ED Administration

Revisions to the Canadian Triage and Acuity Scale Paediatric Guidelines (PaedCTAS)

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Background

The need for effective triage of the increasing number of patients presenting for emergency care was recognized in the early 1990s. Dr. Robert Beveridge led the development of a Canadian triage scale based on work done in Australia to create the Australasian National Triage Scale.[1] The original Canadian Emergency Department Triage and Acuity Scale (CTAS)[2] was an adult-centred classification that provided guidelines as to what presentations would fit in a given triage level. It included both presenting complaints and discharge diagnoses. This scale was incomplete in that only sentinel conditions were considered on diagnosis. Review of childhood deaths of patients awaiting care in emergency departments in Ontario (1994) identified the problem with defining triage by presenting diagnosis alone. In response to this review, the Canadian Triage and Acuity Scale Paediatric Guidelines (PaedCTAS)[3] was created to include physiologic assessment as an essential component of triage in children.

In 2001, a paediatric version was published, one that was more inclusive of common paediatric presentations and physiologic parameters. Studies have shown PaedCTAS to have moderate to good interrater agreement[4–8] between nurses evaluating children, and good validity demonstrated by the correlation between triage level and markers of severity. Throughout this article "children" includes newborns, infants, children and adolescents.

Early in the development of CTAS and PaedCTAS, the National Working Group (NWG) recognized the challenge of basing triage on final ICD-10 diagnosis. Both adults and children present with symptoms and concerns that, depending on their past experiences and apprehensions, may not immediately identify the current medical problem. In 2004, the NWG reorganized CTAS based on presenting complaints (CEDIS; Canadian Emergency Department Information System Presenting Complaint List).[9] Health care delivery and patient expectations continue to evolve, which requires ongoing evaluation of the CTAS process. Changes to hospital and emergency department accountability have included the development of electronic triage systems. CTAS and PaedCTAS have been revised to meet these demands (Table 1).[10–12] The current version (2008) is a unified adult and paediatric triage process based on presenting complaints, with physiologic and historical modifiers. This article will highlight the most recent changes concerning paediatric triage assessment and should be used in conjunction with the previous adult guidelines article.[13]

Rationale for change

Over the past 20 years, an increasing proportion of Canadians

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have sought their health care in emergency departments. The majority of paediatric emergency patients are seen and cared for in general emergency departments. It was recognized, with the increasing emergency workloads, that an amalgamated, simplified CTAS process was necessary to reflect both adult and childhood needs.[14–16] Comments from users of PaedCTAS provided suggestions for clarification to improve the guidelines. The NWG will continue to adapt the CTAS process as the health care environment changes.

Revisions

1. Colour palette

Consensus was reached to adopt the adult poster colour palette for the CTAS level colour assignment: Level I – blue, Level II – red, Level III – yellow, Level IV – green, and Level V – white.

2. Rural protocol

There has been an alarming decrease in the physician workforce in rural settings. The Society of Rural Physicians of Canada (SRPC) published guidelines (2003)[17] in response to the increased demands for emergency care in the face of decreased manpower. The SRPC recognized that most small hospitals did not have sufficient medical staff to allow a physician presence 24/7. The guidelines acknowledge that most patients in CTAS level V may be safely managed by skilled nurses informed by appropriate patient care directives. Rural health care providers are strongly encouraged to develop policies and protocols together to meet their local needs. Telephone contact must be easily available in questionable cases.

The SRPC further recognized that infants under 6 months of age may be difficult to triage accurately.

3. Canadian Emergency Department Information System (CEDIS)

Health services across Canada have required hospitals to develop electronic management systems, including triage and medical records. The NWG has adopted the CEDIS Presenting Complaint List to more appropriately reflect patient presentations.[12] The majority of paediatric patients can be triaged with a small number of presenting complaints. It is the physiologic response of the child that is the most significant concern of triage. The challenge has been to ensure physiologic parameter assessment is appropriately incorporated early in the triage process. For example, vomiting is one of the top 5 common presentations in children. The level of dehydration may be difficult to assess at triage without a full examination. The respiratory rate and heart rate may be the only indication of underlying sepsis or impending shock.

