Prehospital Canadian Triage & Acuity Scale

Prehospital CTAS
Paramedic Guide

Version 2.0

Emergency Health Services Branch
Ministry of Health and Long-Term Care

Ontario

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Introduction:

The Canadian Triage and Acuity Scale (CTAS) was first developed for use in Canadian hospital emergency departments (ED) as a tool to help define a patient's need for care. CTAS assists hospital staff to assign a level of acuity for patients based on the presenting complaint and the type and severity of their presenting signs and symptoms. Patients are triaged using CTAS to ensure that they are managed based on their need for care (e.g. sickest patients are seen first).

Shortly after CTAS was implemented in Ontario hospital EDs, CTAS was successfully adapted for use by paramedics in the prehospital environment. One major difference between the hospital use of CTAS and the prehospital use is that in the ED, the CTAS assessment is used as a triage tool while in the prehospital care setting it is used solely as an indicator of acuity. This difference in the application of CTAS between the ED and the prehospital environment is further reflected in the work conducted by the CTAS National Working Group (NWG). The NWG had originally named the prehospital care acuity scale designed for paramedics the Canadian Prehospital Acuity Scale (CPAS). However, the NWG has recently rebranded CPAS to Prehospital CTAS or Pre CTAS to maintain consistency across the industry and to avoid any concerns that could be raised regarding the effectiveness of the program. In Ontario, the term Prehospital CTAS will continue to be used to be consistent with the terminology found in current legislation and paramedic practice standards. Paramedics should be aware that Prehospital CTAS in Ontario uses the same principles and tools as the NWG Pre CTAS program. Throughout this Guide the term CTAS is repeatedly used. Wherever this word appears, it refers to the term Prehospital CTAS unless otherwise indicated.

The use of a standardized system of acuity assignment by paramedics that is similar to the tools used in EDs has several advantages, including:

- CTAS assists paramedics in the determination of the most appropriate destination based on the acuity of the patient (e.g. CTAS Level 1 patients must be transported to the nearest/closest most appropriate receiving facility).
- The use of a common language by paramedics, ambulance communications officers and ED staff improves reliability when communicating the acuity level of patients. The use of CTAS leaves less room for individual interpretation of a patient's acuity.
- Prehospital CTAS assists EDs in preparing their internal resources for patients arriving by ambulance based on the needs of the patient.

This Guide has been developed to familiarize paramedics with the most current CTAS guidelines and provides the tools required to apply the scale effectively and safely in the field. The *Basic Life Support Patient Care Standards* (BLS PCS) and *Advanced Life Support Patient Care Standards* (ALS PCS) are to continue to guide the specifics of patient care when considering CTAS.

Objectives

After reviewing the CTAS Paramedic Guide-version 2.0, the paramedic will be able to:

- define CTAS;
- recall the common prehospital presentations for each of the five (5) CTAS levels;
- assign an appropriate CTAS level to both adult and pediatric patients using the most current guidelines;
- communicate an appropriate CTAS level to receiving hospital staff;
- document CTAS levels appropriately on an Ambulance Call Report (ACR).

List of Abbreviations

The following abbreviations, in alphabetical order, appear in the CTAS Paramedic Guide.

A

ALS PCS	Advanced Life Support Patient Care Standards
ABCDs	Airway, Breathing, Circulation and Deficits
ACO	Ambulance Communications Officer
ACR	Ambulance Call Report

B

BLS PCS	Basic Life Support Patient Care Standards
BPM	Breaths Per Minute
BVM	Bag Valve Mask

C

CEDIS	Canadian Emergency Department Information System
CPAS	Canadian Prehospital Acuity Scale
COPD	Chronic Obstructive Pulmonary Disease
CTAS	Canadian Triage and Acuity Scale
CVA	Cerebral Vascular Accident

D

DBP	Diastolic Blood Pressure

E

ED	Emergency Department
ENT	Ear, Nose and Throat

List of Abbreviations (continued)

G

GCS	Glasgow Coma Scale
GI	Gastrointestinal

I

INR	International Normalized Ratio

K

kPa	Kilopascal

L

LOC	Level of Consciousness
LPM	Litres per minute

M

MCI	Multiple Casualty Incidents
MOI	Mechanism of Injury
MVC	Motor Vehicle Collision

N

NWG	National Working Group

O

OB/GYN	Obstetrics/Gynecology
O_2	Oxygen

P

$PaCO_2$	Arterial Blood Gas Carbon Dioxide
PAT	Pediatric Assessment Triangle
PCS	Pediatric Coma Scale
PT	Prothrombin Time
PTT	Partial Thromboplastin Time
PVC	Premature Ventricular Contraction

List of Abbreviations (continued)

R

ROSC	Return of Spontaneous Circulation
RUQ	Right Upper Quadrant

S

SBP	Systolic Blood Pressure
SIRS	Systemic Inflammatory Response Syndrome
SOB	Shortness of Breath

T

TOR	Termination of Resuscitation

W

WBC	White Blood Cell

Prehospital CTAS Level Definitions:

CTAS is based on a five-level scale with Level 1 (Resuscitation) representing the "sickest" patients and Level 5 (Non urgent) representing the least ill group of patients. The determination of a CTAS level is achieved by establishing a relationship between a patient's presenting complaint (or chief complaint) and the potential causes as defined by sentinel events. Other factors known as modifiers further refine the application of an acuity level. Specific modifiers and their application in determining a CTAS level will be discussed later in this Guide.

Each CTAS level is primarily based on a patient's need for medical interventions and the aggressiveness of the interventions to prevent or mitigate threats to the patients life or limb.

Each of the five (5) CTAS levels with an explanation of the types of patients that would fall under each category is listed below.

Level 1 (Resuscitation)

Conditions that are considered threats to life or limb or have an imminent risk of deterioration requiring immediate aggressive interventions. These are patients that have arrested, or require active and aggressive resuscitation, or are pre arrest or post arrest. Their treatment is often started in the prehospital setting and further aggressive or resuscitative efforts are required immediately upon arrival at the ED. It includes all arrests, any patient requiring airway support and ventilation or circulatory support. Essentially these patients have a problem with their ABCs requiring immediate intervention or continuing treatment.

Level 2 (Emergent)

Conditions that are a potential threat to life, limb or function requiring rapid medical interventions and the use of condition specific controlled medical acts. These patients have serious illness or injury and have the potential for further deterioration that may then require resuscitation. They need prompt treatment to stabilize developing problems and treat acute conditions. These patients often have had controlled acts applied in the field (i.e. ALS PCS *Medical Directives*) but require further rapid intervention and treatment.

Level 3 (Urgent)

Conditions that could potentially progress to a serious problem requiring emergency interventions. May be associated with significant discomfort or affect ability to function at work or activities of daily living. These patients have normal vital signs but their presenting problem suggests a more serious acute process. They often have moderate acute pain (pain scale 4-7/10) and it is this category of patients where the pain scales are used more often in the assignment of acuity.

Level 4 (Less Urgent)

Conditions that relate to patient age, distress, potential for deterioration or complications that would benefit from intervention or reassurance. These patients will typically have stable vital signs and lower pain scales. The potential seriousness of their problem based on the chief complaint is not as acute. The need for acute intervention is not as great and patients may not require the use of medical directives. Many patients with chronic illness without significant acute exacerbation of their illness may fall into this category.

Level 5 (Non Urgent)

Conditions that may be acute but non-urgent as well as conditions which may be part of a chronic problem with or without evidence of deterioration. The investigation or interventions for some of these illnesses or injuries could be delayed and the potential use of medical directives is limited. These are truly minor complaints that do not pose any immediate risk to the patient. The degree of pain is limited in these patients.

ED CTAS Colour Coding:

In addition to a numeric value, it is important to note that each CTAS level has been assigned a specific colour code for use exclusively by EDs as a means for staff to quickly identify the CTAS levels of patients visually. These colour codes have no application within CTAS. The colour codes associated with CTAS levels must not be confused with the colour codes used to triage patients during a Multiple Casualty Incident (MCI).

Rules for Assigning a CTAS Level to Prehospital Patients:

Unlike in the ED where the initial CTAS level is assigned on initial contact with the patient by a triage nurse and not changed (i.e. it is truly used as a triage tool prior to any treatment) the prehospital care patient will have CTAS applied and documented a minimum of two (2) times. This will reflect the initial condition of the patient and the condition of the patient following paramedic interventions in the prehospital care setting. Additional CTAS levels may need to be determined and documented if a patient's condition changes prior to arrival at hospital. It is important to look for all modifiers that apply to the individual patient and not stop at the first modifier that is applied.

The first CTAS level will be determined on arrival at the patient (Arrival CTAS) and will reflect the initial condition of the patient prior to paramedic interventions and serve as a marker for response times as they relate to the patient's acuity. The additional information provided by the documentation of the Arrival CTAS will be useful when reviewing dispatch procedures, vehicle resources and patient care standards.

The second CTAS level will be determined at the time of departure from the scene (Departure CTAS). The Departure CTAS will aid in determining the destination (e.g. CTAS Level 1 and 2 to the nearest/closest most appropriate receiving facility) and will also reflect any change in the patient's condition as a result of prehospital interventions on scene prior to transport.

These two CTAS levels (Arrival and Departure) are mandatory and must be documented on the ACR. Additional CTAS levels are to be obtained and documented if there is a change in the patient's condition enroute to the hospital. This CTAS level will reflect the patient's current condition if there has been a change from the Departure CTAS level. It is important for paramedics to notify the ED of any changes in the CTAS level enroute to allow the ED staff to prepare the appropriate resources for the patient. The ability and need to provide an additional CTAS score will be in large part determined by the transport time. With shorter transport times (e.g. 5 to 10 minutes) paramedics may not have an opportunity to update the CTAS level and notify the ED prior to arrival. With longer transport times (e.g. ≥20 minutes) there is a greater likelihood that the patient's condition may change thus changing the resources the ED must prepare in advance of patient. As well, there is generally more time for paramedics to update the ED of changes to the patient's CTAS level when transport times are longer.

Attitude and empathy are important. Remaining consistent and non-judgemental toward all patients is important. Any element of prejudice leading to a moral judgement of patients can increase patient risk due to incorrect assignment of acuity levels. Do not prejudge patients based on appearance or attitude.

The following rules must be considered by paramedics when assigning CTAS levels to patients.

Rule #1

A minimum of two (2) CTAS scores will be applied to each patient.

The initial CTAS level (Arrival CTAS) is determined on patient contact and sets the baseline to which future acuity determinations are compared. The more critical the patient's condition, the higher the level of acuity, Level 1 being the highest and Level 5 the lowest.

This Arrival CTAS level is not reported to the receiving institution however, it is required to be documented in the "Remarks" section of the ACR. In some instances the Arrival CTAS can be determined by the presenting complaint on its own. In other cases the paramedics may need to carry out the primary survey, obtain vital signs and potentially carry out a secondary survey so that modifiers can be used to determine the Arrival CTAS.

The second CTAS level (Departure CTAS) is the CTAS score applied after treatment has been initiated and at the time of departure from the scene. This will reflect any change in the patient's condition from arrival to departure and will assist paramedics in determining the final destination for the patient.

Rule #2

The CTAS level reported to the receiving institution is the level at departure from the scene (Departure CTAS) or if the patient's condition deteriorates after transport has been initiated.

The Departure CTAS level is based on the patient's initial complaint as well as the application of first and second order modifiers as determined by the information obtained from the primary survey and secondary survey, and the response to any treatment that has been given while on scene.

It is important that the acuity level reported to the receiving institution accurately reflect the patient's current condition since the patient's condition may have changed from initial contact. This may be due to treatment given or spontaneous change in the patient. An example would be a diabetic who is unconscious upon arrival. These patients may receive glucagon or intravenous glucose, respond quickly and becomes fully alert by departure. The initial acuity before treatment would be Level 1, but by departure is a Level 3. Thus, it would be more appropriate to inform a hospital that the patient is now a CTAS Level 3 diabetic, responsive and alert that initially was unresponsive prior to treatment.

If during transport to the hospital there is a deterioration in the patient's condition the ED must be notified. It will allow the ED to better prepare for the patient's arrival (e.g. appropriate stretcher/room, appropriate resources and alert additional staff if required). This revised CTAS level is to be clearly documented in the "Remarks" section of the ACR.

In instances where it is not practical to provide a radio update regarding changes to a patient's condition and CTAS level to the ED staff (e.g. short time to arrival), the updated CTAS level should be provided verbally to hospital staff on arrival.

Rule #3

When taking into consideration the patient's response to treatment, subsequent CTAS levels assigned must not be any greater than two (2) levels below the pre treatment acuity (Arrival CTAS).

With some paramedic interventions a patient's condition may improve significantly however, there is always the possibility that their condition may deteriorate or significantly change. Improvements in condition and CTAS level must be considered to be "dynamic" in the prehospital care setting as CTAS is applied over time and many factors (e.g. transport time) can affect the patient's acuity. For example, a patient may be found unresponsive with serious airway compromise because of an anaphylactic reaction on arrival and assigned Arrival CTAS Level 1. Following the administration of epinephrine the patient may improve to the point where they become alert and oriented with no airway issues prior to departure to the hospital. Paramedic must not however, assign a Departure CTAS level greater than two (2) levels below the Arrival CTAS level as this may not reflect how acutely ill the patient was on arrival and the potential for deterioration. This rule is meant to create a safety margin in cases where a patient's condition may deteriorate over time.

Rule #4

For a patient who is VSA on arrival and who is resuscitated, the CTAS must stay as a CTAS 1.

A patient's condition is not static and may change. An improvement in the patient's condition may be temporary and there is the risk that they could deteriorate again.

In the case of cardiac arrest patients who are VSA on arrival and who have been successfully resuscitated, the CTAS level should always remain as Level 1 throughout transport due to the potential need for further resuscitation and the significant risk of re-arrest.

Rule #5

If paramedics receive a Termination of Resuscitation (TOR) order while managing a patient, the CTAS level assigned for the patient and documented on the ACR is based on the status of the patient on arrival and departure (if applicable) from the scene.

Paramedics will assign an appropriate CTAS level based on their assessment of the patient on their arrival at the scene. If the patient is VSA on arrival, an Arrival CTAS Level 1 is assigned unless the patient is "obviously dead" as defined by the *BLS PCS*. If a patient is not VSA on arrival and is assessed to be a CTAS 2 or lower (e.g. chest pain of ischemic origin) but then experiences a cardiac arrest, the Arrival CTAS will not change however, if the patient is transported the Departure CTAS will be documented as CTAS Level 1.

If a TOR order is received prior to initiating transport, a Departure CTAS of zero (0) is to be documented on the ACR regardless if the patient is transported or not. No additional CTAS levels are required to be documented in the "Remarks" section of the ACR when a TOR order is received after transport has been initiated.

For all patients where a TOR order is received paramedics must ensure that the applicable procedure code for TOR is recorded in the procedure section of the ACR.

Rule #6

In cases where it is determined on arrival that a patient is "obviously dead", no CTAS level (Arrival or Departure) is required to be assigned and documented as a zero (0) on the ACR.

If a patient is determined on arrival at the scene to be "obviously dead" as defined by the *BLS PCS*, the CTAS level (Arrival or Departure) of zero (0) is required to be documented on the ACR regardless if the patient is transported or not.

Determination of a Receiving Facility:

The decision for determining a receiving facility is based on patient condition and the medical care the paramedic feels the patient will likely require. It will be necessary to provide the Departure CTAS to the ambulance communications officer (ACO) which will assist in determining the most appropriate receiving facility.

All CTAS Level 1 patients must be transported to the nearest/closest most appropriate receiving facility capable of providing the medical care required by the patient unless directed otherwise by an ACO. The following guidelines are to be used when considering transport decisions for CTAS levels:

- Level 1 – nearest/closest most appropriate receiving facility
- Level 2 – nearest/closest most appropriate receiving facility based on communication between paramedics, dispatch and the receiving facility.
- Level 3, 4, 5 – most available receiving facility based on communication between dispatch and the receiving facility. The final destination for these lower acuity levels may also take into consideration the patient's wishes for destination.

