Emergency Department Triage

June 9, 2020

Presented by Dr. Jennifer Bryan
Moderated by Dr. Dominick Shelton

Special thank you to University Health Network Emergency Department nurses Andrea Adjmul and Ruth Appiah-Boateng

Global Health Emergency Medicine

This session will be recorded

We are recording this Zoom session so that it can be watched again at your convenience, and so that we can share it with your colleagues who were not able to join us today.

If you would prefer that this recording **not** be shared with your EM colleagues, please email amcknight@ghem.ca within 24 hours of the session.

We will share the presentation slides and other materials (journal articles, etc.) by email; you will have access to all materials regardless of whether the recording is shared.

Global Health Emergency Medicine

Please also note:

The information in this presentation and the video recording is up to date as of the date it was recorded June 9, 2020

It has not been updated to include any subsequent advances in practice, and the information presented in this video does not replace hospital, health centre, or governmental guidelines.

Global Health Emergency Medicine

Disclosure Statement

I have not received any financial or in-kind support from any commercial organization and have no conflicts of interest to declare.

Global Health Emergency Medicine

"Many deaths in hospital occur within 24 hours of admission. Some of these deaths can be prevented if very sick patients (especially children) are **quickly identified** on their arrival and **treatment is started without delay**."

-EMSSA South African Triage Scale Manual, 2012

Global Health Emergency Medicine

Outline

- What is triage
- Why is triage important
- What are the core principles of triage
- What triage strategies are in place around the world (CTAS, SATS, ESI)
- Triage controversies

Global Health Emergency Medicine

What is triage? Why does it matter?

Global Health Emergency Medicine

What is Triage?

- A process of prioritizing patients based on the severity of their condition.
- Rapidly assess patients with urgent, life-threatening conditions
- Focusing limited resources effectively

Reasons for triage

Ensures critically ill receive priority attention

Predicts resources needed

Predicts how long the patient can safely wait

Supports effective use of resources

Supports surveillance

Targets for tracking ED performance

‘Not all patients are as well as they appear; not all patients are as sick as they think’

-CAEP Canadian Triage and Acuity Scale Education Manual, 2012

Routes of entry to triage

- Telephone
- Pre-hospital
- **Emergency Department**
- Disaster triage

Triage requirements

Structural Requirements			
Does the triage area meet the following criteria:		Yes	No
1	Is the triage area a dedicated space?		
2	Is the triage area well signed?		
3	Is the triage area secure (i.e. behind the security gate, or in easy view of security staff)?		
4	Is the triage area at least 10 square meters in size (i.e. should be able to accommodate a nurse, patient in a wheelchair and relative or carer)?		

Appendix A: https://emssa.org.za/wp-content/uploads/2017/10/SATS-Manual.pdf

Content Requirements			
	Does the triage area contain the following:	Yes	No
1	A desk and chair?		
2	Triage paperwork for adult, children and infants?		
3	A wall clock with a second hand?		
4	A stethoscope?		
5	A low reading thermometer?		
6	Dry dressings and bandages?		
7	Gloves?		
8	Sphygmomanometer (manual, digital or electronic)?		
9	Blood glucose monitor?		
10	A measuring tape **OR** marks displayed on wall in triage area to measure children (i.e one mark at 95cm and one at 150 cm)?		
11	2 x different SATS posters prominently displayed in triage area?		
12	SATS manual readily available for triage office as a source of info?		
13	SATS patient info leaflet prominently displayed in the waiting area?		
14	Triage register or computer with register?		
15	White board to track and communicate to other staff acuity of those triaged?		

Appendix A: https://emssa.org.za/wp-content/uploads/2017/10/SATS-Manual.pdf

Triage systems

- CTAS: Canadian Triage Assessment Scale
- ESI: Emergency Severity Index
- SATS: South African Triage Scale
- ETAT: Emergency Triage Assessment and Treatment
- IMAI: WHO Integrated Management of Adult/Adolescent Illness
- Australasian Triage Scale
- Manchester Triage Scale
- ...