4. Critical look

The initial first impression of the patient is assessed using the Paediatric Assessment Triangle.[18] This quick response evaluation tool includes 1) General Appearance; 2) Work of Breathing; and 3) Circulation. An initial assessment of whether the child is unconscious or obtunded, working hard to breath and tachypneic, poorly perfused and tachycardic should identify most patients requiring immediate care in CTAS levels I and II. Further triage assessment should not delay care to confirm a presenting complaint or triage modifiers.

5. Triage modifiers

The NWG recognized the need to stratify patients by objective observations in order to accurately prioritize patients in busy emergency departments. The common critical illnesses affecting Canadian children differ from the

Table 1. History of Canadian triage

Year	Publication	Basis of triage
1999	CTAS implementation guidelines	Adult diagnosis
2001	PaedCTAS implementation guidelines	Paediatric diagnosis; physiologic assessment
2002	PaedCTAS education program	Paediatric diagnosis; physiologic assessment
2003	CEDIS Presenting Complaint List	Presenting complaint
2004	Revisions to CTAS	Adult presenting complaint; physiologic modifiers
2006	Combined adult and paediatric education program	Adult and paediatric presenting complaints; physiologic modifiers
2007	Complaint oriented triage	Presenting complaint
2008	Revisions to CTAS Adult Guidelines; revisions to CEDIS Presenting Complaint List; revisions to PaedCTAS	Unified adult and paediatric presenting complaints; physiologic modifiers

CEDIS = Canadian Emergency Department Information System; CTAS = Canadian Emergency Department Triage and Acuity Scale; PaedCTAS = Canadian Triage and Acuity Scale Paediatric Guidelines.

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adult population. The first and second order modifiers developed for paediatric triage reflect the more general presentation of illness in children and the necessity to assess specific vital signs early in the triage process. The normal range of vital signs varies with age, hence the need for age-specific standardized charts. The NWG recognizes that there is little primary research to establish lower end–age specific standardized vital signs. Standard deviations from normal were used to calculate the CTAS level associated ranges, in the absence of validated norms.

The significance of presenting complaints varies with development stages, presence of handicaps, technological dependence and underlying conditions. Caregiver assessment has to be considered with triage and could be the only indication of serious illness in complex children. Perceptions of illness influence the severity of symptom presentation. The physiologic parameters may assist objectively evaluating the severity of illness.

First order modifiers

Physiologic modifiers were first included in the triage process to assist with the assessment of the severity of illness in infants and young children.

First order modifiers for paediatrics include formal assessment of level of consciousness, respiratory rate and effort, and heart rate and circulatory status (Table 2, Table 3 and Table 4). Age-specific physiologic parameter assessment is essential for evaluating children (Table 5 and Table 6). Variance from normal should identify and define triage level I, II and III patients.

Table 2. Respiratory distress physiologic acuity modifiers and definition

Signs of respiratory distress	Respiratory rate*	Oxygen saturation	PEFR baseline	CTAS level
Severe: excessive work of breathing, cyanosis; lethargy, confusion, inability to recognize caregiver, decreased response to pain; single word or no speech; tachycardia or bradycardia; tachypnea or bradypnea, apnea, irregular respirations; exaggerated retractions, nasal flaring; grunting; absent or decreased breath sounds; upper airway obstruction (dysphagia, drooling, muffled voice, laboured respirations and stidor); unprotected airway (weak to absent cough or gag reflex); poor muscle tone	> or < 2 standard deviations from normal	< 90%	—	I
Moderate: increased work of breathing, restlessness, anxiety or combativeness; tachypnea; hyperpnea; mild increased use of accessory muscles, retractions, flaring, speaking phrases or clipped sentences, stridor but airway protected, prolonged expiratory phase	> or < 1 standard deviation from normal	< 92%	< 40% baseline	II
Mild: Dyspnea; tachypnea; shortness of breath on exertion; no obvious increased work if breathing; able to speak in sentences; stridor without obvious airway obstruction; mild shortness of breath on exertion; frequent cough	> or < normal range	92%–94%	40%–60% baseline	III
None	normal range	> 94%	—	IV, V

CTAS = Canadian Emergency Department Triage and Acuity Scale; PEFR = peak expiratory flow rate.
*See Table 5.