It should be noted that part of the determination of the most appropriate receiving facility is the consideration of other applicable criteria (e.g. *Field Trauma Triage Standard*) or local transfer guidelines, which include patient priority directives and/or local bypass protocols (e.g. STEMI, Stroke)

Documentation of CTAS:

CTAS levels, on arrival at the patient (Arrival CTAS) and on departure (Departure CTAS), must be documented on the Ambulance Call Report for all emergency patients transported to an ED. The current version of the ACR contains a specific field for the documentation of a patient's Departure CTAS. The Arrival CTAS should be documented within the "Remarks" section of the ACR. Arrival CTAS may be documented retrospectively on the ACR following the completion of the call. Any changes to a patient's CTAS level during transport should also be clearly documented in the "Remarks" section of the ACR.

Updated and revised versions of the ACR will include three (3) fields for the documentation of CTAS Arrive Patient, CTAS Depart Scene and CTAS Arrive Destination. Changes to the CTAS level that occur during transport will continue to be documented in the "Remarks" Section of the ACR.

CTAS Reporting to Dispatch:

CTAS information (Arrival CTAS, Departure CTAS and any updates) must be reported to dispatch so that it can be recorded as part of the dispatch call record. The Arrival CTAS can be provided at any time during the call or when clearing the hospital.

Prehospital CTAS vs. Emergency Department CTAS

It is important to note that the Prehospital CTAS may not always be the same as the CTAS level assigned to the patient in the ED. CTAS in the prehospital setting is used as a dynamic marker of the patient's acuity over time while in the ED CTAS is used to assess the acuity of the patient as a triage tool for a specific point in time. Differences may also occur due to modifying the presenting complaints used in the ED to make them more applicable to the prehospital care setting. Also, if the transport time is short (e.g. 10 minutes or less) the paramedic may not be able to patch to the ED to update the CTAS level. Finally, to be safe during transport, when taking into consideration the patient's response to treatment subsequent CTAS levels assigned must not be any greater than 2 levels below the pre treatment acuity (Arrival CTAS). Additionally studies have shown that assigning a CTAS level is accurate within one level 85% of the time with more variability in the lower acuity levels. CTAS levels done by two individuals are not expected to match 100% of the time.

Prehospital CTAS

Adult

Canadian Emergency Department Information System (CEDIS) and the Presenting Complaint

The Canadian Emergency Department Information System (CEDIS) is a health information tool that places patients into one (1) of eighteen (18) categories that are system based (e.g. cardiovascular, orthopedic and respiratory). The CEDIS list is a standardized list that was developed on a national basis by the NWG and is the exact same list that EDs use. Placing the patient into a specific CEDIS category initiates the process for determining the CTAS level for individual patients.

Once the CEDIS category is determined, a presenting complaint can be determined from a list of presenting complaints that are associated with each CEDIS category. These presenting complaints are essentially the same as those used by triage nurses in the ED but have been modified to be more applicable to the prehospital care setting. These modifications are as follows:

1. In the categories, ENT has been folded into one category instead of three.
2. The presenting complaints list is not as extensive as that used by triage nurses as the nurses must take into account ambulatory patients who do not require an ambulance for transport.
3. Some presenting complaints have first order modifiers added to them so that specific presenting complaints can be placed under specific CTAS levels.
4. Some specific conditions not included in the NWG presenting complaints list are included as some conditions are difficult to assign a CTAS level to.

The current presenting complaints list has approximately 150 presenting complaints making it difficult to use in the prehospital care setting. The NWG is revising the presenting complaints list used by nurses to adapt it for the prehospital care setting to make it more practical.

By using the CEDIS and the presenting complaints list to assess and categorize patients, paramedics will be speaking the "same language" as the ED thereby optimizing the communication between the prehospital environment and the ED.

The following is the list of CEDIS categories:

CEDIS Categories	
• Cardiovascular • ENT • Environmental • Gastrointestinal • Genitourinary • Mental Health • Neurologic • Obstetrics/Gynecology (OB/GYN)	• Ophthalmology • Orthopedic • Pediatric • Respiratory • Skin • Substance Misuse • Trauma • General and Minor

Prehospital Approach to Assigning CTAS Levels

A consistent and organized approach must be used to assess the CTAS level of individual patients to make the determination of CTAS timely, efficient and practical. To determine the CTAS level, up to four steps are required depending on the severity of the patient.

For the purposes of determining a CTAS level, an adult patient is defined as a person ≥18 years of age.

Quick Look

The first step in the CTAS process is the "Quick Look". In some cases, the CTAS level can be determined quickly by simply conducting a "Quick Look" when the presenting complaint is obvious. This applies primarily to critically ill patients who appear in extremis on initial contact. The "Quick Look" must not be used to place a patient in any CTAS level other that CTAS Level 1. Many patients who may not appear ill may have subtle signs that modifiers will identify placing them in a more acute CTAS level than the "Quick Look" would indicate.

Presenting Complaint

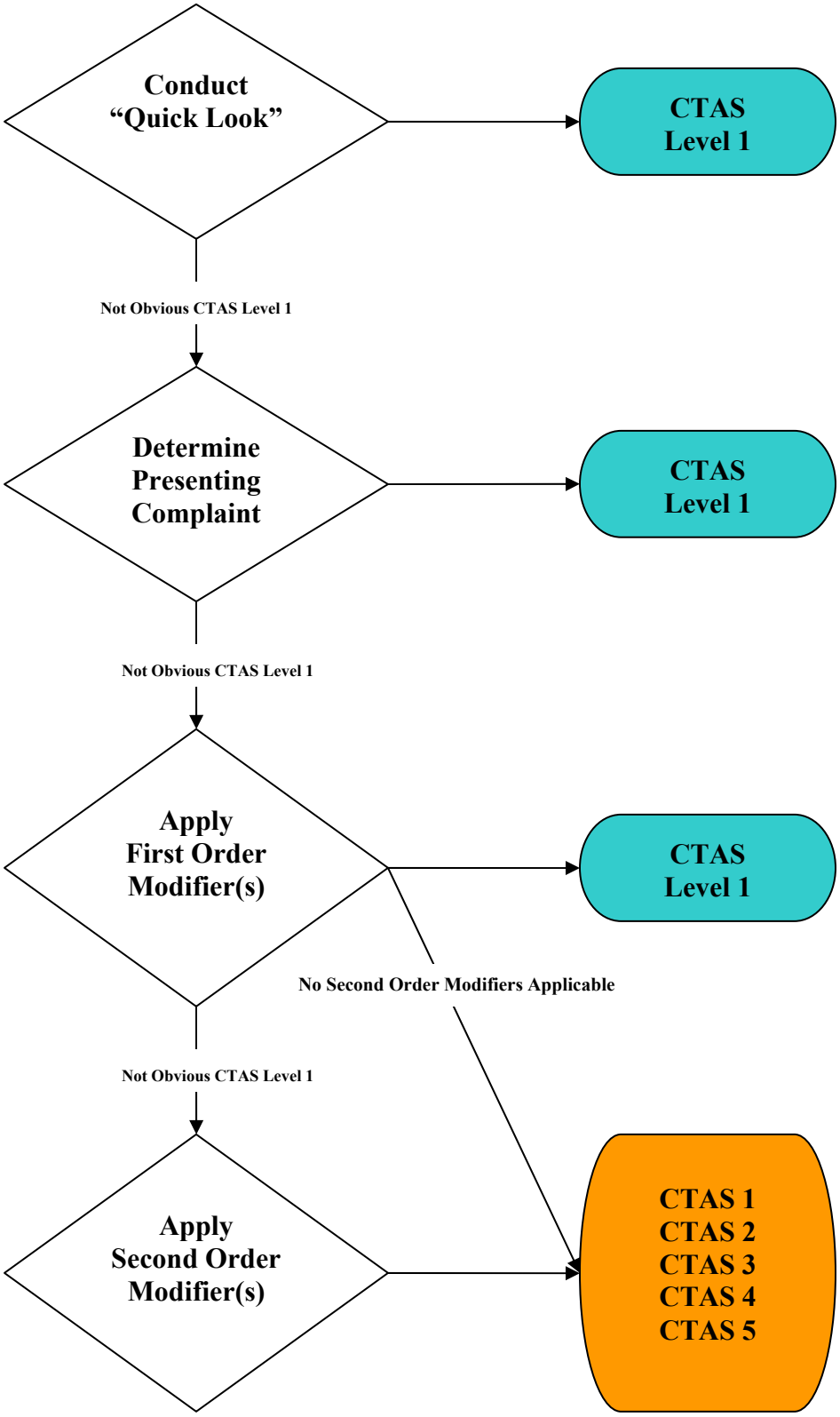
The second step is to determine the presenting complaint based on the CEDIS category. As with the "Quick Look", the presenting complaint should only be used to place the patient into CTAS Level 1. An example of this is a patient in the cardiovascular category with a complaint of chest pain with cardiac features and signs of decompensation.

First and Second Order Modifiers

In many cases however, it may not be obvious what the CTAS level should from the "Quick Look" and the presenting complaint alone. In these cases, first and second order modifiers will be needed to assign a CTAS score. These modifiers are determined during the primary and secondary surveys and will help refine the severity of the presenting complaint to accurately determine the CTAS level. In addition, many presenting complaints will fall within more than one CTAS level and modifiers will be needed to accurately determine the CTAS level. A good example of this is a patient that falls within the gastrointestinal category with a presenting complaint of abdominal pain where the presence of fever, vital sign abnormalities and pain severity will affect the CTAS level. First and second order modifiers are the third and fourth steps in determining the CTAS level and their application in determining CTAS levels will be discussed in detail later in the Guide.

By following an organized approach for every patient that includes the "Quick Look", determining the presenting complaint and applying modifiers where applicable, paramedics will improve their ability to consistently assign CTAS scores. It is important to look for all modifiers that apply to the individual patient and not stop at the first modifier that is applied.

Organized Approach to CTAS Determination – Adult



CTAS Levels – Common Prehospital Presentations

The following are lists of the CEDIS categories and typical presenting complaints by CTAS level. The three ENT categories have been folded into one category thus there are sixteen (16) categories for each CTAS level compared to the eighteen used by triage nurses. In addition, some first order modifiers have been added to help clarify some of the presenting complaints.

CTAS Level 1 – Resuscitation

Cardiovascular

- Cardiac arrest - traumatic and non-traumatic
- Pre-arrest - severe end-organ hypoperfusion (e.g. tachycardia, hypotension)
- Patients with a return of spontaneous circulation (ROSC) following a cardiac arrest
- Chest pain with cardiac features - severe end-organ hypoperfusion
- Severe dehydration

Environmental

- Chemical burn - ≥25% body surface area

Mental Health

- Violent/homicidal behaviour - imminent harm to self or others or specific plans
- Bizarre behaviour - uncontrolled

Neurological

- Unconscious - GCS 3-9
- Seizures - actively seizing

Obstetrics/Gynecology

- Pregnancy ≥20 weeks - presenting fetal parts, prolapsed cord
- Pregnancy ≥20 weeks - vaginal bleeding in 3rd trimester

Respiratory

- Respiratory arrest
- Shortness of breath - severe respiratory distress

Trauma

- Major trauma - severe hemodynamic compromise (shock)
- Traumatic amputation of an extremity

CTAS Level 2 – Emergent

Cardiovascular

- Chest pain with cardiac features - borderline perfusion (e.g. tachycardia with low blood pressure)
- Hypertension - SBP ≥220 or DBP ≥130 with symptoms
- Syncope - history of new onset dysrhythmia/irregular pulse and/or known/suspected change in rate
- Moderate dehydration

Ears, Nose, Throat

- Dental avulsion
- Sore throat - drooling or stridor, obvious edema/swelling of lips, tongue or oropharynx
- Neck pain - neck stiffness/meningismus +/-fever
- Epistaxis - uncontrolled despite appropriate pressure

Environmental

- Frostbite/cold injury - cold pulseless limb
- Hypothermia with severe symptoms
- Chemical exposure - eye(s)
- Chemical exposure - major burns to hand(s), feet, groin or face
- Allergic reaction - previous severe reaction

Gastrointestinal

- Vomiting blood - active or significant hematemesis
- Rectal bleed - large amount of melena or rectal bleeding
- Abdominal pain (severe pain)

Mental Health

- Attempted suicide or clear suicide plan
- Severe anxiety/agitation

Neurologic

- Altered level of consciousness - GCS 10-13
- Headache - sudden, severe, worst ever
- Headache - visual acuity disturbance +/- eye pain
- Seizure - post-ictal
- CVA - time of symptom onset <3.5 hours

Obstetrics/Gynecology

- Vaginal bleeding - heavy +/- pregnancy
- Pregnancy ≥20 weeks - active labour (contractions <2 minutes apart)
- Pregnancy ≥20 weeks - complex hypertension +/- headache +/-edema +/-abdominal pain

CTAS Level 2 – Emergent (continued)

Ophthalmology

- Acute vision loss

Respiratory

- Shortness of breath - moderate respiratory distress
- Foreign body obstruction - drooling or stridor, hoarseness or dysphagia

Trauma

- Significant Mechanism of Injury - all patients with injuries, symptoms and complaints related to trauma
- Penetrating head, chest or abdomen
- Neurovascular compromise of an extremity
- Burns - ≥25% body surface area
- Abdominal pain (severe central pain)

CTAS Level 3 – Urgent

Cardiovascular

- Chest pain, non cardiac features - acute onset, ongoing
- Hypertension - SBP ≥220 or DBP ≥130 with no symptoms
- Hypertension - SBP 200-220 or DBP 110-130 with symptoms
- Mild dehydration

Environmental

- Frostbite/cold injury - blanching of skin
- Hypothermia - moderate symptoms

Gastrointestinal

- Vomiting blood - "coffee-ground" emesis, small amount
- Rectal bleed - melena, small amount

Mental Health

- Depression/suicidal (suicidal ideation, no plan)
- Moderate anxiety/agitation

Neurologic

- Seizures - resolved, normal level of alertness
- CVA - onset of symptoms ≥3.5 hours or resolved

Obstetrics/Gynecology

- Menorrhagia
- Pregnancy ≥20 weeks (active labour, contractions ≥2 minutes apart)
- Pregnancy ≥20 weeks - possible leaking amniotic fluid (≥24 hours)

Respiratory

- Shortness of breath - mild/moderate respiratory distress
- Foreign body obstruction - no distress but with difficulty swallowing

Trauma

- Burns - 5-25% body surface area

CTAS Level 4 – Less Urgent

Cardiovascular

- Hypertension - SBP 200-220 or DBP 110-130 with no symptoms
- Potential for dehydration

Environmental

- Hypothermia - mild with normal vital signs

Gastrointestinal

- Rectal Bleeding - small amount
- Constipation (mild pain < 4/10)

Genitourinary

- Urinary tract infection complaints/symptoms (mild dysuria)

Mental Health

- Mild anxiety/agitation

Neurologic

- Confusion - chronic, no change from usual state

Obstetrics/Gynecology

- Non pregnant vaginal bleeding - minor/spotting

Trauma

- Burns - <5% body surface area
- Laceration/puncture (sutures required)
- Upper extremity injury

CTAS Level 5 – Non-Urgent

Environmental

- Minor bites (+/- mild pain <4)

Gastrointestinal

- Diarrhea (mild, no dehydration)

General and Minor

- Dressing change (plus normal vital signs +/- mild pain <4)

Respiratory

- Sore throat/upper respiratory illness - no respiratory symptoms/compromise

Trauma

- Minor contusions, abrasions or lacerations (not requiring closure by any means)

Adult CTAS Modifiers

In some cases, the CTAS level can be determined quickly by the presenting problem/chief complaint and the patient's general appearance/primary survey. This is common for high acuity patients (CTAS Level 1/2) who present with serious, life threatening illness or injury (e.g. cardiac arrest).

In many cases however, more information and assessment is needed to determine an accurate CTAS level. This additional information is systematically referred to as first and second order modifiers. Modifiers are additional physiologic and/or historical information that are applied along with the patient's presenting chief complaint to determine the appropriate CTAS level.