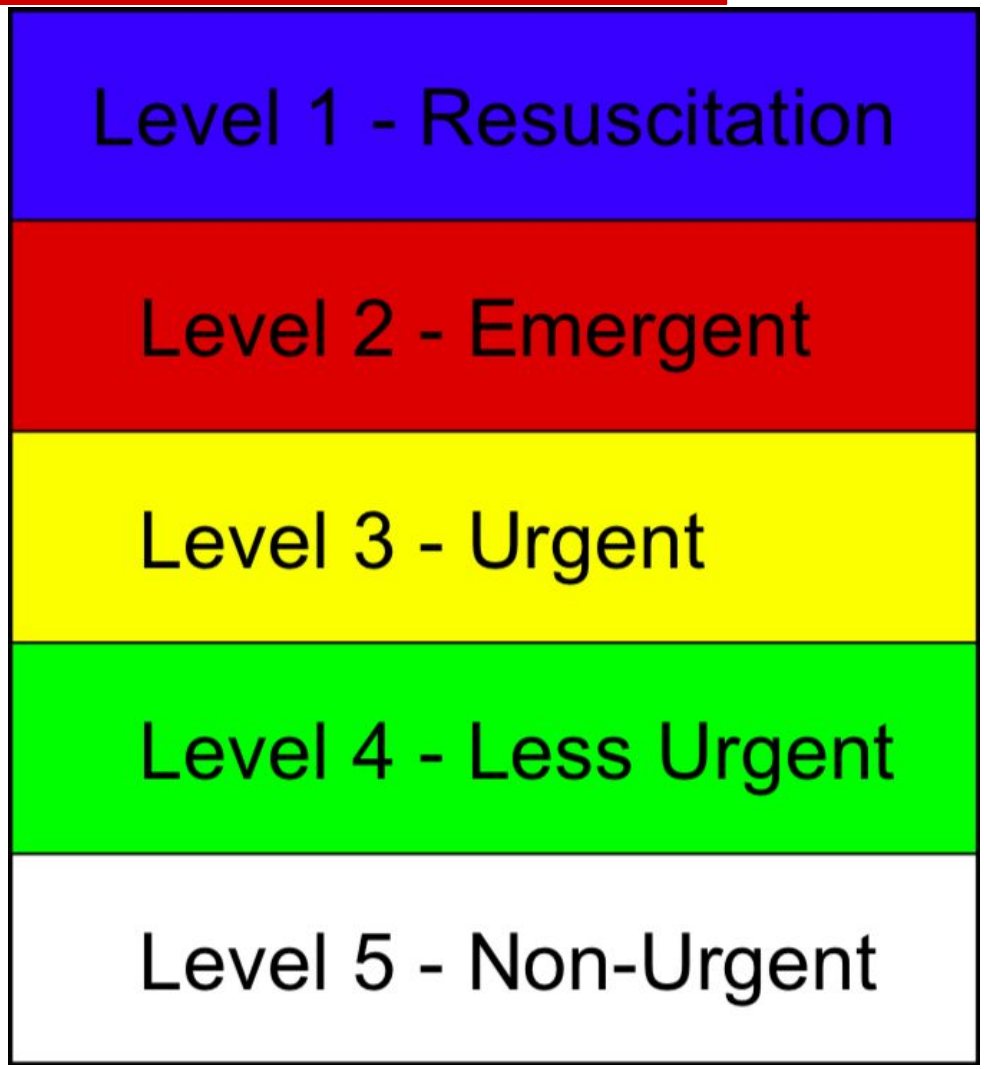
Triage systems

- **CTAS: Canadian Triage Assessment Scale**
- **ESI: Emergency Severity Index**
- **SATS: South African Triage Scale**
- ETAT: Emergency Triage Assessment and Treatment
- IMAI: WHO Integrated Management of Adult/Adolescent Illness
- Australasian Triage Scale
- Manchester Triage Scale
- ...

Triage: The Canadian Experience

- Canadian Triage and Acuity Scale (CTAS)
- First published in 1998
- Adult and pediatric
- Goal is to optimize time to MD assessment
- Triage is by nurses in the ED and pre-hospital triage by paramedics

How does CTAS work?