Table 3. Hemodynamic stability physiologic acuity modifiers and definitions

Hemodynamic status	Heart rate*	CTAS level
Shock: evidence of severe end-organ hypoperfusion — marked pallor, cool skin, diaphoresis, weak or thready pulse, hypotension, postural syncope, significant tachycardia or bradycardia, ineffective ventilation or oxygenation, decreased level of consciousness; could also appear as flushed, febrile, toxic, as in septic shock	>/< 2 standard deviations from normal	I
Hemodynamic compromise: delayed capillary refill, tachycardia, decreased urine production and skin changes suggest poor tissue perfusion; vomiting and diarrhea secondary to gastrointestinal infection are a common etiology; the signs of dehydration are not always reliable, particularly in younger patients; hemorrhage in moderate trauma may be masked by a childs a bility to maintain his or her blood pressure	To +/– 2 standard deviations from normal	II
Volume depletion with abnormal vital signs	To +/– 1 standard deviation from normal	III
Normal vital signs	Normal range	IV, V

CTAS = Canadian Emergency Department Triage and Acuity Scale.
*See Table 6.

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Second order modifiers

Other modifiers, referred to as second order modifiers, for paediatrics are needed to accurately assign a CTAS level in specific presentations. These include temperature, pain, mechanism of injury and glucose. At times, children and geriatric patients present with more than one acute medical process and all first and second order modifiers are needed to make an accurate triage decision (e.g., a complex child involved in a motor vehicle collision in extremes of weather).

Table 4. Level of consciousness physiologic acuity modifiers and definitions

Level of consciousness, status	GCS score	CTAS level
Unconscious: unresponsive; responds to pain or loud noise only and without purpose; flexion or extension position; continuous seizing; progressive deterioration in level of consciousness; unable to protect airway	3–9	I
Altered level of consciousness: a change from one's "normal" level of consciousness; lethargic; obtunded; localizes to painful stimulus; confused; disoriented; restless; irritable; agitated or combative; inconsolable, poor feeding in an infant; able to protect their airway; alert with minor behavioural or vital sign alterations from normal	10–13	II
Conscious: a state of awareness, implying orientation to person, place and time; interacts appropriately for age (e.g., infant coos and babbles); consolable	14–15	III, IV or V

CTAS = Canadian Emergency Department Triage and Acuity Scale; GCS = Glasgow Coma Scale.

A. Fever

Fever is one of the most common reasons for childhood presentation to emergency departments. The current guidelines state:

- Infants under 3 months of age and children aged 3 months to 3 years who look unwell and have fever should be triaged as CTAS level II.
- All immunocompromised children should be triaged as CTAS level II.
- Children aged 3 months to 3 years who look well and children over 3 years who look unwell should be triaged as CTAS level III.
- Children over 3 years of age and looking well with normal vital signs should be triaged as CTAS level IV.

A recent study[19] in a paediatric tertiary care setting has identified that children over 6 months of age with fever but who appear well according to an experienced triage nurse could be level IV. In cases of uncertainty they should remain as a level III. The increased level of triage training and the decreased level of childhood bacterial illness related to universal immunizations have decreased the

Table 5. Respiratory rate for age

	Respiratory rate by CTAS levels, breaths/min						
Patient age level	I	II	III	IV, V	III	II	I
0–3 mo	< 10	10–20	20–30	30–60	60–70	70–80	> 80
3–6 mo	< 10	10–20	20–30	30–60	60–70	70–80	> 80
6–12 mo	< 10	10–17	17–25	25–45	45–55	55–60	> 60
1–3 yr	< 10	10–15	15–20	20–30	30–35	35–40	> 40
6 yr	< 8	8–12	12–16	16–24	24–28	28–32	> 32
10 yr	< 8	8–10	10–14	14–20	20–24	24–26	> 26

CTAS = Canadian Emergency Department Triage and Acuity Scale.