More than one modifier can be applied to a given patient in some cases. To determine the most accurate acuity when more than one modifier is assessed, paramedics should choose the highest CTAS level from all of the modifiers that are applicable.

The HIGHEST CTAS level must be assigned using ALL applicable modifiers

First Order Modifiers

First order modifiers are applied once the presenting complaint has been determined and the modifiers are applied in two (2) steps/groups. The initial first order modifiers that are applied are related to airway, breathing and circulation (ABCs), level of consciousness (D-deficits) and vital signs. These include:

1. Respiratory Distress modifier ("A" and "B") using the respiratory rate, oxygen saturation (if available) and respiratory effort.
2. Hemodynamic Stability modifier ("C") using heart rate, blood pressure and signs of perfusion.
3. Level of Consciousness modifier ("D") using the patient's general level of consciousness and the Glasgow Coma Scale (GCS).
4. Temperature (if available)

The second group of first order modifiers that are applied are related to specific conditions or symptoms. These include:

1. Pain
2. Bleeding Disorders
3. Mechanism of Injury (MOI)

Respiratory Distress

While collecting the history, observe the patient's breathing to evaluate respiratory effort, rate, depth, accessory muscle use, in drawing, skin colour and the position the patient assumes to assist with respiratory effort. Assess for airway and breathing sounds such as stridor, cough, wheezes and crackles. The degree of respiratory distress indicates a CTAS level as shown in Table 1. Using oxygen saturation readings to help differentiate the level of respiratory distress assumes an accurate reading and an assumption of normal oxygen saturation when healthy. For patients with chronic respiratory disease, you may need to rely more on other signs of respiratory distress. The adult Respiratory Distress-based modifier recommendations are shown below.

Table 1 – Respiratory Distress

Level of Distress	O_2 Saturation	CTAS Level
Severe: Fatigue from excessive work of breathing, cyanosis, single-word speech, unable to speak, upper airway obstruction, lethargic or confused	<90%	**1**
Moderate: Increased work of breathing, speaking phrases or clipped sentences, significant or worsening stridor but the airway protected.	<92%	**2**
Mild/Moderate: Dyspnea, tachypnea, shortness of breath on exertion, no obvious increased work of breathing, able to speak in sentences, stridor without any obvious airway obstruction	92-94%	**3**
None	≥94%	**4, 5**

*First and Second Order Modifier tables (1-33) adapted from Ontario Hospital Association CTAS training manual, 2009

Hemodynamic Stability

The patient's perfusion status is assessed taking into consideration the skin colour, temperature and moisture. These are helpful signs to differentiate shock, hypoperfusion and hemodynamic compromise. An effective way to evaluate a patient's perfusion is to palpate their radial pulse. The rate and quality of the pulse rate can be used to assess cardiac output. The patient's heart rate and blood pressure readings are obtained to quantify the assessment of hemodynamic status. This modifier is perhaps the one that will upgrade the patient's CTAS level more than any other modifier and may be overlooked as other modifiers may also apply to the patient. It must be remembered that if more than one (1) modifier applies to the patient and their presenting complaint, the modifier that gives the most acute CTAS level is used. For example, a patient that falls in the respiratory category with a presenting complaint of shortness of breath, has a temperature of 39.0^{o}C, an oxygen saturation of 91%, a systolic blood pressure of 80 mmHg and who is pale and diaphoretic would be a CTAS Level 2 if only the Respiratory Distress modifier or the Temperature modifiers were used. This patient is actually a CTAS Level 1 as the application of the Hemodynamic Stability modifier places the patient in the higher CTAS level.

The adult Hemodynamic Stability-based modifier recommendations are shown below.

Table 2 – Hemodynamic Stability

Hemodynamic Status	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.	**1**
Hemodynamic Compromise. Evidence of borderline perfusion: pale, history of diaphoresis, unexplained tachycardia, postural hypotension (by history), feeling faint on sitting and standing, or suspected hypotension (lower than normal blood pressure or expected blood pressure for a given patient).	**2**
Vital signs at the upper and lower ends of normal as they relate to the presenting complaint, especially if they differ from the usual values for the specific patient.	**3**
Normal Vital signs	**4, 5**

Level of Consciousness

Level of consciousness assessment provides important information about neurological function. Quantifying neurological function is easily performed using the GCS which was developed for, and is appropriately applied to, patients presenting with a suspected head injury. Remember, the criteria to determine the GCS are elicited/actively obtained not just observed.

Patients with dementia, cognitive impairment or chronic neurologic dysfunction may make the use of the score difficult. Attempts should be made to determine baseline function and determine if there is any change from the patient's norm when conducting an assessment.

The adult Level of Consciousness-based modifier recommendations are shown below.

Table 3 – Level of Consciousness

Status – Level of Consciousness	GCS	CTAS Level
Unconscious: Unable to protect airway, response to pain or loud noise only and without purpose, continuous seizure or progressive deterioration in level of consciousness	3 - 9	**1**
Altered level of consciousness: Response inappropriate to verbal stimuli, loss of orientation to person, place or time, new impairment of recent memory, altered behaviour	10 - 13	**2**
Normal: Other modifiers are used to define	14 - 15	**3, 4, 5**

Temperature

Fever is defined as an oral temperature of $\geq 38.5^{o}$ C in adult patients (≥18 years of age). There is increasing emphasis on the importance of early recognition of adult patients with systemic infections since early intervention has been shown to have a direct effect on morbidity and mortality. With this in mind, the CTAS modifier definitions are based on an understanding of Systemic Inflammatory Response Syndrome (SIRS) and its role in defining sepsis and severe sepsis. It is important to note that with these conditions, the systemic effect of an infection can result in either hyperthermia (temperature $\geq 38.5^{o}$C) or hypothermia (temperature $<36^{o}$C). Hypothermia is a result of the sepsis affecting the body's normal thermal autoregulation process. Patients with hypothermia have worse outcomes than those who are able to maintain their thermal autoregulation. Although hypothermia is more common in the pediatric and elderly populations, it can occur in any patient with sepsis. It is important to know that fever and hypothermia are defined using an oral reading.

SIRS is the systemic inflammatory response which can be associated with a variety of severe infectious insults. The response is manifested by two (2) or more of the following conditions (only the first three (3) can be assessed in the prehospital care setting):

- temperature ≥38.5°C or <36°C
- heart rate ≥90 beats/minute
- respiratory rate ≥20 breaths/minute
- $PaCO_2$ <32 torr (<4.3 kPa)
- WBC ≥12000 cells/mm^3. <4000 cells/mm^3 or ≥10% immature (band) forms

Sepsis is defined as the systemic response to infection, manifested by two (2) or more of the SIRS criteria as a result of infection. Severe sepsis is defined as sepsis associated with organ dysfunction, hypoperfusion or hypotension; hypoperfusion and perfusion abnormalities may include but are not limited to lactic acidosis, oliguria or an acute alteration in mental status.

The adult Temperature-based modifier recommendations are shown below:

Table 4 – Temperature

Temperature ≥38.5^o	CTAS Level
Immunocompromised: neutropenia (or suspected), chemotherapy or immunosuppressive drugs including steroids	**2**
Looks septic: patient has evidence of infection, have 3 SIRS criteria positive, or show evidence of hemodynamic compromise, moderate respiratory distress or altered level of consciousness	**2**
Looks unwell: patient has <3 SIRS criteria positive but appear ill-looking (i.e. flushed, lethargic, anxious or agitated)	**3**
Looks well: patient has fever as their only positive SIRS criteria and appear to be comfortable and in no distress	**4**

Any patient with a suspected infectious process who is immunocompromised or presenting with hemodynamic compromise, moderate respiratory distress or altered level of consciousness should automatically be assigned at a minimum a CTAS Level 2; and given the evidence of circulatory, respiratory or central nervous system dysfunction, should be considered severe sepsis and treated accordingly. Other First Order Modifiers (Respiratory Distress, Hemodynamic Stability and Level of Consciousness) often apply to these patients and must be applied to determine the appropriate/accurate CTAS level. The highest CTAS level with the temperature modifier is a CTAS 2 and if any one of the other First Order Modifiers indicates that the patient should be a CTAS Level 1 then this score must be applied to the patient.

Pain

Pain assessment is an important determinant of patient acuity after first ensuring that abnormal vital signs have not already assigned the patient CTAS Level 1 or 2. Pain may be an indicator of a serious underlying illness or injury. For the purpose of CTAS, pain is assessed as to its severity, location and duration.

Pain Severity

A patient's pain severity is assessed using the Likert scale – mild, moderate, severe. Each category of pain is further defined using a scale of 0 – 10 where 0 is the least amount and 10 is the worst.

- Severe: 8 – 10 /10
- Moderate: 4 – 7 /10
- Mild: 0 – 3 /10

Pain Location

The location of pain is divided into central and peripheral pain as the pathophysiology involved in producing the pain and the quality of the pain is quite different.

Central pain: originates within a body cavity or organ and may be associated more frequently with life threatening conditions. As the cause of the pain is often not visible, serious conditions could be overlooked.

Peripheral pain: originates in the skin, soft tissues, axial skeleton or superficial organs where dangerous diagnoses are less likely to be missed.

Note: If a patient presents with pain in a location that would be usually considered a peripheral site but it is suspected that the patient has a potential life or limb threatening condition (e.g. necrotizing fasciitis, peripheral or vascular occlusion) the pain should be scored as central pain.

Pain Duration

Acute pain: a new onset pain and is more likely to prove dangerous (prior to a diagnostic work-up) than chronic pain.

Chronic pain: a well-recognized continuing or recurring pain syndrome manifesting the same pattern.

The adult Pain-based modifier recommendations are shown below:

Table 5 – Pain

Severity	Location	Duration	CTAS Level
Severe (8 – 10/10)	Central	Acute	**2**
		Chronic	**3**
	Peripheral	Acute	**3**
		Chronic	**4**
Moderate (4 – 7/10)	Central	Acute	**3**
		Chronic	**4**
	Peripheral	Acute	**4**
		Chronic	**5**
Mild (0 – 3/10)	Central	Acute	**4**
		Chronic	**5**
	Peripheral	Acute	**5**
		Chronic	**5**

Bleeding Disorders

These modifiers have been developed with input from the Canadian Hemophilia Society. Patients with congenital bleeding disorders and significant factor deficiencies usually require rapid factor replacement. Patients on anticoagulants or with severe liver disease may have a diminished ability to clot with prolonged prothrombin time (PT), partial thromboplastin time (PTT) or International Normalized Ratio (INR) and are at risk for massive bleeding requiring rapid intervention. While the prehospital patient population with congenital or acquired bleeding disorders is limited, these modifiers are applicable to all presenting complaints related to trauma plus any non-trauma presenting complaint with associated bleeding (e.g. GI bleed), thus the decision to consider these as first order modifiers.

The Bleeding Modifier is to be applied to the following patients:

1. Patients with congenital bleeding disorders (e.g. hemophilia, Von Willebrand's Disease).
2. Patients with severe liver failure.
3. Patients taking anticoagulants (e.g. coumadin, warfarin, dalteparin).

The adult Bleeding Disorder-based modifier recommendations are shown below:

Table 6 – Bleeding Disorders

Bleeding Site	CTAS Level
• Head (intracranial) and neck • Chest, abdomen, pelvis, spine • Massive vaginal hemorrhage • Iliopsoas muscle and hip • Extremity muscle compartments • Fractures or dislocations • Deep lacerations • Any uncontrolled bleeding	**2**
• Moderate, minor bleeds • Nose (epistaxis) • Mouth (including gums) • Joints (hemathroses) • Menorrhagia • Abrasions and superficial lacerations	**3**

Mechanism of Injury (MOI)

MOI has been added as a modifier to assist in assigning a CTAS level for trauma patients. All patients with injuries, symptoms, and complaints related to trauma should have the MOI assessed and documented. MOI describes how energy was transferred from the environment to the patient. Anatomical and kinetic knowledge can assist in predicting how energy was transferred and help identify or anticipate possible injuries.

The MOI may place a patient in a more acute CTAS level in patients who may have otherwise been considered stable. All trauma patients meeting the MOI criteria below are to be considered CTAS level 2. Remember however, to apply all applicable modifiers as other first order modifiers may classify the patient as CTAS Level 1.

The adult Mechanism of Injury-based modifier recommendations are shown below:

Table 7- Mechanism of Injury

Mechanism of Injury	CTAS Level 2
General Trauma	**Motor Vehicle Collisions** • Ejection (partial or complete) from vehicle • Rollover • Extrication time ≥20 minutes • Significant intrusion into passenger's space (≥ 0.3 metres occupant site; ≥0.5 metres any site, including roof) • Death in the same passenger compartment • Impact ≥40 km/h (unrestrained) or impact ≥60 km/h (restrained) **Motorcycle Collision** • Impact with a vehicle ≥30 km/h, especially if rider is separated from motorcycle **Fall** • From ≥6 metres (one storey is equal to 3 metres) **Penetrating Injury** • To head, neck, torso or extremities proximal to elbow and knee
Head Trauma	**Motor Vehicle Collision** • Ejection (partial or complete) from vehicle • Unrestrained passenger striking head on windshield **Pedestrian** • Struck by vehicle **Fall** • From ≥1 metre or 5 stairs **Assault** • With blunt object other than fist or feet
Neck Trauma	**Motor Vehicle Collision** • Ejection (partial or complete) from vehicle • Rollover • High speed (especially if driver unrestrained) **Motorcycle Collision** **Fall** • From ≥1 metre or 5 stairs **Axial Load to the Head**

Second Order Modifiers

Second Order Modifiers are more complaint-specific and are applied after the presenting complaint is determined and the first order modifiers have been applied. A second order modifier should not be used to downgrade the CTAS level in instances where a higher CTAS prevails due to the presenting complaint or where first order modifiers apply. For example, if a patient has chest pain of suspected cardiac origin, shortness of breath with an oxygen saturation of 91% and a blood pressure of 210/100, the second order modifier of hypertension would class the patient as a CTAS level 3. The patient however, should stay at CTAS level 2 due to the presenting complaint of chest pain of ischemic origin and the first order modifier of Respiratory Distress with the oxygen saturation of 91%.

Second order modifiers are of two (2) types:

1. Second order modifiers are meant to supplement first order modifiers that may apply to more than one (1) or more presenting complaints:
    - blood glucose
    - hypertension
    - dehydration
    - selected adult second order modifiers.

2. Presenting complaint specific modifiers - apply to specific presenting complaints that first order modifiers may not adequately address
    - obstetrics ≥20 weeks gestation
    - mental health

Blood Glucose Level

Blood glucose level is a second order modifier for patients with diabetes and/or whose presenting complaint may be associated with an abnormal glucose level. Complaints associated with this second order modifier are: hyperglycemia, altered level of consciousness and confusion.

The *Hypoglycemia Medical Directive* within the *ALS PCS* would be used to obtain a blood sugar level if the patient meets the applicable indications. Hypoglycemic patients often respond very quickly to treatment and can go from being unconscious with a GCS of 5 on arrival (Arrival CTAS Level 1) to being alert and oriented and essentially back to normal on departure. Rule #3 however, stipulates that a patient's CTAS level cannot go down more than two (2) levels from the Arrival CTAS level so the Departure CTAS cannot go below CTAS 3 in these types of cases.

The adult Blood Glucose Level-based modifier recommendations are shown below:

Table 8 – Blood Glucose Level

Blood Glucose Level	Symptoms	CTAS Level
<3 mmol/L	Confusion, seizure, diaphoresis, behavioural change, acute focal deficits	**2**
	None	**3**
≥18 mmol/L	Dyspnea, tachypnea, dehydration, thirst, weakness, polyuria	**2**
	None	**3**

Hypertension/Blood Pressure

Elevated blood pressure can be used to determine the CTAS level in cases where it is the primary problem or to modify and upgrade other presenting complaints such as headache and chest pain. It should not however, be used to downgrade the CTAS level in instances where a higher CTAS prevails due to the presenting problem (e.g. patient has chest pain with suspected cardiac origin but the blood pressure is 210/100 should stay at CTAS Level 2 due to the chest pain).

