The Australian emergency medical community adopted a single national 5-level triage acuity scale in 1993, the National Triage Scale, or NTS.<sup>18</sup> This development followed the 1989 publication of a thesis by Fitzgerald, *Emergency Department Triage*.<sup>19</sup>

In 1995, a group of Canadian emergency physicians who were aware of the Australian work developed a similar but slightly different 5-level triage acuity scale. This scale was advocated by the Canadian Association of Emergency Physicians (CAEP) as a national scale for use in all EDs. CAEP joined forces with the National Emergency Nurses Association (NENA) to produce the next iteration of their 5-level scale, along with a recommended approach to training, the Canadian ED Triage and Acuity Scale (CTAS).

In the UK, there is currently a move to introduce a 5-level triage scale, originated by the Manchester Triage Group. The effort is backed by a recently published text, *Emergency Triage*.<sup>20</sup> The text offers a detailed, flow-chart based approach to triage decision-making.

### **Reliability of triage**

Triage reliability is an important practical issue. The assignment of a triage rating can be potentially harmful if it is unreliable, and if the assignment to a lower acuity category is coupled with delay, nonpayment, or refusal of care. The Society for Academic Emergency Medicine's (SAEM) position is that refusal of care based on triage is only ethically justified if the triage criteria "...are based on research that shows them to be safe and effective."<sup>21</sup> Unfortunately one cannot assume that triage ratings are reliable predictors of the need for care. Studies have shown that there are both low rates of inter-rater agreement on triage assignment, and many instances where triage rules do not reliably identify patients that could be safely cared for outside the ED.

Reliability is an essential attribute of triage for clinicians, researchers, and third-party payors. Using an analogy of a dartboard, the closer together a group of darts is clustered, the more reliable the throws; this is in contrast to how close the darts come to the bulls-eye, which is the separate issue of validity. Reliability can be tested by comparing different individuals (inter-rater reliability), or the same individual on different occasions (test-retest reliability). Measuring only the percentage agreement is unsatisfactory, because some degree of agreement would be expected by chance alone. Researchers may calculate the kappa statistic, which is a measure of agreement beyond chance, and varies from 0 (no agreement beyond chance) to 1 (perfect agreement). The kappa statistic can be based on paired or multiple observations, and is based on the assumption that the rating categories are nominal variables (e.g. eye color). Unfortunately

this assumption is not valid for triage ratings, which are ordinal (ranked) variables. Two alternatives are the weighted kappa, and the Kendall's tau-b statistic.

An immediate practical problem with triage reliability research arises because of the subjective nature of these assessments, which introduces an unmeasurable co-variant. Researchers have attempted to deal with this subjectivity by using standardized written patient scenarios, and by using explicit criteria for triage assignment.

One author has reported five years experience with explicit refusal of care guidelines.<sup>11</sup> These were applied to 176,074 patients with 31,165 (18%) triaged out. Follow-up of 34% of patients showed that 26% sought no further care, 1% went to another ED, and 1.8% returned with the same complaint. A validation study of these previously published refusal of care criteria showed that for 534 patients with physician-nurse concordance for which criteria were present, 1.1% of patients required hospitalization.

Another validation study which involved a retrospective review with explicit criteria for appropriateness showed that of 487 ambulatory patients, 106 patients met criteria for triage out but 35 (33%) had appropriate (i.e. non-avoidable) visits and four were hospitalized.<sup>13</sup>

A large multi-center study of ED use with 6,187 patients showed that among the 37% of patients triaged as "nonurgent," 5.5% required hospitalization.<sup>22</sup>

Chart review of 27 patients by eight professionals (four nurses, two emergency physicians, two family physicians) found variation in percentage judged "emergent" from 11% to 63%, kappa 0.38. Within the nurse group, prospective-retrospective agreement was poor with kappa only 0.19. Test-retest agreement was high (kappa 0.89).<sup>23</sup>

Of 244 patients denied managed care authorization, 115 (47%) met established criteria for appropriateness based on vital signs and high-risk indications.<sup>24</sup>