Table 6. Heart rate for age

	Heart rate by CTAS levels, beats/min						
Patient age level	I	II	III	IV, V	III	II	I
0–3 mo	< 40	40–65	65–90	90–180	180–205	205–230	> 230
3–6 mo	< 40	40–63	63–80	80–160	160–180	180–210	> 210
6–12 mo	< 40	40–60	60–80	80–140	140–160	169–180	> 180
1–3 yr	< 40	40–58	58–75	75–130	130–145	145–165	> 165
6 yr	< 40	40–55	55–70	70–110	110–125	125–140	> 140
10 yr	< 30	30–45	45–60	60–90	90–105	105–120	> 120

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proportion of severely ill febrile young children. The initial concerns of general and small hospital settings must be addressed before changes to the current guidelines are considered. The CTAS NWG invites feedback and further study and will continue to review this issue.

B. Pain

Pain evaluation differs in children in that it is usually difficult to distinguish central from peripheral pain and localize appropriately. The paediatric pain scales are validated to a global assessment of generalized pain in a variety of conditions. For these reasons, the NWG has only identified an assessment of acute and chronic general pain rather than specifying central and peripheral pain as in adults:

- CTAS level II acute severe pain: pain score 8–10 out of 10
- CTAS level III acute moderate pain: pain score 4–7 out of 10
- CTAS level IV acute mild pain: pain score 0–3 out of 10
- Chronic pain: triage down 1 level from severity

C. Mechanism of injury

Injury patterns of children are often specific and different from the adult population. Height and energy considerations should be related to the size and development of the child (Table 7).

D. Glucose

Glucose is a secondary modifier for diabetics and should

Table 7. Mechanism of injury modifier guidelines*

Mechanism of injury	Description	CTAS level
General trauma	**MVC:** ejection from vehicle, rollover, extrication time > 20 min, significant intrusion into passenger's space, death in the same passenger compartment, impact > 40 km/h (unrestrained) or impact > 60 km/h (restrained) **MCC:** impact with a car > 30 km/hr, especially if rider is separated from motorcycle **Pedestrian or bicyclist:** run over or struck by vehicle at >10 km/h **Fall:** from > 3 ft (> 1 m) or 5 stairs **Penetrating injury:** to head, neck, torso or extremities proximal to elbow and knee	II
Head trauma	**MVC:** ejection from vehicle, unrestrained passenger striking head on windshield **Pedestrian:** struck by vehicle **Fall:** from > 3 ft (> 1 m) or 5 stairs **Assault:** with blunt object other than fist or feet	II
Neck trauma	**MVC:** ejection from vehicle, rollover, high speed (especially if driver unrestrained) **MCC:** impact with a car > 30 km/hr, especially if rider is separated from motorcycle **Fall:** fall from > 3 ft (> 1 m) or 5 stairs Axial load to the head	II

CTAS = Canadian Emergency Department Triage and Acuity Scale; MCC = motorcyclist collision; MVC = motor vehicle collision.
*This is not an exclusive list.