The adult Hypertension/Blood Pressure-based modifier recommendations are shown below:

Table 9 – Hypertension/Blood Pressure

Blood Pressure	Symptoms	CTAS Level
Systolic Blood Pressure ≥220 or Diastolic Blood Pressure ≥130	**Any** other symptoms (e.g. headache, chest pain, shortness of breath or nausea).	**2**
Systolic Blood Pressure ≥220 or Diastolic Blood Pressure ≥130	**No** symptoms.	**3**
Systolic Blood Pressure 200 - 220 or Diastolic Blood Pressure 110 - 130	**Any** other symptoms (e.g. headache, chest pain, shortness of breath or nausea).	**3**
Systolic Blood Pressure 200 - 220 or Diastolic Blood Pressure 110 - 130	**No** symptoms	**4, 5**

Dehydration

Dehydration is not a specific presenting complaint and is directly related to three (3) presenting complaints; nausea/vomiting, diarrhea and general weakness. It is particularly important in the pediatric population (covered later in this Guide) and in the elderly where dehydration may have significant implications to other co-morbid conditions.

The adult Dehydration-based modifier recommendations are shown in the table below:

Table 10 – Dehydration

Dehydration	CTAS Level
Severe Dehydration: marked volume loss with classic signs of dehydration and signs and symptoms of shock.	**1**
Moderate Dehydration: dry mucous membranes, tachycardia, plus or minus decreased skin turgor and decreased urine output.	**2**
Mild Dehydration: stable vital signs with complaints of increasing thirst and concentrated urine and a history of decreased fluid intake or increased fluid loss or both.	**3**
Potential Dehydration: no symptoms of dehydration, presenting with fluid loss ongoing or difficulty tolerating oral fluids.	**4**

Selected Second Order Adult Modifiers

These second order modifiers apply to a few specific presenting complaints and help to further determine the CTAS level that may not be adequately addressed by the first order modifiers. For instance a patient may have a fractured forearm and complain minimally of pain. The patient's pain of 2 out of 10 places them as a CTAS 5 but if the forearm is deformed, this increases the CTAS to a level 3. They also help highlight other potential significant causes of chest pain and address stroke and TIA symptoms.

The Selected Second Order Adult Modifier recommendations are shown below:

Table 11 – Selected Second Order Adult Modifiers

Presenting Complaint	Revised Modifier	CTAS Level
Chest pain, non cardiac features	Other significant chest pain (ripping or tearing)	**2**
Extremity weakness/symptoms of CVA	Time of onset of symptoms <3.5 hours.	**2**
	≥3.5 hours or resolved	**3**
Difficulty swallowing/dysphagia	Drooling or stridor, hoarseness or dysphagia	**2**
	No distress but with difficulty swallowing	**3**
Upper or lower extremity	Obvious deformity	**3**

Obstetrics ≥20 Weeks Gestation

Obstetrical patients may present with complications/conditions that are specific to pregnancy and may result in complications that can rapidly deteriorate. As such, pregnant patients need further modifiers applied to capture these unique situations. The following table is to be used for gestation ≥20 weeks only. For obstetrical patients <20 weeks gestation, the presenting complaint and other first and second order modifiers should be applied to determine the CTAS level. The *BLS PCS* for managing all obstetrical patients also apply.

The Obstetrics ≥20 Weeks Gestation-base modifier recommendations are shown below:

Table 12 - Obstetrics - ≥20 weeks Gestation

Presenting Complaint	CTAS Level
Presenting fetal parts or prolapsed umbilical cord.	**1**
Vaginal bleeding in the third trimester (other than show).	**1**
Active labour (contractions <2 minutes apart).	**2**
No fetal movement or no fetal heart sounds.	**2**
Complex hypertension +/- headache, +/- edema, +/- abdominal pain.	**2**
Post delivery (mother and infant).	**2**
Active labour (contractions ≥2 minutes apart).	**3**
Possible leaking amniotic fluid (≥24 hours).	**3**

Mental Health

As there are no "hard" measurements (e.g. vital signs) to apply when assessing a patient for possible mental health problems it is often difficult to assess their acuity. Assigning a CTAS level to patients with possible mental health disorders is unique in that it attempts to quantify the risk of the patient causing harm to themselves and/or to others around them. It is also important to remember that many primary complaints (termed "organic disorders") may masquerade as a mental health problem (e.g. hypoglycemia). Paramedics need to take this into consideration when assessing patients for a mental health condition.

Paramedics are reminded to follow the specific standards found within the *BLS PCS*, Section 8 – Psychiatric Disorders, when assessing, managing and transporting patients with possible mental health disorders.

Table 13 – Mental Health

The adult Mental Health-based modifier recommendations are shown below:

Presenting Complaint	Description	CTAS Level
Depression/Suicidal or deliberate self harm.	Attempted suicide, clear plan.	**2**
	Active suicide intent.	**2**
	Uncertain flight or safety risk.	**2**
	Suicidal ideation, no plan.	**3**
	Depressed, no suicidal ideation.	**4**
Anxiety/Situational Crisis	Severe anxiety/agitation.	**2**
	Uncertain flight or safety risk.	**2**
	Moderate anxiety/agitation.	**3**
	Mild anxiety/agitation.	**4**
Hallucinations or Delusions	Acute psychosis.	**2**
	Severe anxiety or agitation.	**2**
	Uncertain flight or safety risk.	**2**
	Moderate anxiety or agitation or with paranoia.	**3**
	Mild agitation, stable.	**4**
	Mild anxiety or agitation, chronic hallucinations.	**5**
Insomnia	Acute	**4**
	Chronic	**5**
Violent or Homicidal Behaviour	Imminent harm to self or others, or specific plan.	**1**
	Uncertain flight or safety risk	**2**
	Violent or homicidal ideation, no plan.	**3**
Social Problem	Abuse physical, mental, high emotional stress.	**3**
Bizarre Behaviour	Uncontrolled	**1**
	Chronic, non-urgent	**5**

Patients Who Are Hard to Assign an Acuity Level:

If a patient seems difficult to assign an acuity level to because they don't seem to fit any of the categories, paramedics need to either discuss the case with their partner or make a judgement based on their experience and/or instinct. The fundamental principle when deciding on an acuity level is the potential seriousness of the problem and how quickly they need to be seen for treatment. Whenever there is a debate about the level, always err on the side of assigning a higher level of acuity. If you are unsure, remember, "**If they look sick they probably are**".

It may also be difficult to assign a CTAS level to patients with the same set of symptoms or in cases where the presenting complaint can be assigned to one of several CTAS levels (e.g. chest pain, head injury, asthma, etc). This is because the same problem has varying severity to their presentations. It is important to understand the severity in each of these levels and be aware that more than one first or second order modifier may apply to the patient. It is important to look for all modifiers that apply to the individual patient and not stop at the first modifier that is applied.

Prehospital CTAS

Pediatric

Pediatric Prehospital CTAS

For the purposes of determining a CTAS level, a pediatric patient is defined as a person <18 years of age.

Comparison of Adult and Pediatric CTAS

The basic process for determining the CTAS level for pediatric patients is the same as for adults including:

- The critical "First Look".
- The presenting chief complaint determination.
- Concurrently obtaining a pertinent history.
- The application of appropriate first and second order modifiers to make a final CTAS level determination for patients that are not obviously CTAS Level 1 patients.

Although the basic process for assessing pediatric patients is the same, there are some significant differences with respect to presenting complaints, the critical "First Look", the order in which modifiers are applied and how the modifiers are applied that make the overall assessment of the pediatric patient quite different from an adult. These differences are highlighted below.

Pediatric Considerations:

The signs and symptoms of serious problems may be subtle or develop quickly in children. Frequent reassessment of children is especially important to ensure their safety and address the concerns of parents/caregivers.

"First Look"

The initial impression of the severity of illness from a quick assessment of general appearance, work of breathing and circulation (Pediatric Assessment Triangle) can often define the need for immediate attention. The value of this critical "First Look" cannot be over emphasized and it is important to note that it is different from the usual "ABCD" approach used with adults. It is extremely important to identify CTAS Level 1 or Level 2 patients as soon as possible as they require immediate transport of the child to the emergency department for further assessment and treatment.

"First Look" using the Pediatric Assessment Triangle (PAT)

The PAT is the most important tool that a paramedic can use to quickly identify those children with conditions that require immediate attention and transport. The PAT can be initiated concurrently with obtaining pertinent information about the history associated with the presenting complaint.

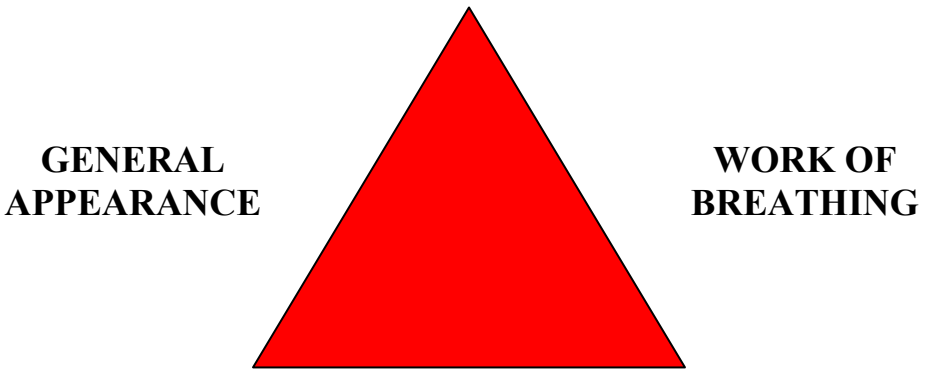
All pediatric patients must have the critical "First Look" noting the three components that are used in the PAT: general appearance, work of breathing and circulation. This part of the assessment may be limited if the patient requires rapid access to care/interventions (CTAS Level 1 & 2 patients).

The first step in the PAT is the child's overall appearance looking at the child's degree of distress and emotional response. It may be severe distress to no apparent distress or anxious to indifferent. The child may be alert or appear very lethargic or "floppy". If they are lethargic, do they respond to stimulation?

The second step in the triangle is noting the work of breathing by looking at respiratory rate, respiratory effort (shallow breaths, indrawing, accessory muscle use) and listening for adventitious sounds (wheezing, grunting, stridor).

The third step is to determine the patient's circulatory status by observing skin colour and temperature. Look for signs of dehydration. Circulation to the skin will generally shutdown when a pediatric patient is in shock. The signs of poor circulation to the skin include pallor, mottling and cyanosis.

The PAT is illustrated below:



Presenting Complaint

In pediatrics, assessment of the presenting complaint is often complicated by the limited ability of children to communicate their difficulties and a paramedic's reliance on the perceptions of caregivers. Many conditions are categorized differently in the pediatric population and there are a number of pediatric specific entities, e.g., neonatal jaundice. The significance of certain presenting complaints in the pediatric population may be of greater importance compared to that in the adult population (e.g. vomiting). Furthermore, many problems seen in pediatric patients may be categorized within multiple CTAS levels depending on the physiologic response of the child to their condition.

The five (5) most common presenting complaints are:

- Fever
- Respiratory difficulties
- Injuries
- Changes in behaviour
- Vomiting and/or diarrhea (dehydration)

Pediatric History: Subjective Data

The ability of young children to accurately describe symptoms, feelings and events should never be underestimated. Obtaining an accurate history in an efficient manner is dependant upon many variables that differ from obtaining a history from an adult. These variables include the child's age, developmental status, language, ability to interact and the ability to apply/assess for specific modifiers (e.g. pain). Other factors that may influence effective communication include cultural differences, the need for an interpreter, hearing disability and mental competency. In general, avoid leading questions as they may inadvertently bias the information given. Open-ended questions help elicit feelings and perceptions along with the specifics of the presenting complaint. Closed questions (with yes or no answers) are useful for obtaining facts. In general, initial questions should be open-ended (subjective assessment) whereas closed questions (objective assessment) can be used to validate information.

In many cases the information received from a parent/caregiver may be all that is available. Listen closely to the details given and also take into account their perception of the child's condition. Information is not solely obtained from verbal communication as non-verbal communication from observing the child and the parents/caregivers can be helpful. It cannot be emphasized enough how significant non-verbal information is as an important source of information.

Attitude and empathy are important. Remaining consistent and non-judgemental toward all patients is important. Any element of prejudice leading to a moral judgement of patients can increase patient risk due to incorrect assignment of acuity levels. Do not prejudge patients based on appearance or attitude.

The following observations may also be helpful:

- Does the child have age/developmentally appropriate behaviour and social interactions?
- Are the interfamilial dynamics appropriate?
- Are there any indications of child abuse or neglect?

Do not forget that the initial physical assessment (PAT) is done concurrently with the pediatric interview.

Pediatric Modifiers

As with adults, if it is not clear what the CTAS level is from the "First Look" and the presenting complaint then first order modifiers are applied early to quickly identify patients who are of higher acuity. The application of these modifiers is different in children as they are divided into physiological first order modifiers that include vital signs and non-physiological first order modifiers. The physiologic modifiers are applied first and if the CTAS level is not clear, then non-physiologic first order modifiers are applied. If it is still unclear as to what the CTAS level should be, then second order modifiers, including the pediatric specific modifiers, can be used to assist in assigning a CTAS level.

Pediatric Modifier Considerations

Vital Signs

Vital signs play an integral role in determining the CTAS level for pediatric patients as all vital signs are incorporated into a modifier. A complete set of vital signs are to be done for all patients as indicated in the *BLS PCS* unless there are circumstances that prevent it. The range of normal vital signs is quite wide and very age dependant unlike in the assessment of adults where for all ages the vital signs either fall within or outside of what is considered a normal range. It may also be difficult to obtain certain vital signs due to the age, size and condition of the patient. For instance, it is often very difficult to obtain a blood pressure in an infant and paramedics may need to rely on pulses when assessing for circulation in some instances. Whenever possible, vital signs should be done when the child is quiet so that the most accurate information can be obtained and used to assign a CTAS level. A child that is upset and crying can have an increased heart rate and respiratory rate that may result in a different CTAS score than if the CTAS level is determined after the child quiets down.

Fever

Febrile illness is a common presentation but it should be noted that the degree of temperature elevation does not necessarily reflect the severity of illness. Paramedics should rely on the parent's measurement of the child's temperature if it is stated to be elevated. The paramedic should ask how the temperature was taken (axillary, oral or rectal) and what the temperature reading was. Unlike in adults, elevated temperatures at different ages have different implications (e.g. fever in patients less than three months of age is considered more serious than in older children). Remember that extremely ill children may also present with a diminished temperature (hypothermia) due to their inability to regulate temperature.

Pain

An age/developmentally appropriate pain scale should be used on children to attempt to quantify pain. Although pain scales are less helpful (or reliable) at the extremes of age they are still helpful in determining a CTAS level. It would also be unwise to exclude serious problems when pain is not described as severe while at the same time severe pain can be associated with benign processes (otitis media).

The parents may be able to give an indication of the severity of pain as pain scales are not absolute, but do allow the patient or parent to communicate the intensity of a problem from their perspective. This evaluation is used in conjunction with the presenting complaint, to assign patients with similar complaints to different acuity levels. The more intense the pain (e.g. 8-10/10) the more paramedics should be concerned about the need to identify or exclude serious illnesses and attempt to offer empathy and interventions that will diminish unnecessary pain and suffering.

Pain perception is very individual and may be influenced by age, past experience and cultural differences. The first pain someone has may be by definition 10 out of 10, if the question is asked as the worst pain you have ever had (as opposed to the worst pain imaginable). Providers should never assume that a patient's pain is not severe. On the other hand, when patients report high pain levels (more than 7 out of 10) with a presenting complaint that suggests a minor injury or problem, paramedics may take this into consideration when assigning a CTAS level.

One of the major differences compared to the adult CTAS is that in the pediatric pain modifier there is no distinction between central and peripheral pain. The reason for this is that it is often very difficult to distinguish between the two in very young children who cannot talk and the communication skills are often limited in children.