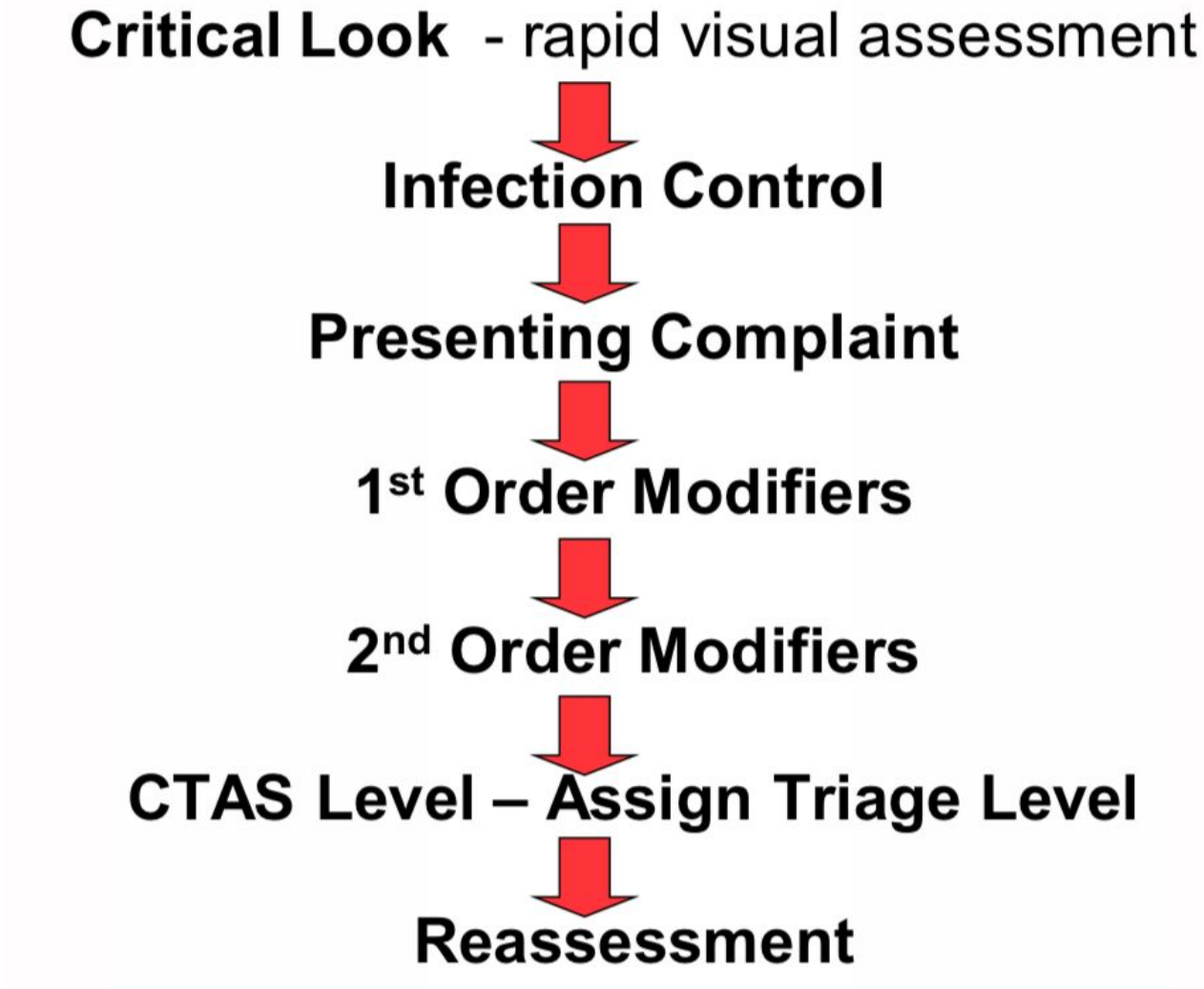
Global Health Emergency Medicine

CTAS Level	Conditions:	Time to MD	Example
Level 1	**Resuscitation**: Threats to life or limb (requires immediate aggressive intervention)	**Immediate**	Code arrest Shock states Major trauma
Level 2	**Emergent:** Potential threat to life , limb or function, requiring rapid intervention	**<15 minutes**	Altered mental status Head injury
Level 3	**Urgent:** Potential progress to serious problem	**<30 minutes**	Moderate asthma Seizure (known)
Level 4	**Semi-urgent**: stable but require assessment	**1-2 hours**	Fractures, sprains, lacerations
Level 5	**Non-urgent**: minor or chronic problems, unlikely to deteriorate	**>2 hours**	Minor lacerations (not requiring closure) Sprains Vomiting, no dehydration

"Time to MD" is the goal, but not often the reality except for CTAS1

Global Health Emergency Medicine

Triage assessment includes



Critical look

- 3-5 seconds
- ABCDs
- Immediate action if indicated

Level 1 presentations

- Cardiac arrest
- Respiratory arrest
- Major trauma (in shock)
- Shortness of breath (severe respiratory distress)
- Altered level of consciousness (unconscious, GCS 3-9)

Infection control screening

General

COVID-19

Global Health
Emergency Medicine

Chief complaint

Substance Misuse (Subst)
Substance misuse / Intoxication
Overdose ingestion
Substance withdrawal

Mental health & psychosocial
Depression / Suicidal / Deliberate self harm
Anxiety / Situational crisis
Hallucinations / Delusions
Insomnia
Violent / Homicidal behaviour
Social problem
Bizarre behaviour
Concern for patient's welfare
Paediatric Disruptive behaviour

Neurologic (Cns)
Altered level of consciousness
Confusion
Vertigo
Headache
Seizure
Gait disturbance / Ataxia
Head injury
Tremor
Extremity weakness / Symptoms of CVA
Sensory loss / Parasthesias
Floppy child