Table 8. New CEDIS paediatric presenting complaints

CEDIS presenting complaint	ICD-10 definition	Additional comments
Concern for patient's welfare	Physical abuse	May also apply to adult populations. Where significant injuries occur, those complaints should take precedence. Care should be taken in displaying this complaint to the patient or family.
Paediatric disruptive behaviour	Conduct disorder	Excludes suicidal ideation or attempt, or acute drug-related issues.
Floppy child	Other disorders of muscle tone of newborn	Includes infants with hypotonia and decreased resistance to passive movement.
Paediatric gait disorder or painful walk	Other and unspecified abnormalities of gait and mobility	Previously identified as "limp," which is too ambiguous a term. Includes children with new onset of painful gait.
Stridor	Stridor	New complaint.
Apneic spells in infants	Other and unspecified abnormalities of breathing	New complaint.
Inconsolable crying in infants	Nonspecific symptoms of infancy (excessive infant crying)	
Congenital problem in children	Congenital malformation of the heart, unspecified	New complaint that includes but is not limited to congenital heart, and inborn errors of metabolism patients.

CEDIS = Canadian Emergency Department Information System; ICD-10 = International Statistical Classification of Diseases and Related Health Problems, 10th revision.

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also be rapidly assessed in any child with an altered level of consciousness. It is specifically a concern in young infants for an underlying metabolic problem or seizures, and in adolescents for intoxication.

E. Coagulation disorders

Bleeding disorders in children are generally well recognized and on protocols familiar to their caregivers. Their triage assessment is similar to those previously stated for adults.[20,21]

6. Presenting Complaint List

In most hospitals, the time constraints for triage are 3 minutes or less. The triage nurse must be vigilant to the nuances associated with triaging paediatric patients. The caregiver(s) with the child may not be aware of important injuries or symptoms. Younger children, those with developmental challenges and adolescents may be unable or unwilling to share the most important symptoms or history. Illness in young children may progress rapidly. The true urgency of the presenting complaint may only become apparent when the nurse assesses the patient with first and second order modifiers and asks directed questions based on his or her experience and intuition.

The CEDIS Presenting Complaint List is applicable to both adults and children. Paediatric tertiary care centres may wish to internally truncate or add to the Presenting Complaint List to address the unique needs of their population. The process for triage should be done within the framework of the CTAS guidelines. External reporting should be done within the context of the CEDIS list to assist comparisons across all sites of children's care.

A. Concern for patient welfare

This presenting complaint, although introduced for children, is also applicable to other populations: geriatrics, mental health and spousal. It encompasses abandonment, maltreatment, physical and sexual abuse. Recognize that many other complaints may represent concerns for abuse: pregnancy; gynecologic, urologic and anal complaints; abrasions, lacerations, bruises, fractures, head and internal injuries.

B. Paediatric disruptive behaviour

Paediatric emergency mental health care concerns the identification of risk, decisions regarding admission and the identification of community resources. CTAS triage level assignment is principally an assessment of the risk to the patient, others and the environment. Mental health disorders present a unique challenge for triage, and a number of specific validated risk assignment tools for children have been created.[22–25] Defining a specific presenting complaint is compromised by the ambiguity of childhood mental health presentations, lack of previous care or diagnosis and, frequently, the absence of appropriate individuals with key information. The mental health classification described

Table 9. New CEDIS presenting complaints of paediatric relevance

CEDIS presenting complaint	ICD-10 definition	Additional comments
Near drowning	Drowning and nonfatal submersion	New complaint
Oral/esophageal foreign body	Foreign body in esophagus	Includes but not limited to food boluses lodged in the esophagus that do not otherwise affect breathing
Scrotal pain and/or swelling	Other specified disorders of male genital organs	Includes testicular complaints as well as scrotal problems
Depression/suicidal/ deliberate self-harm	Depressive episode, unspecified	New complaint
Bizarre behaviour	Strange and inexplicable behaviour	Disoriented or irrational behaviour that includes extreme self-neglect, disordered or racing thoughts, or both, speech pattern impairments, impaired reality testing with "lack of insight"
Violent/homicidal behaviour	Physical violence	Combined these 2 complaints into 1 since by definition homicidal patients are violent
Red eye/discharge	Disorders of the eye and adnexa, unspecified	Combines previous categories of red eye and discharge eye
Periorbital swelling	Acute inflammation of the orbit	This category previously included fever as a descriptor; fever now represents a CTAS modifier
Cough/congestion	Cough	New complaint

CEDIS = Canadian Emergency Department Information System; CTAS = Canadian Emergency Department Triage and Acuity Scale; ICD-10 = International Statistical Classification of Diseases and Related Health Problems, 10th revision.