Assessment of Pediatric Patients:

General Approach

An accurate assessment is critical as the pediatric patient has the potential for rapid deterioration. **An actual diagnosis is not as important as recognition of the potential for rapid deterioration based on the "First Look", history and physical findings.** The pediatric assessment for determining the CTAS level consists of the following components:

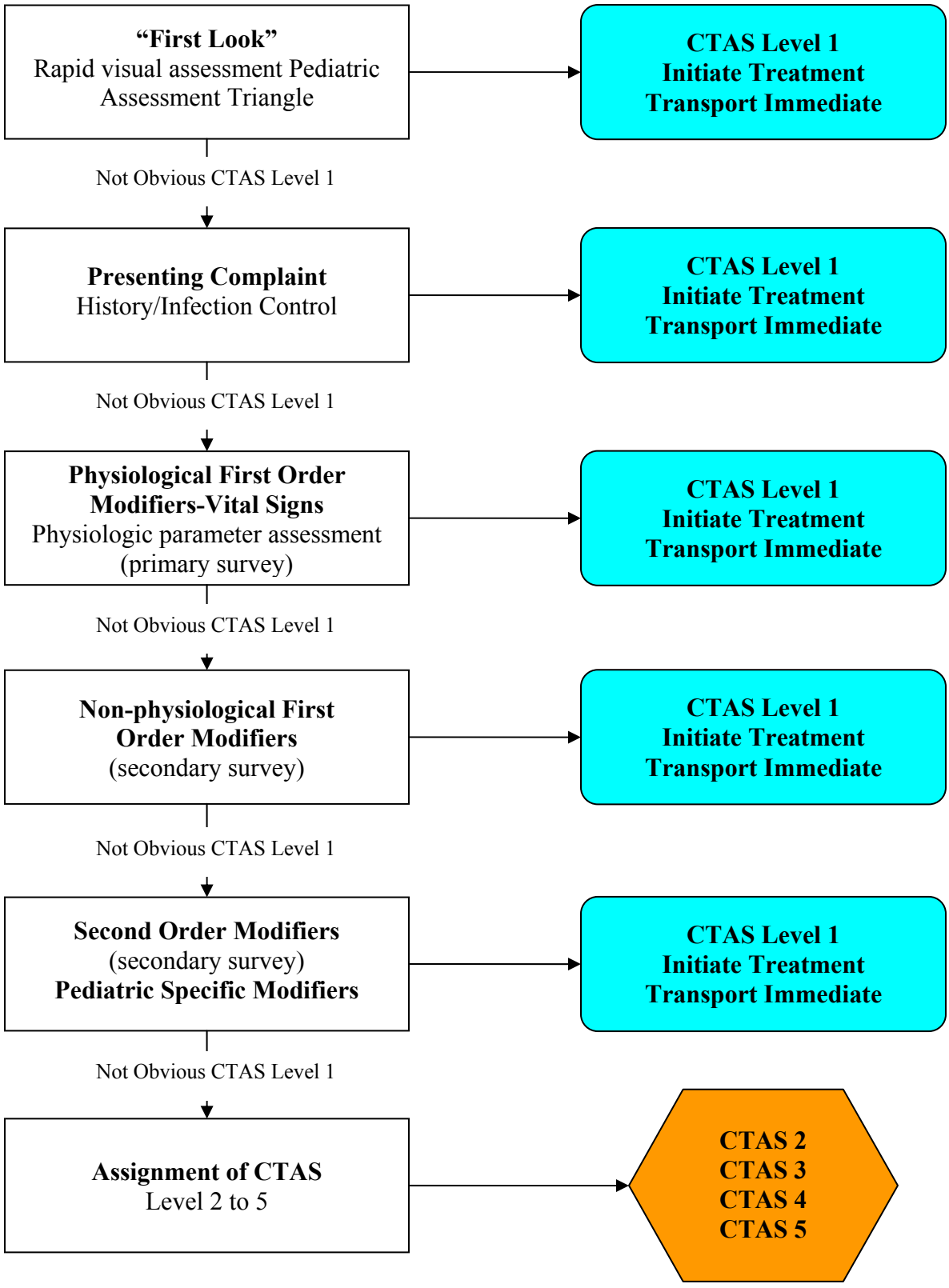
- The critical "First Look" using the PAT.
- Pediatric history (subjective data), a 2-5 minute interview concurrent with the PAT.
- Physical assessment (objective data) with the application of physiological first order modifiers.
- Application of non-physiological first order modifiers.
- Application of second order modifiers.
- Application of pediatric specific modifiers.

Paramedics must obtain enough critical information in their history and assessment to determine patient acuity and the immediate care needs of the patient as well as a sense of the potential for deterioration.

The assessment of pediatric patients must follow the *BLS PCS.* In general, the first 3 parameters used to assign a CTAS level will be determined during the primary assessment while the fourth, second order and pediatric specific modifiers, will be determined during the secondary survey.

Some patient may be assigned to CTAS Level 1 (Resuscitation) or CTAS Level 2 (Emergent) categories prior to full assessment based on the initial presentation (e.g. respiratory arrest). Patients classified to lower acuity levels should have a full assessment completed to avoid missing subtle presentations of serious illness, particularly in young infants.

Organized Approach to CTAS Determination – Pediatric



Other Pediatric Considerations

While CTAS assignment is based on the "usual presentation" this is not totally dictated by the presenting complaint. The care provider's experience/intuition (does the patient look sick?) and other information (the parents'/care givers' opinion/intuition) helps to quantify severity and can modify the decision.

There are several common symptom complexes which appear in more than one acuity level and in particular in acuity Levels 2 to 4 (vomiting, fever, head injury etc.). Prior to assignment of acuity levels, it is essential to carefully consider the child's age, immune status, co-morbidity, past health and details of the events leading up to the illness or injury. Physiological parameters (especially level of consciousness, respiratory rate and effort, heart rate and perfusion) must be evaluated. Tachypnea and tachycardia may be the only measurable signs of early shock (respiratory failure, sepsis, hypovolemia, or myocardial dysfunction). The parent's perception of how ill the child is also guides the assignment of the CTAS level.

Pediatric CTAS – Common Prehospital Presentations

The following are lists of categories and typical presenting complaints by CTAS level:

CTAS Level 1 - Resuscitation

Behaviour
- Unresponsive

Cardiovascular
- Cardiac arrest
- Shock/hypotension
- Exsanguinating hemorrhage

Child Abuse
- Unstable situation or conflict

Endocrine
- Diabetic - altered consciousness

Gastrointestinal
- Difficulty swallowing with airway/respiratory compromise
- Abdominal trauma - penetrating/blunt - signs/symptoms of shock

Gynecological
- Vaginal bleeding, patient with abnormal vital signs

Hematologic/Immunologic
- Anaphylaxis

Infection
- Septic shock

Musculoskeletal
- Major trauma
- Traumatic amputation - extremity
- Major cold injury - hypothermia

Neurological
- Major head injury
- Unconscious/unresponsive
- Active seizure state

Respiratory
- Airway compromise
- Severe Respiratory Distress, inadequate breathing
- Critical asthma
- Chest trauma with respiratory distress

Skin
- Burn ≥25% body surface area or airway involvement

CTAS Level 2 - Emergent

Behaviour
- Lethargic child
- Infant <7 days old

Cardiovascular
- Significant tachycardia
- Bradycardia
- Severe dehydration
- Uncontrolled major hemorrhage

Child Abuse
- History of ongoing risk

Endocrine
- Diabetic - ketoacidosis/hypoglycemia

Eye/Ear/Nose/Throat
- Chemical substance in eye
- Burn, penetration, of eye
- Orbital infection
- Impaled object or amputation of ear
- Uncontrolled epistaxis/post tonsillectomy bleed
- Sore throat with drooling, stridor, and/or difficulty swallowing
- Hoarseness, sudden onset with history of trauma to larynx

Gastrointestinal
- Acute bleeding, vomitus or rectal
- Abdominal pain with vomiting/diarrhea/abnormal vital signs

Genitourinary
- Severe testicular pain
- Urine retention ≥24 hours
- Paraphimosis, priapism

Gynecological
- Possible ectopic pregnancy with normal vital signs
- Severe vaginal bleeding

Hematological/Immunologic
- Bleeding disorder
- Fever - neutropenia/sickle cell disease

CTAS Level 2 – Emergent (continued)

Infection

- Any infant or child with toxic (or septic) appearance
- Infant <3 months, Temperature <36°C or ≥38.5°C

Musculoskeletal

- Traumatic amputation - digit
- Fracture, open or with neurovascular impairment
- Back pain with neurologic deficit
- Avulsed permanent tooth

Neurological

- Moderate head injury with altered mental state
- Altered consciousness
- Shunt dysfunction - patient appears ill
- Sudden onset of confusion, weakness, severe headache

Psychiatry

- Toxic overdose
- High risk of harm to self or others
- Violent behaviour

Respiratory

- Marked stridor
- Moderate respiratory distress
- Severe asthma
- Foreign Body aspiration with respiratory distress
- Inhalation of toxic substances

Skin

- Burn - ≥10% body surface area or face/hand/foot involvement
- Burn, chemical or electrical
- Purpuric rash

CTAS Level 3 - Urgent

Behaviour
- Inconsolable infant
- Infant not feeding

Cardiovascular
- Tachycardia
- Signs of dehydration
- Uncontrolled minor hemorrhage

Child Abuse
- Physical assault
- Sexual assault <48 hours

Ears/Eyes/Nose/Throat
- Foreign body in nose causing pain or possible risk of aspiration
- Epistaxis, controlled/history of post tonsillectomy bleed
- Puncture wound of soft palate
- Tonsil pustules with difficulty swallowing
- Hearing problem - acute onset
- History of postoperative bleeding - tonsillectomy and/or adenoidectomy
- Foreign body in ear
- Periorbital swelling with fever
- Sudden vision change

Endocrine
- Diabetic - Hyperglycemia

Gastrointestinal
- Persistent vomiting of bile
- Vomiting and/or diarrhea <2 years
- Possible appendicitis

Genitourinary
- Moderate testicular pain or swelling
- Inguinal bulge with pain
- Urinary retention ≥8 hours

Gynecological
- Vaginal bleeding with normal vital signs

Hematologic/Immunologic
- Sickle cell crisis
- Moderate allergic reaction

Infection
- Infant 3-36 months, temperature $\geq 38.5^{o}C$

CTAS Level 3 – Urgent (continued)

Musculoskeletal

- Probable fracture with no neurovascular deficit
- Tight cast with possible neurovascular impairment
- Joint pain with fever
- Dental trauma

Neurological

- Minor head injury, PCS <15
- History of altered consciousness
- Headache
- Possible shunt obstruction with no distress
- Seizure prior to paramedic arrival, not actively seizing

Psychiatry

- Ingestion requiring observation
- Moderate risk of harm to self/others
- Disruptive/distressed

Respiratory

- Stridor
- Mild respiratory distress
- Moderate asthma
- Foreign body aspiration, cough present, with no distress
- Constant cough, appears distressed

Skin

- Burn, partial thickness and <10% body surface area
- Burn, full thickness <5% body surface area
- Localized cold injury
- Cellulitis - patient appears ill, or is febrile
- Complex lacerations

CTAS Level 4 – Less Urgent

Behaviour
- Irritable, inconsolable infant
- Atypical behaviour

Cardiovascular
- Chest pain with normal vital signs

Child Abuse
- Signs or history of family violence

Ears/Eyes/Nose/Throat
- Corneal foreign body/abrasion
- Crusting, matting, discharge from eye
- Ear drainage
- Earache

Gastrointestinal
- Constipation; not eating; cramps
- Abdominal pain with vomiting or diarrhea ≥2 years old

Genitourinary
- Scrotal trauma
- Possible urinary infection

Hematologic/Immunologic
- Local allergic reaction

Infection
- Child ≥36 months with temperature ≥38.5^{o}C, non toxic appearance

Musculoskeletal
- Possible extremity fracture, greenstick/buckle
- Sprain/strain, extremity swelling

Neurological
- Minor head injury - no vomiting or altered consciousness, PCS 15
- Chronic or repeating headache with no acute distress

Psychiatry
- Depression - Low risk of harm to self or others

CTAS Level 4 – Less Urgent (continued)

Respiratory

- Mild asthma
- Possible foreign body aspiration with no history of distress
- Minor chest injury with no respiratory distress

Skin

- Minor cold injury - no discolouration - minimal pain
- Localized cellulitis, minor burn

CTAS Level 5 – Non Urgent

Ears/Eyes/Nose/Throat

- Sore throat, laryngitis, minor mouth sores
- Nasal congestion, allergy or upper respiratory infection
- Conjunctivitis

Gastrointestinal

- Vomiting or diarrhea, no pain or dehydration, normal vital signs

Psychiatry

- Chronic symptoms with no acute changes

Skin

- Superficial burn
- Minor lacerations, abrasions, contusions
- Localized rash
- Minor bite

Pediatric CTAS Modifiers

First Order/Physiological Modifiers

The first order modifiers are assessed after the First Look using the Pediatric Assessment Triangle. First order modifiers for pediatric patients can be divided into physiological and non-physiological modifiers. The physiological modifiers will be assessed in the primary survey and include formal assessment of respiratory rate/effort (A & B), heart rate/circulatory status (C) and level of consciousness (D). Temperature is also considered a physiological first order modifier and can be used if available. Fever may be used as a modifier when obtained by history or when obtained directly by the paramedic (if available). If obtained directly by the paramedic it should be done at the very end of the primary survey or at the beginning of the secondary survey. Age-specific physiologic parameter assessment is essential for evaluating children and thus the tables for pulse rate and respiratory rates with standard deviations are essential in evaluating the CTAS level.

When appropriate, attempts to measure vital signs should be done while the child is quiet. Vital sign measurement and general appearance must both be considered in acuity level assignment.

Three of the first order modifiers are assessed using vital signs as a key component. They are:

- Respiratory Distress (respiratory rate and effort)
- Hemodynamic Stability (heart rate, blood pressure and appearance)
- Level of Consciousness (Pediatric Coma Scale and Level of Consciousness scale)

Pediatric Vital Signs

The following table illustrates normal ranges for respiratory and hearts rates for pediatric patients based on the patient's age:

Table 14 – Normal Pediatric Vital Signs

Age	Normal Range Respiratory Rate	Normal Range Heart Rate
0 – 3 months	30 – 60	90 – 180
3 months – 6 months	30 – 60	80 – 160
6 months – 1 year	25 – 45	80 - 140
1 year – 3 years	20 – 30	75 – 130
6 years*	16 – 24	70 – 110
10 years*	14 - 20	60 - 90

*Note: All values increase by increments and are reflected in the respiratory and heart rates listed. Use best judgement when assessing the pediatric patient.

Respiratory Status

The patient's respiratory status is assessed using the respiratory rate, the level of distress and O_2 saturation. The respiratory rate is highly dependent upon the age of the child. For the purposes of assigning a CTAS level, rate is divided into normal and +/- one and two standard deviations as shown in the table below:

Table 15 – Pediatric Respiratory Rates

Physiologic Range Respiratory Rate							
Level	**1**	**2**	**3**	**4/5**	**3**	**2**	**1**
0 – 3 months	<10	10 - 20	20 - 30	30 - 60	60 - 70	70 - 80	>80
3 – 6 months	<10	10 - 20	20 - 30	30 - 60	60 - 70	70 - 80	>80
6 – 12 months	<10	10 - 17	17 - 25	25 - 45	45 - 55	55 - 60	>60
1 – 3 years	<10	10 - 15	15 - 20	20 - 30	30 - 35	35 - 40	>40
6 years*	<8	8 - 12	12 - 16	16 - 24	24 - 28	28 - 32	>32
10 years*	<8	8 - 10	10 - 14	14 - 20	20 - 24	24 - 26	>26

The respiratory rate is then used along with the observed level of respiratory distress and O_2 saturation to determine the CTAS level as shown in Table 16.