Eighty-seven nurses triaging five standardized patients on a 3-level triage scale showed poor agreement, with kappa 0.347. Test-retest agreement was poor, with only 24% of nurses rating all 5 cases the same on both occasions, and 46% changing more than one severity rating.<sup>16</sup>

One hundred and ten Australian nurses showed fair agreement, with >50% exact agreement on 89% of 100 written patient profiles.<sup>19</sup> One-hundred and eight Australian nurses showed fair agreement, with kappa 0.254 for 20 written patient profiles. There have been similar degrees of agreement when analyzed by site (16 hospitals) and years of nurse experience.<sup>25</sup>

A recent study in Canada using a 5-level system based on NTS had general agreement in inter-rater agreement of triage classification (0.662).<sup>26</sup>

Another study using the Canadian ED Triage and Acuity Scale with 50 case scenarios for both nurses and physicians found an overall kappa of 0.84.<sup>27</sup>

### **The ideal triage scale**

Reliable triaging based on need is obviously the key to efficiency and clinical effectiveness in emergency care. Such a tool should be strongly predictive of outcomes reflective of illness severity such as mortality rate, as well as resource requirements. Triage assignment would be done at a consistent point in the patient's hospital visit (point of first contact in an episode of care), would be prospective, and would be done by experienced health care professionals with years of clinical judgement and decision-making.

The triage process and rules must be easily understood, rapidly applied, have high rates of inter-rater agreement, facilitate appropriate placement, predict ED resource use requirements, and predict clinical outcome.

Triage is not an endpoint but a beginning. Certainly the triage rules/assignment should be linked to investigation and care plans. The analysis of triage and other outcome data then drives the design and operation of an ED. Expediting immediate care for life-threatening problems is not difficult. Rather, having a system that is well designed and resourced, and with sufficient capacity to deal with variability in demand is what is needed. Such a system should expedite care by accurate initial assessment (i.e. communicate urgency of each case to each staff), ensure prioritization in accordance with severity of medical condition, instigate preliminary diagnostic procedures, assist patients requiring treatment in another hospital department, and improve patient flow patterns within EDs.

In sum, the ideal triage scale would be the first step towards performance measurement in the ED.

### **Differences between the Canadian Triage & Acuity Scale and the National Triage Scale**

Over the past 5 years Australia (1994) and Canada (1995) have both introduced nationally recognized 5-level triage scales. The British Association of Accident and Emergency Medicine (BAAEM) and A & E Nursing Association have also jointly endorsed a time-based 5-level triage scale (1996), but national recognition and implementation has not occurred yet. Prior to this, widely disparate and parochial triage rules and scales using 2-7 different levels of priority had been the norm. The lack of agreement on how to triage, by what rules, and for what purpose has been viewed as a deterrent to establishing valid case mix comparisons between facilities within and between countries.

Australia was the first country to successfully implement a national triage scale (NTS). This was subsequently adopted nationally by the Australasian College of Emergency Physicians (1994). This is now a mandatory requirement for all Australian hospitals, and triage reports with compliance rates for triage time objectives have become an integral part of ED planning and funding formulas.

The original version of the Canadian Triage and Acuity Scale (CTAS) was developed at the Saint John Regional Hospital (SJRH) in Saint John New Brunswick. This involved a review of presenting complaint data in relation to sentinel ICD-9 discharge diagnoses. Time objectives for nursing and physician assessment, length of stay (LOS) and disposition at discharge were assessed. Studies done at Saint John confirmed that there was excellent inter-rater agreement rates for nurses and physicians with minimal or no training in the use of the scale. The triage assignment in 25,000 patients triaged in the SJRH ED was also found to correlate strongly with admission rates, time to see a nurse, time to see a physician, and ED LOS. Interestingly, the triage assignments for patients admitted to hospital were correlated with hospital LOS, total procedures done, and mortality within 48 hours and 2 weeks. The results were strikingly similar to those found in Australian studies. In 1995, the board of the Canadian Association of Emergency Physicians (CAEP) officially announced the CAEP ED Triage and Acuity Scale as official policy.