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by Bullard and colleagues[11] is applicable to the paediatric population, but presentations may vary considerably.

The chief complaint Paediatric Disruptive Behaviour has been added to the CEDIS list.[12] The DSM-IV[26] category Paediatric Disruptive Behaviour includes a wide range of diagnoses and presentations: Attention Deficit Disorders, Conduct Disorders and Oppositional Defiant Disorder. It is also intended to provide a CEDIS complaint for the more specific conditions autism, Asperger syndrome and Rhett syndrome presenting in the paediatric population. A significant proportion of children have more than one of these conditions concurrently. It is not always easy to separate normal temper tantrums and authority defiance from DSM-IV conditions.

C. Congenital problem in children

Children with metabolic disease often have higher metabolic needs or lower tolerance to fasting. Accordingly, they may present with acidosis, hypoglycemia or other metabolic disturbance secondary to what would be minor symptoms in another child. These children can deteriorate rapidly in situations of vomiting, diarrhea or fasting. It is difficult for a triage nurse to know which inherited metabolic disease is a risk and which is not. This is why PaedCTAS suggests that all patients known for an inherited metabolic disease (e.g., congenital lactic acidosis or galactosemia, etc.), type 1 diabetes or adrenal insufficiency be triaged level II in case of vomiting, diarrhea or severe fasting.

A number of children with congenital heart disease and other anatomic and genetic conditions are prone to deteriorate rapidly. Specific protocols may be provided by caregivers to identify their risks. Consideration should be given to "up" triage these children if their physiologic condition is unknown or their risk for deterioration cannot be established.

Other presentations specific to children are identified in Table 8, Table 9 and Table 10.

Discussion

The process of triage is similar across all age groups and presentations. The assignment of triage acuity level addresses

Table 10. Presenting complaints, CTAS levels and modifiers

Presenting complaint	Description	CTAS level
Concern for patient's welfare	Conflict or unstable situation	I
	Risk of flight or ongoing abuse	II
	Physical or sexual assault > 48 hr prior	III
	History/signs of abuse or maltreatment	IV
Paediatric disruptive behaviour	Uncertain flight or safety risk/family distress	II
	Acute difficulties with others/environment	III
	Persistent problematic behaviour	IV
	Chronic, unchanged behaviour	V
Floppy child	No tone, unable to support head	II
	Limited/less than expected muscle tone	III
Paediatric gait disorder/painful walk	Gait or limp problems with fever	III
	Walking with difficulty	IV
Stridor	Airway compromise	I
	Marked stridor	II
	Audible stridor	III
Apneic spells in infants	Apneic episode on presentation	I
	Recent spell consistent with apnea or respiratory compromise	II
	History of spell consistent with apnea	III
Inconsolable crying in infants	Inconsolable infant — abnormal vital signs	II
	Inconsolable infant — vital signs stable	III
	Irritable but consolable	IV
Congenital problem in children	Conditions and protocol letters identifying concerns for rapid deterioration or need for immediate therapy	II
	Vomiting/diarrhea in child with known inherited metabolic disease, type 1 diabetes or adrenal insufficiency	
	Caregivers identifying need for care	III
	Stable child with known congenital disease with potential for problems	IV

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the 2 issues, "What is this patient's priority (urgency) to be seen?" and "How long can the patient safely wait?" The principal elements to assign paediatric patients to the most appropriate triage acuity level include:

1. The most essential component of identifying the critical or emergently ill or injured child is the experience and training of Emergency Medical Services and triage nursing staff. The critical first look is accomplished by a rapid visual inspection of the patient using the principles of the Paediatric Assessment Triangle: general appearance, work of breathing and circulation. Most CTAS level I and II patients will be identified and immediate care provided. Further clarification of the presenting complaint and modifiers can await stabilization of the child.
2. A directed limited history should be obtained from patients and/or caregivers for the child not requiring urgent care. The CEDIS presenting complaint may identify the presentation as a specific triage level.
3. The vital signs, level of consciousness, respiratory rate and effort, heart rate and perfusion form the basis of the first order modifiers for paediatric patients. Specific physiologic parameter assessment of respiratory rate and heart rate is necessary to avoid missing children with abnormal vital signs at triage. This will ensure identification of all CTAS I, II or III patients; only CTAS IV and V patients have normal vital signs.
4. Always triage from the presenting complaint or the physiologic assessment to the highest triage level indicated. Triaging lower than measured vital signs should be done with caution and the reason clearly noted (e.g., tachycardia in upset child). Never allow the state of the emergency department or staffing levels to influence triage decisions.
5. Other (second order) modifiers may be essential to the clarification of the appropriate triage level, especially differentiating CTAS III and IV patients. Historical and subjective elements such as mechanism of injury and pain assessment may be important to consider for "up" triaging the patient to a higher level. The use of therapeutic and management protocols (patient care plans) should be considered at this step.
6. Clinical instincts are important, especially in the assessment of young infants. If you think or feel the child is "ill," then he or she probably is "ill," and you should consider "up" triaging the patient.
7. Unexpected paediatric health emergencies can be stressful events for children and their families. Physical stabilization is usually the primary concern of the emergency care system; however, psychological stress should not be overlooked or underestimated as a significant component of the presentation.
8. The triage process has become increasingly specific over the past decade. The NWG is committed to redeveloping posters to provide an easily readable wall poster and tools for triage. The Complaint Oriented Triage (COT) Excel-based document is also being updated on the CAEP website (www.caep.ca/template.asp?id=B795164082374289BBD9C1C2BF4B8D32) to reflect the recent changes and is an excellent, readily available computer-based reference for presenting complaints. The CTAS NWG would highly recommend using computer software–based triage databases and greater dissemination of e-triage.
9. We wish to emphasize that the triage process exists solely to sort patients on arrival in emergency departments. Triage does not take the place of a complete nursing assessment, repeated vital signs and other modifiers, or thorough physician evaluation.

Concurrent and ongoing activity

There is an ongoing need for initial and renewal of triage nursing training. The NWG is committed to developing paediatric and adult posters, pocket cards and other tools to facilitate triage. We welcome further educational research and evaluation of the current education program.

Research is required to establish and confirm age-specific vital sign ranges as they relate to triage levels. All CTAS categories, complaints and processes require further validation studies. To ensure the utility of triage we need to perfect quality assurance measures and share best practices. Government will require further research relating triage to health care costs, admission rates, survival and patient outcome.

The utility and impact on patient care of CTAS in the prehospital sector has not been established to date. Ongoing development and improvement of current e-triage systems directed at providing greater age- and presentation-specific algorithms will occur in the future.

Evaluation of all CTAS adaptations in the rural community hospital and tertiary care centre setting is required to identify the impact on the care of children and their long-term outcomes.

Conclusion

The CTAS NWG recognizes the difficulty in rapidly assessing the paediatric patient, especially infants. The

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amalgamation of the paediatric and adult guidelines is in response to feedback from the educational materials to simplify and improve the utility of the CTAS process. The declining proportion of paediatric patients and the improvements in child health care will present increasing challenges to recognizing the severely ill child. Ongoing research and tracking of the CTAS triage process changes will be necessary to improve the level of childhood emergency care. The CTAS NWG welcomes further study, feedback and responses to aid future revisions as future evidence, patient demands and the hospital environment change.

Competing interests: None declared.

Keywords: triage, emergency department, CTAS, administration, pediatric

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