Table 16 - Respiratory Distress (Pediatric)

Level of Distress	Oxygen Saturation	CTAS Level
Severe: Fatiguing from excessive work of breathing. Signs may include 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, grunting; signs of upper airway obstruction.	<90%	**1**
Moderate: Increased work of breathing, restlessness, anxiety, or combativeness; tachypnea; hyperpnea; mild increased use of accessory muscles, retractions, speaking phrases or clipped sentences, prolonged expiratory phase.	<92%	**2**
Mild: No obvious increase in work of breathing. Signs may include tachypnea; mild shortness of breath on exertion; able to speak in sentences.	<92 – 94%	**3**
None	≥94%	**4, 5**

Hemodynamic Status

Hemodynamic status is assessed using the age specific heart rate. As with the respiratory rate, the heart rate is divided into normal range and +/- one and two standard deviations as shown in the table below:

Table 17 – Pediatric Heart Rates

Physiologic Range Heart Rate							
Level	**1**	**2**	**3**	**4/5**	**3**	**2**	**1**
0 – 3 months	<40	40 - 65	65 - 90	90 - 180	180 - 205	205 - 230	>230
3 – 6 months	<40	40 - 63	63 - 80	80 - 160	160 - 180	180 - 210	>210
6 – 12 months	<40	40 - 60	60 - 80	80 - 140	140 - 160	160 - 180	>180
1 – 3 years	<40	40 - 58	58 - 75	75 - 130	130 - 145	145 - 165	>165
6 years	<40	40 - 55	55 - 70	70 - 110	110 - 125	125 - 140	>140
10 years	<30	30 - 45	45 - 60	60 - 90	90 - 105	105 - 120	>120

Along with the heart rate, other factors associated with hemodynamic stability are used to determine the CTAS level. These factors include blood pressure, capillary refill, skin changes, LOC, urine output and the general appearance of the child as outlined in Table 18.

Table 18 – Hemodynamic Status (Pediatric)

Hemodynamic Stability	CTAS Level
Shock: Evidence of severe end-organ hypoperfusion such as 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.	**1**
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 the child's ability to maintain his or her blood pressure.	**2**
Volume depletion with abnormal vital signs	**3**
Normal Vital Signs	**4, 5**

Level of Consciousness

Use of the Pediatric Coma Scale (PCS) may be appropriate depending on the age of the patient. If an accurate PCS can be determined then it should be used. The PCS is shown below:

Table 19 – Pediatric Coma Scale

Pediatric Coma Scale		
Eye Opening	**Verbal Response**	**Motor Response**
4 Spontaneous 3 To speech 2 To pain 1 None	5 Coos or babbles 4 Irritable/constantly cries 3 Cries to pain 2 Moans to pain 1 None	6 Obeys commands 5 Withdraws from touch 4 Withdraws from pain 3 Flexion to pain 2 Extension to pain 1 None

The LOC is further assessed using the scale in Table 20. The LOC is obtained from an accurate history and from observation of the patient. This assessment is to be carried out even if the PCS cannot be determined.

Table 20 – Level of Consciousness (Pediatric)

Level of Consciousness	PCS	CTAS Level
Unconscious: Unresponsive; responds to pain or loud noise only without purpose; flexion or extension position; continuous seizing; progressive deterioration in level of consciousness; unable to protect airway.	3-9	**1**
Altered LOC: A change from one's "normal" level of consciousness; lethargic; obtunded; localizes to painful stimulus; irritable; agitated or combative; inconsolable, poor feeding in an infant; able to protect their airway; alert with minor behavioral or vital sign alterations from normal.	10-13	**2**
Normal: A state of awareness, implying orientation to person, place and time; interacts appropriately for age (e.g. infant coos and babbles); consolable. Other modifiers are used to define the CTAS level.	14-15	**3, 4, 5**

Temperature

Fever is a common presenting complaint in the pediatric population and has significant implications as to the acuity level of a child and the potential for deterioration. As such, fever is used as a first order modifier in the pediatric patient. Although "fever" (elevated temperature) can be a sign of serious infection, the body's response to infection may also result in a lowering of the temperature. This hypothermic response is seen in the adult population however, it is more common and significant in the pediatric population. Actual temperature (if available) should be considered when applying this modifier. If the temperature is obtained from the parent/caregiver, it is important to know that fever and hypothermia are defined using an oral reading. In general, axillary temperatures are one (1) degree less than oral readings and rectal readings are one (1) degree higher.

Table 21 - Temperature <36°C (Pediatric)

Age	Temperature	CTAS Level
0 – 3 months	<36°C	**2**
≥3 months	<32°C	**2**
≥3 months	32°C – 35°C	**3**

Table 22 - Elevated Temperatures (Pediatric)

Age	Temperature	CTAS Level
0 – 3 months	≥38°C	**2**
3 months–3 years	≥38.5°C Immunocompromised (e.g. neutropenia, transplant steroids)	**2**
	≥38.5°C Looks unwell.	**2**
	≥38.5°C Looks well.	**3**
≥3 years	≥38.5°C Immunocompromised (e.g. neutropenia, transplant steroids)	**2**
	>38.5°C Looks unwell (consider heart rate and respiratory rate).	**3**
	≥38.5°C Looks well.	**4**

Note:

"Looks unwell" refers to patients who are flushed, in a hyperdynamic state (tachycardic, tachypneic) and anxious, agitated or confused. If the critical "First Look", presenting complaint, respiratory status, hemodynamic status or LOC indicates the child is a CTAS Level 1, then this will always override the temperature modifier.

"Looks well" refers to patients who look comfortable, are in no distress, have normal pulse quality and are alert and oriented.

First Order/Non-physiological Modifiers

The non-physiological first order modifiers are considered after the physiologic modifiers and after the vital signs are obtained. This usually takes place during the secondary survey. These modifiers include pain and mechanism of injury.

Pain

When using pain as a modifier in a child, it is important to note that there are many differences compared to when it is used in an adult. As with many parameters used to assess the CTAS level in a pediatric patient, the assessment of pain is very age dependant and limited due to the difficulty in communicating with children. The following are some key factors that affect the assessment of pain in a child:

- Pain scales are not absolute, but do allow patients to communicate the intensity of the problem from their view.
- Accuracy varies with age and development.
- Pain scales are less reliable at the extremes of age.
- Pediatric guidelines do not differentiate between central and peripheral pain.
- Pain indications differ from adults e.g. chest pain is usually musculoskeletal related.
- Chronic pain is not common in pediatric patients.
- An assessment between chronic pain and acute pain should be attempted.

Remember to use all the objective information that can be obtained including evidence of tachycardia, pallor, sweating and other physiological signs in the evaluation of pain.

Table 23 – Pain (Pediatric)

Severity	Duration	CTAS Level
Severe (8 – 10/10)	Acute	**2**
Moderate (4 – 7/10)	Acute	**3**
Mild (0 – 3/10)	Acute	**4**

Note: Chronic pain can be triaged one level lower if considered appropriate.

Mechanism of Injury (MOI)

MOI has been added as a modifier to assist in assigning a CTAS level in the setting of trauma. Although trauma is common in the adult population, it is even more prevalent in the pediatric population and one of the most common presenting complaints. Assessment and documentation of the MOI should be completed for all patients with injuries, symptoms, and complaints related to trauma or suspected trauma. If the history appears to be inconsistent with the clinical findings that suggest trauma, then child abuse must be considered.

Table 24 – Mechanism of Injury (Pediatric)

Mechanism of Injury	CTAS Level 2
General Trauma	**Motor Vehicle Collisions** • Ejection (partial or complete) from vehicle • Rollover • Extrication time ≥20 minutes • Significant intrusion into passenger's space (≥0.3 metres occupant site; ≥0.5 metres any site, including roof) • Death in the same passenger compartment • Impact ≥40 km/h (unrestrained) or impact ≥60 km/h (restrained) **Motorcycle Collision** • Impact with a vehicle ≥30 km/h, especially if rider is separated from motorcycle **Fall** • From ≥6 metres (one storey is equal to 3 metres) **Penetrating Injury** • To head, neck, torso or extremities proximal to elbow and knee
Head Trauma	**Motor Vehicle Collision** • Ejection (partial or complete) from vehicle • Unrestrained passenger striking head on windshield **Pedestrian** • Struck by vehicle **Fall** • From ≥1 metre or 5 stairs **Assault** • With blunt object other than fist or feet
Neck Trauma	**Motor Vehicle Collision** • Ejection (partial or complete) from vehicle • Rollover • High speed (especially if driver unrestrained) **Motorcycle Collision** **Fall** • From ≥1 metre or 5 stairs **Axial Load to the Head**

Second Order Modifiers

Second order modifiers are applied after the first order modifiers, usually during the secondary survey. Glucose determination is the same as with adults however, the remainder of the second order modifiers are pediatric specific modifiers that are obtained from the history or through observing the child. Second order modifiers include:

- Glucose Determination
- Pediatric Specific Modifiers
  - Concern for Patient's Welfare
  - Disruptive Behaviour
  - Stridor
  - Apneic Spells in Infants
  - Inconsolable Crying in Infants
  - Floppy Child
  - Pediatric Gait Disorder/Painful Walking
  - Congenital Disorders

Blood Glucose Level

Blood glucose level is a second order modifier for patients with diabetes and/or whose presenting complaint may be associated with an abnormal glucose level. It is important to note that pediatric patients are more prone to hypoglycemia. Their glycogen stores are limited and hence their ability to respond to stress is limited resulting in hypoglycemia. Measuring the blood sugar may assist in determining the CTAS level in situations where it may not have been considered in the adult population. Presenting complaints that would need to be considered for this second order modifier include altered level of consciousness and confusion.

Table 25 – Blood Glucose Level (Pediatric)

Blood Glucose Level	Symptoms	CTAS Level
<3 mmol/L	Confusion, seizure, postictal, diaphoretic, behavioural change or infant <1 year.	**2**
	None	**3**
≥18 mmol/L	Dyspnea, dehydration, weakness.	**2**
	None	**3**

Second Order Pediatric Specific Modifiers

There are several unique conditions that are specific to the pediatric population that have the potential to play a significant role in assigning a CTAS level. They should be considered after the first order modifiers. Pediatric specific modifiers have the potential to upgrade the CTAS level.

Table 26 – Concern for Patient's Welfare

Second Order Modifier	CTAS Level
Conflict or unstable situation.	**1**
Risk of flight or ongoing abuse.	**2**
Physical or sexual assault.	**3**
History/signs of abuse or maltreatment.	**4**

Table 27 - Pediatric Disruptive Behaviour

Second Order Modifier	CTAS Level
Uncertain flight or safety risk/family distress.	**2**
Acute difficulties with others/environment.	**3**
Persistent problematic behaviour.	**4**
Chronic unchanged behaviour.	**5**

Table 28 - Stridor

Second Order Modifier	CTAS Level
Airway compromise.	**1**
Marked stridor.	**2**
Audible Stridor.	**3**

Table 29 - Apneic Spells in Infants

Second Order Modifier	CTAS Level
Apneic episode on presentation.	**1**
Recent spell consistent with apnea or respiratory compromise.	**2**
History of spell consistent with apnea.	**3**

Table 30 - Inconsolable Crying in Infants

Second Order Modifier	CTAS Level
Inconsolable infant - abnormal vital signs.	**2**
Inconsolable infant – stable vital signs.	**3**
Irritable but consolable.	**4**

Table 31 - Floppy Child

Second Order Modifier	CTAS Level
No tone, unable to support head.	**2**
Limited/less than expected muscle tone.	**3**

Table 32 - Pediatric Gait Disorder/Painful Walking

Second Order Modifier	CTAS Level
Gait or limp problems with fever.	**3**
Caregivers identifying need for care, walking with difficulty.	**4**

Congenital Disorders in Children

Children with metabolic disease often have higher metabolic needs or lower tolerance to fasting. They may present with acidosis, hypoglycemia or other metabolic disturbances secondary to what would be minor symptoms in another child. These children can deteriorate rapidly in situations of vomiting, diarrhea, or fasting. All patients with known inherited metabolic disease (e.g. congenital lactic acidosis or galactosemia, etc.), Type 1 diabetes or adrenal insufficiency are assigned CTAS level 2 if they are presenting with vomiting, diarrhea or severe fasting.

Consideration should be given to "upgrade" the CTAS level for congenital heart disease and other anatomic and genetic conditions. These types of patients are prone to deteriorate rapidly.

Table 33 - Congenital Problems in Children

Second Order Modifier	CTAS Level
Conditions/protocol letters identifying concerns for rapid deterioration or need for immediate therapy.	**2**
Vomiting/diarrhea in a child with inherited metabolic disease, Type 1 diabetes or adrenal insufficiency.	
Caregivers identifying need for care.	**3**
Stable child with congenital disease with potential for problems.	**4**

Prehospital CTAS

Case Studies

Case Studies

The following case studies are provided to allow paramedics an opportunity to practice applying CTAS levels in patient care situations. An answer key is provided immediately following the case studies that includes a rationale for the appropriate CTAS level. Paramedics are encouraged to work through each scenario and compare their answer with the answer key.

Modifiers may not cover all presenting complaints. Use the presenting complaints in conjunction with the applicable modifiers to assign the best CTAS score. There are times where modifiers won't be applicable and presenting complaints will need to be used. If multiple modifiers apply to a presenting complaint always default to the highest CTAS level.

1. You arrive on a scene to find a 20 year old male, a possible heroin overdose. The patient is unresponsive with a GCS of 3. Vitals signs are; B/P 106/60, pulse 64 and regular, respirations 6 and shallow. You are assisting the patient's respirations with a BVM. What is the Arrival CTAS Level?

   Arrival CTAS Level ___

   You administer 0.8 mg of naloxone on the scene and at the time of departure the patient is moaning. You determine that his GCS is now 8. Reassessment of his vital signs reveals a blood pressure of 110/65, pulse of 80 and regular, respirations of 12 and O_2 saturation of 98% on high concentration oxygen via a non-rebreather mask. What is the patient's Departure CTAS Level?

   Departure CTAS Level ___

   During transport to the hospital the patient becomes more responsive. 5 minutes from the hospital you determine the patient's GCS to be 14, pulse 70, respirations 14 and O_2 saturation of 98% on nasal cannula at 2 lpm. What is the patient's revised CTAS Level on arrival at the hospital?

   CTAS Level Arrive Destination ___

2. Your patient is an unresponsive 36 year old female who was involved in a head-on crash. She has no eye opening or verbal response and withdraws to pain. Vital signs are: respirations 28, pulse 120, B/P 76/48, GCS 6. Her skin is pale, moist and cool. Your findings include an unstable pelvis and an open femur fracture. What is the Arrival CTAS Level?

   Arrival CTAS Level ___

3. Your patient is 20 months old and has been experiencing vomiting and diarrhea for 3 days. The child lies still, presents with cracked lips, sunken eyes and tenting skin. You note the child is lethargic. Vital signs are: pulse 180 with a very weak brachial pulse, respirations 44 and shallow. What is the Arrival CTAS Level?

   Arrival CTAS Level ___

4. You attend to a 76 year old female with COPD complaining of moderate SOB (able to speak in sentences), with an expectorating cough and a mild fever. She states she has recently been placed on an antibiotic for a chest infection. Initial vital signs were: respirations 26, pulse 120, B/P 110/70, O_2 saturation 92% (on room air). Chest assessment revealed diffuse wheezes in both lungs.

   You manage the patient using the *Bronchoconstriction Medical Directive*. Just prior to transport the patient indicates that she feels better. Your assessment of the patient now reveals: respirations 20, pulse 110, O_2 saturation 95%. Her wheezes have diminished.

   What was this Patient's Arrival CTAS Level? What is the Departure CTAS Level?

   Arrival CTAS Level ___ Departure CTAS Level ___

5. Your patient appears to have suffered a stroke (CVA). The patient has slurred speech and your assessment reveals facial drooping and left-sided weakness. Her blood sugar is normal. Vital signs are: GCS 13, B/P 225/120, pulse 68, respirations 18. The patient was last observed in their usual state of health 1 hour ago.

   CTAS Level ___

6. A 56 year old male complains of general weakness and feeling unwell. He denies dizziness, nausea, vomiting or pain. He missed his dialysis yesterday and wants to see the doctor in the Emergency Department. Vital signs are: blood pressure 105/60, pulse 60 and regular, respirations 14 and regular and O_2 saturation of 96% on room air. What is his Arrival CTAS Level?