Following a validation study of sentinel diagnoses derived from the Saint John data, a steering committee of the Canadian Institute of Health Information (CIHI) recommended the use of the CAEP scale as a data element for the national ambulatory and reporting system. This study used a 400,000 patient sample, and analyses showed strong measures of central tendency with excellent resource homogeneity within the five triage levels. This was important since previous attempts in Canadian and US studies to group emergency patients based on discharge diagnosis alone had been discouraging. The CIHI formally introduced the National Ambulatory Care Database in April 1997, and included the CTAS as a mandatory-reporting element.

CAEP and the National Emergency Nurses Affiliation (NENA) had worked together on triage issues. Following joint meetings in 1997, modifications to scales that had been independently developed by the two organizations were ratified, and the CTAS was named as joint policy for the two organizations in October 1997. The Canadian Society of Rural Physicians and the CAEP Section for Rural Emergency Medicine worked closely together to address concerns raised by fundamental realities of rural and remote health care issues. CAEP issued a policy document that defined different levels of facility designations, basic design, and operational objectives. It was indicated that all patients, regardless of the facility size, should have triage levels assigned using the standard definitions of the CTAS. The use of delegated acts

and communication systems were intended to deal with the issues surrounding on-site time objectives of physician assessment.

### **Comparison of the CTAS and NTS**

There are more similarities than differences between the CTAS and NTS. Studies done in both countries show very good inter-rater agreement rates and strong correlation with resource use/workload in the ED. Both scales describe usual presentations, list samples of sentinel diagnoses and specify time objectives to physician assessment. The major differences relate to more explicit descriptions in the CTAS of severity assessment for patients with the same presenting scenarios, use of pain scales, time to nursing triage, and definitive nursing assessment.

	CTAS	NTS
Number of levels	5	5
Time to triage assessment	10 minutes	Not specified
Time to nurse assessment	According to initial triage	Not specified
Time to physician assessment	Immediate, 15, 30, 60, 120 min.	Immediate, 10, 30, 60, 120 min.
Fractile responses (CTAS) Performance thresholds(NTS)	I-98, II-95, III-90, IV-85, V-80	I-97.5, II-95, III-90, IV-90, V-85
Pain scales to triage	10 point scale	N/A
Pediatrics (age specific parameters)	Used in scale and described in the education package	Not specified but recognized generally in policy document
Severity definitions for same conditions in multiple levels	Specified for asthma, head injury, painful conditions, chest pain, eye injuries	Not specified in scale
Usual presentations	Yes	Yes
Sentinel diagnoses	Yes	Yes
Expected admission rates	Specified	Defined using actual data from multiple sites
Education implementation material	Yes. Details for every element of triage scale	Yes. No details for scale elements; Video supplied
Rural setting	Yes (described in education package)	Not specified

Head injury, chest pain, asthma, respiratory symptoms, eye injuries, gastrointestinal bleed, vaginal bleeding, psychiatric signs/symptoms, pediatric problems and painful conditions (e.g. migraine, renal colic-- pain scale used to determine level) are all found in multiple triage levels in the CTAS but are less clearly dealt with in the NTS. From an administrative perspective the CTAS and NTS triage scales would be expected to yield similar results for groups of patients.

### **Future implications for a national triage scale**

Triage is the keystone of organization of care in the ED. However, its importance as a topic for clinical research and development has been largely ignored. In part, this may be due to the regulatory environment in the US, wherein ready access to emergency physician screening is the norm, and triage as a screening and redirection tool has been suppressed under federal anti-dumping regulations.

Which conditions and what levels of risk and severity warrant emergent medical attention? The unavoidable resolution of these fundamental questions facing emergency medicine lies in the development of standardized triage methodology.

Any discussion regarding the future of ED triage must deal with the fact that it has for the most part been developed locally, in an unstandardized context, using a presumptive categorization parlance (i.e. emergent, urgent, non-urgent). Under the intense scrutiny of managed care, these terms continue to be confusing and misleading for patients, payors, and other providers because they imply completion of the medical screening process. For example, how are we to explain why we perform workups on our non-urgent patients, and why should we expect insurers to pay for this service? Hence, there are many reasons why triage should be standardized, not the least of which is the need to clear the way for fundamental process reform.