   Arrival CTAS Level ___

   While transporting and 15 minutes from the hospital, the patient states he feels worse. He is not quite as alert and repeat vitals indicate a pulse of 45, respirations 18, B/P 80/70 and an O_2 saturation of 96%. You patch to the hospital when you are approximately 10 minutes away to update them on this change in the patient's condition.

   What is the patient's revised CTAS Level that should be reported to the hospital?

   CTAS Level ___

7. A 6 year old girl fell off a swing and presents with an obviously fractured wrist. Her pulses, motor and sensation are normal in the injured limb. She is in moderate discomfort (5/10). Her vitals are normal and she is alert. You have it splinted and are now on your way to the ED. What is the Arrival and Departure CTAS Level?

   Arrival CTAS Level ___ Departure CTAS Level ___

8. A babysitter called 911 regarding a 5 year old female child in her care as she was concerned that the child had a rash with a fever. According to the parents, the child had a low-grade fever that was 38.7^{o}C. She is in no respiratory distress but looks tired and has an itchy rash with red spots/bumps on their hands and feet that she is vigorously scratching. Her mouth has canker-like sores on the tongue and on the insides of her cheeks. She has no difficulty swallowing or breathing. Assessment of vital signs indicates: pulse 90, respirations 20 and a systolic B/P of 100 mmHg. What is the patient's Arrival CTAS Level?

   Arrival CTAS Level ___

9. Your patient is an elderly man who complains of pain (2/10) in his left eye and difficulty seeing clearly over the last 24 hours. When he looks at lights, he sees a halo. He cannot discern the number of your fingers past 3 feet. He has a B/P of 180/104, pulse 84 and respirations of 16. What is his Arrival CTAS Level?

   Arrival CTAS Level ___

10. You have responded to a two vehicle MVC with the vehicles colliding head-on at a speed of approximately 80 km/h. The first vehicle rolled over at least twice and the second vehicle ended up in a ditch. The first vehicle has two occupants. The first patient is a male who is unresponsive with a GCS of 3, blood pressure 190/100, pulse 60, respirations 12 and O_2 saturation of 94%. You suspect a closed head injury. The second patient has an obvious open fractured femur with a blood pressure of 130/70, pulse 80, respirations 16 and O_2 saturation of 96%. A third patient is in the second vehicle and was wearing a seatbelt. With the air bag deployed the third patient only complains of overall stiffness. His blood pressure is 160/80, pulse 95, respirations 18 and O_2 saturation of 94%. What are the Arrival CTAS Levels for each of the 3 patients?

    Arrival CTAS Level: Patient #1 ___; Patient #2 ___; Patient #3 ___

11. You are dispatched Code 4 to a child that is seizing. You arrive and find a 6 year old female still actively seizing (tonic-clonic). She has been seizing non-stop for over 30 minutes. The patient has a known history of a seizure disorder. Ativan was given sublingually by the parents at home with no response. You are able to obtain a pulse at 120, respirations are 20 noisy and the child is still seizing. Your partner has applied high concentration O_2. You prepare to transport immediately.

    As you load the child into the back of the ambulance, the seizure stops. The child accepts an oral airway without any response and repeat vital signs show the child localizes pain and has a heart rate of 115, respiratory rate of 16 and an O_2 saturation of 99% on high concentration oxygen. What are the CTAS on Arrival and the CTAS on Departure Levels for this patient?

    Arrival CTAS Level ___ Departure CTAS Level ___

    You are faced with a 25 minute transport time and by the time you are 10 minutes from the hospital your reassessment shows the patient is alert with good eye contact and has spit out the oral airway. Talking to her you note that her speech is slightly slow. Her vital signs are now pulse 100/regular and respirations 22/regular.

    What is the revised CTAS Level that you should report to the receiving hospital?

    CTAS Level ___

12. You are called to a school to assess a 17 year old male who complains of pain in his right ankle. He injured the ankle while playing basketball. Pain is described as 4/10. He has elevated and iced it with no relief. Examination shows swelling but no deformity. Pulse, colour and sensations are normal. Vital signs are within normal limits. The school requests that he go to the hospital for assessment. What is the Arrival and Departure CTAS Level?

    Arrival CTAS Level ___ Departure CTAS Level ___

13. A 43 year old woman complains of epigastric abdominal pain that started after dinner. Her pain is described as being a 7/10 colicky type of pain with associated nausea and vomiting but no diarrhea. She states she has had some wine with dinner. Past history includes a duodenal ulcer, pancreatitis and migraines. Vital signs are: pulse 60, respirations 18, B/P 113/65. Her abdomen is tender in the RUQ. Her chest is clear. What is her Arrival CTAS Level?

    Arrival CTAS Level ___

14. A 28 year old female calls the ambulance because of vaginal bleeding. She is eight weeks pregnant and started to "spot" this morning. Now the flow is "like a period" and she also has some abdominal cramping. She is upset however she looks well and her colour is good. Vital signs are: pulse 86, B/P 120/70 and respirations 16. You prepare for transport. What is her Arrival and Departure CTAS Level?

    Arrival CTAS Level ___ Departure CTAS Level ___

15. You are dispatched to a residence for a patient having a severe asthma attack. Upon arrival you are presented with a 20 year old female lying semi-prone on the floor. The mother tells you that she is a severe asthmatic. The patient responds only to painful stimuli, has a pulse of 140 and is breathing approximately 40 times per minute. Her lips are blue and there is very little air entry. Your partner administers oxygen via the BVM while you administer 0.5 mg of epinephrine IM. You immediately prepare the patient for transport. You note that it is somewhat easier to ventilate the patient with the BVM but the patient is still not able to ventilate on her own and she has an oxygen saturation of 89% with the BVM and 100% oxygen. What is the Arrival CTAS Level? What is the Departure CTAS Level?

    Arrival CTAS Level ___ Departure CTAS Level ___

    You have a 30 minute transport time and during the transport you initiate your *Bronchoconstriction Medical Directive* with salbutamol. By the time you are 10 minutes from the hospital; the patient has improved and is speaking a few words. Her pulse is now 115, respirations 24, B/P 130/80 and O_2 saturation is 91% on high concentration oxygen.

    What would the patient's CTAS Level be now that should be reported to the emergency department?

    CTAS Level ___

16. A 45 year old male complains of a sore throat for 2 days with possible fever today. He has been using throat lozenges but taking no other medications. He has no cough or runny nose. He is able to swallow both liquids and solids with no difficulty. He looks well and he took is own temperature 30 minutes ago which was 38^{o}C at that time. His blood pressure is 140/65, pulse 95/regular, respirations 16/regular and O_2 saturation is 96% on room air.

    CTAS Level ___

17. A 45 year old male complains of severe left flank pain with radiation into his left groin. He has been vomiting, is pale, diaphoretic and unable to sit still. He states that he had a previous episode of renal colic three years ago. He describes the pain as 10/10. His vital signs are pulse 120, B/P 180/70 and respirations 16. He looks to be in severe pain. You apply oxygen and prepare to transport the patient. What is the patient's Arrival CTAS Level?

    Arrival CTAS Level ___

    As you load the patient into the back of the ambulance his pain diminishes to a dull ache that he describes as 1/10 on the pain scale. What would you document as the Departure CTAS Level?

    Departure CTAS Level ___

18. A 15 year old male cyclist was struck by a car travelling 50 km/h. He denies loss of consciousness, headache or neck pain. He does state that the handlebar went "into his stomach" and he complains of severe abdominal pain (8/10), mostly in his left upper quadrant. He is in obvious distress and grimacing with the pain. His vital signs are: pulse 126, B/P 110/70, respirations 18 and shallow. His GCS is 15. His abdomen is rigid on palpation. He has no obvious injuries to his extremities.

    CTAS Level ___

19. You are about to transport a 2 year old child who swallowed a small plastic toy. The child has vomited during your assessment and occasionally gags. You note that respirations are not laboured but there is slight stridor. The child's chest is clear and vital signs are within normal limits. What are the Arrival and Departure CTAS Levels?

    Arrival CTAS Level ___ Departure CTAS Level ___

20. You respond to a shopping centre for a male who has collapsed. The patient is found to be vital signs absent and following initial defibrillation he has a return of a perfusing rhythm. The patient's vital signs are: pulse 96 and slightly irregular, B/P 108/68, spontaneous respirations of 10. The cardiac monitor reveals a sinus rhythm with occasional PVCs (<2/minute). The patient responds to loud verbal stimuli by opening his eyes.

    What was his Arrival CTAS Level? What is his Departure CTAS Level?

    Arrival CTAS Level ___ Departure CTAS Level ___

21. You respond to a residence and are met by a mother carrying her 3 month old child in her arms. The child appears to be pale and limp. The mother states that the child has been ill for the last 2 days. She reports that the child has been vomiting and has had very little fluid or food intake. You note that the child is breathing at a rate of 46 bpm and has a fast/thready pulse that is difficult to assess. A blood pressure is unobtainable. What is the Arrival CTAS Level?

    Arrival CTAS Level ___

22. You are dispatched to a nursing home to transport a patient to the emergency department with a complaint of vomiting. You arrive to find a 92 year old male who has been vomiting for the past 6 hours. His skin is pale and dry and you note that the emesis is "coffee-ground" in appearance. The patient is conscious but disoriented. Assessment of his vital signs reveal: pulse 92, B/P 110/72 and respirations 16. He is on multiple medications including coumadin. What is his Arrival CTAS Level?

    Arrival CTAS Level ___

    En route the patient becomes more confused, diaphoretic and repeat vital signs indicate a pulse of 108, respirations 22, B/P 89/75 and O_2 saturation of 97% on high concentration oxygen. You are 10 minutes from the Emergency Department. You patch to update the hospital on the change in the patient's condition.

    What is the revised CTAS level?

    CTAS Level ___

23. You attend a scene for an 18 month old male child who has had a mild fever, vomiting and diarrhea for 2 days. The mother took the child to an urgent care medical clinic last evening and was told to continue with acetaminophen and fluids. This morning the mother advises that the child looks unwell and the he did not void overnight which is unusual. She took an axillary temperature that read 38.1^{o}C. Although the child "looks sick" he is alert with good eye contact. The child's pulse is 140, respirations are 32. What is the Arrival CTAS Level?

    Arrival CTAS Level ___

24. You are presented with a 26 year old male who is feeling depressed however he does not express any suicidal ideation. He has a past history of depression but he has not been prescribed any medication. He denies taking any pills or consuming alcohol. His vital signs are within normal limits. What is the Arrival CTAS Level?

    Arrival CTAS Level ___

25. Your patient is a 10 year old boy. A large dog has bitten the boy's calf leaving several puncture wounds but no lacerations. The child is anxious but his vital signs are stable. The boy indicates that the pain is 3/10. His condition is unchanged on departure. What are the Arrival and Departure CTAS levels?

Arrival CTAS Level ___ **Departure CTAS Level ___**

Case Studies – Answer Key

1. You arrive on a scene to find a 20 year old male, a possible heroin overdose. The patient is unresponsive with a GCS of 3. Vitals signs are: B/P 106/60, pulse 64 and regular, respirations 6 and shallow. You are assisting the patient's respirations with a BVM. What is the Arrival CTAS Level?

   Arrival CTAS Level 1
   This patient is a level 1 because of two (2) first order modifiers; his respiratory rate of 6 requiring assisted ventilation and his unresponsiveness with a GCS of 3.

   You administer 0.8 mg of naloxone on the scene and at the time of departure the patient is moaning. You determine that his GCS is now 8. Reassessment of his vital signs reveals a blood pressure of 110/65, pulse of 80 and regular, respirations of 12 and O_2 saturation of 98% on high concentration oxygen via a non-rebreather mask. What is the patient's CTAS Level on departure?

   Departure CTAS Level 1
   Though the patient's condition has improved, his GCS is still <9.

   During transport to the hospital the patient becomes more responsive. 5 minutes from the hospital you determine the patient's GCS to be 14, pulse 70, respirations 14 and O_2 saturation of 98% on high concentration oxygen via a non-rebreather mask. What is the patient's Departure CTAS Level?

   CTAS Level Arrive Destination 3
   Though the patient's condition has improved significantly and his vital signs are now within normal ranges, even if the CTAS level appears to be a 4, Rule # 3 states that a patient's CTAS level cannot go down more than 2 levels from the Arrival CTAS.

2. Your patient is an unresponsive 36 year old female who was involved in a head-on crash. She has no eye opening or verbal response and withdraws to pain. Vital signs are: respirations 28, pulse 120, B/P 76/48, GCS 6. Her skin is pale, moist and cool. Your findings include an unstable pelvis and an open femur fracture. What is the Arrival CTAS Level?

   Arrival CTAS Level 1
   This patient is exhibiting both hemodynamic instability (increased heart rate, decreased blood pressure and cool skin) and a GCS of 6. Either of these first order modifiers would make her CTAS Level 1.

3. Your patient is 20 months old and has been experiencing vomiting and diarrhea for 3 days. The child lies still, presents with cracked lips, sunken eyes and tenting skin. You note the child is lethargic. Vital signs are: pulse 180 with a very weak brachial pulse, respirations 44 and shallow. What is the Arrival CTAS Level?

   Arrival CTAS Level 1
   This is an extremely ill child with a marked elevation of respiratory rate and tachycardia and likely hypotension. This patient is potentially pre-arrest and thus a CTAS Level 1.

4. You attend to a 76 year old female with COPD complaining of moderate SOB, able to speak in sentences, with an expectorating cough and a mild fever. She states she has recently been placed on an antibiotic for a chest infection. Initial vital signs were: respirations 26, pulse 120, B/P 110/70, O_2 saturation 92% (on room air). Chest assessment revealed diffuse wheezes in both lungs.

   You manage the patient using your *Bronchoconstriction Medical Directive*. Just prior to transport the patient indicates that she feels better. Your assessment of the patient now reveals: respirations 20, pulse 110, O_2 saturation 95%. Her wheezes have diminished.

   What was this Patient's Arrival CTAS Level? What is the Departure CTAS Level?

   Arrival CTAS Level 3
   This patient presents with mild/moderate respiratory distress with an O_2 saturation of 92-94% with an exacerbation of a chronic problem. She initially had abnormal vital signs with a decreased O_2 saturation that stabilized with treatment.

   Departure CTAS Level 4
   At the time of transport, her condition improved to a 4.

5. Your patient appears to have suffered a stroke (CVA). The patient has slurred speech and your exam reveals facial dropping and left-sided weakness. Her blood sugar is normal. Vital signs are: GCS 13, B/P 225/120, pulse 68, respirations 18. The patient was last observed in their usual state of health 1 hour ago.

   CTAS Level 2
   Patients with a presenting complaint of an acute stroke (<3.5 hours) should be considered Level 2. Also, by the second order modifier for Hypertension/Blood Pressure, the patient is a CTAS Level 2.

6. A 56 year old male complains of general weakness and feeling unwell. He denies dizziness, nausea, vomiting or pain. He missed his dialysis yesterday and wants to see the doctor in the Emergency Department. Vital signs are: blood pressure 105/60, pulse 60 and regular, respirations 14 and regular and O_2 saturation of 96% on room air. What is his Arrival CTAS Level?

   Arrival CTAS Level 3
   Some patients are difficult to assign a CTAS Level. In these cases, paramedics should consider the history and assessment findings and assign the CTAS Level based on their interpretation of how acutely ill the patient is and the potential for deterioration. This is a stable patient however he has missed dialysis and has the potential to have significant electrolyte imbalances and could deteriorate suddenly.

   While transporting and 15 minutes from the hospital, the patient states he feels worse. He is not quite as alert and repeat vitals indicate a pulse of 45, respirations 18, B/P 80/70 and an O_2 saturation of 96%. You patch to the hospital when you are approximately 10 minutes away to update them on this change in the patient's condition.

   What is the patient's revised CTAS Level that should be reported to the hospital?

   CTAS Level 1
   The patient has deteriorated and by the First Order Modifier for Hemodynamic Stability the patient is considered hemodynamically unstable. The Emergency Department will need to prepare a resuscitation room for the patient.

7. A 6 year old girl fell off a swing and presents with an obviously fractured wrist. Her pulses, motor and sensation are normal in the injured limb. She is in moderate discomfort (5/10). Her vitals are normal and she is alert. You have it splinted and are now on your way to the ED. What is the Arrival and Departure CTAS Level?

   Arrival CTAS Level 3
   This girl has a fracture and using the First Order/Non-physiologic Modifier for Pain indicates a pain scale that is in a moderate level at 5/10. It should be noted that there is no differentiation between central and peripheral pain in pediatric patients.

   Departure CTAS Level 3

8. A babysitter called 911 regarding a 5 year old female child in her care as she was concerned that the child had a rash with a fever. According to the parents, the child has a low-grade fever that was 38.7^{o}C. She is in no respiratory distress but looks tired and has an itchy rash with red spots/bumps on their hands and feet that she is vigorously scratching. Her mouth has canker-like sores on the tongue and on the insides of her cheeks. She has no difficulty swallowing or breathing. Assessment of vital signs indicates: pulse 90, respirations 20 and a systolic B/P of 100 mm/Hg. What is the patient's Arrival CTAS Level?

   Arrival CTAS Level 4
   You can use First Order/Physiologic Modifier for Fever as there is a history of fever from the parents. She is older than 5 with a fever ≥38.5^{o}C and although tired, she looks well with normal vital signs. This is a stable child with what appears to be a viral illness and viral rash therefore an Arrival (and Departure) CTAS Level 4 is appropriate.

9. Your patient is an elderly man who complains of pain (2/10) in his left eye and difficulty seeing clearly over the last 24 hours. When he looks at lights, he sees a halo. He cannot discern the number of your fingers past 3 feet. He has a B/P of 180/104, pulse 84 and respirations of 16. What is his Arrival CTAS Level?

   Arrival CTAS Level 2
   This patient has an acute loss of vision as the presenting complaint. Any patient with an acute loss of vision should be assigned a CTAS Level 2.

10. You have responded to a two vehicle MVC with the vehicles colliding head-on at a speed of approximately 80 km/h. The first vehicle rolled over at least twice and the second vehicle ended up in a ditch. The first vehicle has two occupants. The first patient is a male who is unresponsive with a GCS of 3, blood pressure 190/100, pulse 60, respirations 12 and O_2 saturation of 94%. You suspect a closed head injury. The second patient has an obvious open fractured femur with a blood pressure of 130/70, pulse 80, respirations 16 and O_2 saturation of 96%. A third patient is in the second vehicle and was wearing a seatbelt. With the air bag deployed the third patient only complains of overall stiffness. His blood pressure is 160/80, pulse 95, respirations 18 and O_2 saturation of 94%. What are the Arrival CTAS levels for each of the 3 patients?

    Patient #1 Arrival CTAS Level 1
    Using the First Order Modifier for Level of Consciousness, this patient is Level 1 because he is unconscious with a GCS 3 from a suspected closed head injury.
    Patient #2 Arrival CTAS Level 2
    This patient has stable vital signs but the First order Modifier for Mechanism of Injury (MOI) applies. With an obvious open fracture, the general trauma category with rollover places him as CTAS Level 2. This is a high-risk mechanism of injury with the potential to deteriorate.
    Patient #3 Arrival CTAS Level 2
    This patient meets the First order Modifier for MOI criteria and taking into consideration the patient's vital signs are in the upper limit of normal by the Hemodynamic Stability modifier, he would be considered a CTAS Level 2.

11. You are dispatched Code 4 to a child that is seizing. You arrive and find a 6 year old female still actively seizing (tonic-clonic). She has been seizing non-stop for over 30 minutes. The patient has a known history of a seizure disorder. Ativan was given sublingually by the parents at home with no response. You are able to obtain a pulse at 120, respirations are 20 noisy and the child is still seizing. Your partner has applied high concentration O_2. You prepare to transport immediately.

    As you load the child into the back of the ambulance, the seizure stops. The child accepts an oral airway without any response and repeat vital signs show the child localizes pain and has a heart rate of 115, respiratory rate of 16 and an O_2 saturation of 99% on high concentration oxygen. What are the CTAS on Arrival and the CTAS on Departure Levels for this patient?

    Arrival CTAS Level 1
    As the patient is still actively seizing, the presenting complaint alone is a CTAS Level 1.

    Departure CTAS Level 1
    By the time of departure, the child has stopped seizing however the Second Order Pediatric Modifier for Level of Consciousness still indicates a CTAS Level 1 as she cannot protect her airway and has a GCS of 3-9.

    You are faced with a 25 minute transport time and by the time you are 10 minutes from the hospital your reassessment shows the patient is alert with good eye contact and has spit out the oral airway. Talking to her you note that her speech is slightly slow. Her vital signs are now pulse 100/regular and respirations 22/regular.

    What is the revised CTAS level that you should report to the receiving hospital?

    CTAS Level 3
    By the presenting complaint list, the patient had a seizure that has resolved thus her CTAS Level is now a 3. Also, Rule #3 states that the CTAS level cannot decrease by more than 2 levels from the Arrival CTAS Level.

12. You are called to a school to assess a 17 year old male who complains of pain in his right ankle. He injured the ankle while playing basketball. Pain is described as 4/10. He has elevated and iced it with no relief. Examination shows swelling but no deformity. Pulse, colour and sensations are normal. Vital signs are within normal limits. The school requests that he go to the hospital for assessment. What is the Arrival and Departure CTAS Level?

    Arrival CTAS Level 4
    This patient is a CTAS Level 4 using the pain modifier with an acute extremity injury and pain scale 4/10

    Departure CTAS Level 4

13. A 43 year old woman complains of epigastric abdominal pain that started after dinner. Her pain is described as being a 7/10 colicky type of pain with associated nausea and vomiting but no diarrhea. She states she has had some wine with dinner. Past history includes a duodenal ulcer, pancreatitis and migraines. Vital signs are: pulse 60, respirations 18, B/P 113/65. Her abdomen is tender in the RUQ. Her chest is clear. What is her Arrival CTAS Level?

    Arrival CTAS Level 3
    Using the pain modifier, this patient is CTAS Level 3 because of acute central abdominal pain, pain severity 7/10 suggesting a more significant problem.

14. A 28 year old female calls the ambulance because of vaginal bleeding. She is eight weeks pregnant and started to "spot" this morning. Now the flow is "like a period" and she also has some abdominal cramping. She is upset however she looks well and her colour is good. Vital signs are: pulse 86, B/P 120/70 and respirations 16. You prepare for transport. What is her Arrival and Departure CTAS Level?

    Arrival CTAS Level 3
    This patient is <20 weeks gestation with vaginal bleeding, stable vital signs without abdominal pain. This is another example of a patient that it is difficult to assign a CTAS level to as she is <20 weeks gestation and does not meet the criteria to use the obstetrical second order modifiers and she is hemodynamically stable. Given her history, it is possible that this patient is experiencing a miscarriage; therefore CTAS Level 3 would be appropriate given the possibility of complications.

    Departure CTAS Level 3

15. You are dispatched to a residence for a patient having a severe asthma attack. Upon arrival you are presented with a 20 year old female lying semi-prone on the floor. The mother tells you that she is a severe asthmatic. The patient responds only to painful stimuli, has a pulse of 140 and is breathing approximately 40 times per minute. Her lips are blue and there is very little air entry. Your partner administers oxygen via the BVM while you administer 0.5 mg of epinephrine IM. You immediately prepare the patient for transport. You note that it is somewhat easier to ventilate the patient with the BVM but the patient is still not able to ventilate on her own and she has an O_2 saturation of 89% with the BVM and 100% oxygen. What is the Arrival CTAS Level? What is the Departure CTAS Level?

    Arrival CTAS Level 1
    This patient presented in severe respiratory distress and requires assisted ventilations.

    Departure CTAS Level 1
    Though the patient had slight but not significant improvement after treatment, the patient still requires aggressive resuscitation and by the Respiratory Distress modifier remains a CTAS Level 1 on departure.

    You have a 30 minute transport time and during the transport you initiate your *Bronchoconstriction Medical Directive* with salbutamol. By the time you are 10 minutes from the hospital the patient has improved and is speaking a few words. Her pulse is now 115, respirations 24, B/P 130/80 and O_2 saturation is 91% on high concentration oxygen.

    What would the patient's CTAS Level be now that should be reported to the emergency department?

    CTAS Level 2
    Although she has improved significantly, she is still moderately short of breath and by using the Respiratory Distress modifier she would be considered a CTAS Level 2 due to her O_2 saturation of 91%.

16. A 45 year old male complains of a sore throat for 2 days with possible fever today. He has been using throat lozenges but taking no other medications. He has no cough or runny nose. He is able to swallow both liquids and solids with no difficulty. He looks well and he took is own temperature 30 minutes ago which was 38^{o}C at that time. His blood pressure is 140/65, pulse 95/regular, respirations 16/regular and O_2 saturation is 96% on room air.

    CTAS Level 5
    Non-urgent with an otherwise stable complaint. The only modifier that may apply is the Fever modifier as his temperature was 38.0^{o}C however, for the Fever modifier to apply, his temperature must be greater than 38.5^{o}C The Fever modifier does not apply in this instance.

17. A 45 year old male complains of severe left flank pain with radiation into his left groin. He has been vomiting, is pale, diaphoretic and unable to sit still. He states that he had a previous episode of renal colic three years ago. He describes the pain as 10/10. His vital signs are pulse 120, B/P 180/70 and respirations 16. He looks to be in severe pain. You apply oxygen and prepare to transport the patient. What is the patient's Arrival CTAS Level?

    Arrival CTAS Level 2
    This patient is experiencing acute, 10/10 central pain and using the Pain modifier for central pain he is a CTAS Level 2.

    As you load the patient into the back of the ambulance his pain diminishes to a dull ache that he describes as 1/10 on the pain scale. What would you document as the Departure CTAS Level?

    Departure CTAS Level 4
    The patient's condition has improved though he still has central acute pain with the pain scale between 0 and 3. Also remember that a CTAS Level cannot go down more than 2 Levels from the CTAS on Arrival (see Rule #3).

18. A 15 year old male cyclist was struck by a car travelling 50 km/h. He denies loss of consciousness, headache or neck pain. He does state that the handlebar went "into his stomach" and he complains of severe abdominal pain (8/10), mostly in his left upper quadrant. He is in obvious distress and grimacing with the pain. His vital signs are: pulse 126, B/P 110/70, respirations 18 and shallow. His GCS is 15. His abdomen is rigid on palpation. He has no obvious injuries to his extremities.

    CTAS Level 2
    The patient has severe, acute abdominal pain (8/10) secondary to being hit by a car. Although he does not meet the criteria for the Mechanism of Injury modifier, he does meet the criteria for the Pain modifier indicating a CTAS Level 2 suggestive of a severe, underlying injury.

19. You are about to transport a 2 year old child who swallowed a small plastic toy. The child has vomited during your assessment and occasionally gags. You note that respirations are not laboured but there is slight stridor. The child's chest is clear and vital signs are within normal limits. What are the Arrival and Departure CTAS levels?

    Arrival CTAS Level 3
    Even though this child may have a partial obstruction of the esophagus, there is still a possibility that the child may have aspirated. The vital signs are stable, and there is no objective evidence of aspiration or airway obstruction but due to the history by presenting complaint and using the stridor modifier, CTAS Level 3 is indicated.

    Departure CTAS Level 3

20. You respond to a shopping centre for a male who has collapsed. The patient is found to be vital signs absent and following initial defibrillation he has a return of a perfusing rhythm. The patient's vital signs are: pulse 96 and slightly irregular, B/P 108/68, spontaneous respirations of 10. The cardiac monitor reveals a sinus rhythm with occasional PVCs (<2/minute). The patient responds to loud verbal stimuli by opening his eyes.

    What was his Arrival CTAS Level? What is his Departure CTAS Level?

    Arrival CTAS Level 1
    All cardiac arrest patients are assigned CTAS Level 1.

    Departure CTAS Level 1
    All post cardiac arrest patients are assigned CTAS Level 1 due to the risk of re-arrest.

21. You respond to a residence and are met by a mother carrying her 3 month old child in her arms. The child appears to be pale and limp. The mother states that the child has been ill for the last 2 days. She reports that the child has been vomiting and has had very little fluid or food intake. You note that the child is breathing at a rate of 46 bpm and has a fast/thready pulse that is difficult to assess. A blood pressure is unobtainable. What is the Arrival CTAS Level?

    Arrival CTAS Level 1
    A "First Look" using the Pediatric Assessment Triangle (PAT) indicates the child is critically ill (pale, limp and tachypneic) thus automatically a CTAS Level 1. Furthermore, using the Hemodynamic Stability modifier, this child is showing signs and symptoms of shock indicating hemodynamic instability also indicating a CTAS Level 1 and will require aggressive resuscitation.

22. You are dispatched to a nursing home to transport a patient to the emergency department with a complaint of vomiting. You arrive to find a 92 year old male who has been vomiting for the past 6 hours. His skin is pale and dry and you note that the emesis is "coffee-ground" in appearance. The patient is conscious but disoriented. Assessment of his vital signs reveal: pulse 92, B/P 110/72 and respirations 16. He is on multiple medications including coumadin. What is his Arrival CTAS Level?

Arrival CTAS Level 2
This patient is experiencing a GI bleed with vomiting. Although his vital signs are within normal limits, the patient is confused with evidence of bleeding. Using the presenting complaint Gastrointestinal category he has active bleeding with normal vital signs, thus he is a CTAS Level 2. Since he is on coumadin, the Bleeding modifier can also be used and with active GI bleeding he is CTAS Level 2. Using the first order Modifier of Hemodynamic Stability, he is pale but otherwise has normal vital signs and would be a CTAS Level 3. The Arrival CTAS is therefore the higher of the two, CTAS Level 2.

En route the patient becomes more confused, diaphoretic and repeat vital signs indicate a pulse of 108, respirations 22, B/P 89/75 and O_2 saturation of 97% on high concentration oxygen. You are 10 minutes from the Emergency Department. You patch to update the hospital on the change in the patient's condition.

What is the revised CTAS Level?

CTAS Level 1
The patient is now a CTAS Level 1. Using the Hemodynamic Stability modifier he is showing obvious signs of shock as demonstrated by his increased confusion and change in vital signs. The Emergency Department needs to be updated as the patient will require aggressive resuscitation.

23. You attend a scene for an 18 month old male child who has had a mild fever, vomiting and diarrhea for 2 days. The mother took the child to an urgent care medical clinic last evening and was told to continue with acetaminophen and fluids. This morning the mother advises that the child looks unwell and the he did not void overnight which is unusual. She took an axillary temperature that read 38.1^{o}C. Although the child "looks sick" he is alert with good eye contact. The child's pulse is 140, respirations are 32. What is the Arrival CTAS Level?

Arrival CTAS Level 2
This patient is exhibiting signs and symptoms of dehydration with pulse and respirations 1 standard deviation from normal. Using the Elevated Temperatures modifier, it indicates that he has an elevated temperature greater than 38.5^{o} as an axillary temperature reading is one degree less than an oral reading, he is CTAS 2.

24. You are presented with a 26 year old male who is feeling depressed however he does not express any suicidal ideation. He has a past history of depression but he has not been prescribed any medication. He denies taking any pills or consuming alcohol. His vital signs are within normal limits. What is the Arrival CTAS Level?

    Arrival CTAS Level 4
    The patient states he is experiencing depression however he does not have any suicidal ideations and there is no significant risk to himself or others. Using the Mental Health modifier he is a CTAS Level 4.

25. Your patient is a 10 year old boy. A large dog has bitten the boy's calf leaving several puncture wounds but no lacerations. The child is anxious but his vital signs are stable. The boy indicates that the pain is 3/10. His condition is unchanged on departure. What are the Arrival and Departure CTAS Levels?

    Arrival CTAS Level 4
    There are puncture wounds but no lacerations requiring suturing. The patient is not in any degree of distress and using the Second Order Modifier for Pain he would be considered in mild pain (3/10) and CTAS Level 4 is appropriate.

    Departure CTAS Level 4

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