### **Goals and benefits of triage development**

Triage standardization should improve triage quality and enhance utility, allow a new patient classification taxonomy to be developed, and lead to a system for classification of presentational urgency.

Improved triage quality would allow us to set standards for timeliness of care delivery, and to develop a standardized platform for screening and redirection programs.

A new ED patient classification taxonomy would allow us to systematically classify patients in accordance with our assessment process. Current methods of classifying patients, including use of ICD-9 codes and CPT reimbursement codes, involve use of retrospective classification based on the nature and outcome of ED workups. Thus, there is no way to group or compare classes of patients based on the urgency and the intensity of service that they may require. A more appropriate classification system would reflect the way we actually sort patients at the time of their initial assessment, in which the goal is to make an immediate determination of risk and symptom severity, and to provide any necessary intervention prior to ordering tests or making a diagnosis.

Finally, a presentational urgency classification system would give us a new means to measure service intensity and resource utilization.

In the US, the market shift to managed care, the adoption of the prudent layperson utilization standard, and the anticipated shift to ambulatory patient classifications (APCs) with prospective payment methodologies will create a compelling need for explicit triage data and improved utilization measures.

### **Development path**

Major steps in the scientific and professional advancement of triage should include the adoption of a standard triage scale and nomenclature, and validation of a basic triage data set. Each step necessitates recognition of how these scales will be used in different practice environments. Adoption of a standardized triage scale could provide the basic yardstick for categorizing service intensity across jurisdictions. Functional terms could then be chosen for each category in the scale in accordance with the practice environment. For example, triage is used almost exclusively for internal staging of ED care in the US, so a terminology reflecting timeliness of service may be more appropriate (e.g. immediate, early, etc.)<sup>28</sup>

Selection of the basic triage data set should reflect the need for brevity in the triage process. Basic components would include the patient's chief complaint, age, comorbid illnesses, symptom severity, objective findings, including vital signs, and optional components such as pulse oximetry. Standardizing the data set would not preclude the ability to gather additional data based on local needs.

### **Summary**

Standards for access to care are hotly debated for scheduled surgical procedures using delays of days, weeks, and months to determine what is acceptable or reasonable. No such time objectives exist in EDs where delays of minutes or hours for unrecognized problems can be the difference between life and death.

Without using a standard measure such as a national triage scale it will be difficult to measure acuity, perform case mix comparisons, or develop ED operational standards.

The CTAS and NTS use fractile responses (performance thresholds) for the time objectives to be seen by a physician rather than an absolute number. This is in recognition of the fact that there are unavoidable fluctuations in demand for services and that most systems are not resourced to meet peak demands at all times. These fractile response times are used to set “system” objectives that should be met a certain percentage of the time. Failure to meet time objectives on a frequent basis should lead to a process review to determine whether ED design, operation, utilization or resourcing are sufficient to ensure safe access standards for emergent and urgent assessment/intervention. This is particularly relevant to many EDs that are increasingly facing gridlock caused primarily by reduced access to inpatient beds.

Setting priorities among patients in an ED has long been an accepted function of triage by nurses and physicians. Changing to time objectives for individuals or groups of patients now puts more measurable performance criteria that are easily understood by patients, members of the informed lay public, administrators, health agencies and governments. Care providers can easily recognize unsafe conditions in an ED but struggle to quantify this or make a process assessment relative to expected standards.

The issue of liability is important whenever patient assessment or intervention does not occur within a specified time objective. The provider should not be liable when a system fails to allow an ED to be properly designed, resourced, and utilized.

Federal, state, regional authorities and administrators of a hospital facility need to have more objective definitions of the expected standard so that specific needs of a community can be met. Without a unified method of assigning triage it is unlikely that EDs can be benchmarked against each other or define expected standards for facilities.

The adoption of a national triage scale should have a profound effect on the future operation of EDs and finally lead to a new measure of accountability for access to care within health care systems.

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