Ophthalmology (Ophth)
Chemical exposure, eye
Foreign body, eye
Visual disturbance
Eye pain
Red Eye, discharge
Photophobia
Diplopia
Periorbital swelling
Eye trauma
Re-check eye

ENT – Nose
Epistaxis
Nasal congestion / Hay fever
Foreign body, nose
URTI complaints
Nasal trauma

ENT – Ears
Earache
Foreign body ear
Loss of hearing
Tinnitus
Discharge, ear
Ear injury

ENT – Mouth, Throat, Neck
Dental / Gum problems
Facial trauma
Sore throat
Neck swelling / pain
Neck trauma
Difficulty swallowing / Dysphagia
Facial pain (non-traumatic / non-dental)

Respiratory (Resp)
Shortness of breath
Respiratory arrest
Cough / Congestion
Hyperventilation
Hemoptysis
Respiratory foreign body
Allergic reaction
Stridor
Wheezing – no other complaints
Apneic spells in infants

Cardiovascular
Cardiac arrest (non traumatic)
Cardiac arrest (traumatic)
Chest pain (cardiac features)
Chest pain (non cardiac features)
Palpitations / Irregular heart beat
Hypertension
General weakness
Syncope / Pre-syncope
Edema, generalized
Bilateral leg swelling / Edema
Cool pulseless limb
Unilateral reddened hot limb

Gastrointestinal (GI)
Abdominal pain
Anorexia
Constipation
Diarrhea
Foreign body in rectum
Groin pain / mass
Vomiting and/or nausea
Rectal / Perineal pain
Vomiting blood
Blood in stool / Melena
Jaundice
Hiccoughs
Abdominal mass / distention
Anal / Rectal trauma
Oral / Esophageal Foreign Body
Feeding difficulties in newborn
Neonatal jaundice

Ob – Gyn (Ob - Gyn)
Menstrual problems
Foreign body, vagina
Vaginal discharge
Sexual assault
Vaginal bleed
Labial swelling
Pregnancy issues < 20 wks
Pregnancy issues > 20 wks
Vaginal pain / itch

Genitourinary (Gu)
Flank pain
Hematuria
Genital discharge / lesion
Penile swelling
Scrotal pain and/or swelling
Urinary retention
UTI complaints
Oliguria
Polyuria
Genital trauma

Orthopedic (Ortho)
Back pain
Traumatic back / spine injury
Amputation
Upper extremity pain
Lower extremity pain
Upper extremity injury
Lower extremity injury
Joint(s) swelling
Paediatric gait disorder / painful walk
Cast check

Trauma (T)
Major trauma – penetrating
Major trauma – blunt
Isolated chest trauma – penetrating
Isolated chest trauma – blunt
Isolated abdominal trauma – penetrating
Isolated abdominal trauma – blunt

ENVIRONMENTAL
Frostbite / Cold injury
Noxious inhalation
Electrical injury
Chemical exposure
Hypothermia
Near Drowning

Skin (Skin)
Bite
Sting
Abrasion
Laceration / Puncture
Burn
Blood and body fluid exposure
Pruritus
Rash
Localized swelling / redness
Wound check
Other skin conditions
Lumps, bumps, calluses
Redness / tenderness, breast
Rule out infestation
Cyanosis
Spontaneous bruising
Foreign body, skin
Removal staples / sutures

General & Minor (Gen)
Exposure to communicable disease
Fever
Hyperglycemia
Hypoglycemia
Direct referral for consultation
Dressing change
Imaging tests
Medical device problem
Prescription / Medication request
Ring removal
Abnormal lab values
Pallor / Anemia
Post-operative complications
Inconsolable crying in infants
Congenital problem in children
Minor complaints NOS

Modifiers

- Vital Signs
  - Respiratory Distress .....Airway
    .....Breathing
  - Hemodynamic Status .....Circulation
  - Level of Consciousness .....Disability
  - Temperature
- Other
  - Pain Score, Bleeding Disorder, Mechanism of Injury

https://caep.ca/wp-content/uploads/2017/06/module_2_slides_v2.5b_2013.pdf

Triage is a dynamic process

Reassessment after initial triage:

CTAS LEVEL	Nursing reassessment
Level 1	Continuous
Level 2	Every 15 minutes
Level 3	Every 60 minutes
Level 4	Every 60 minutes
Level 5	Every 160 minutes

CTAS 2 example

52-year old male

Reported a 1 hour history of heavy, central substernal chest pain, which has now resolved

Vital signs: RR 20, HR 68, BP 132/76

https://caep.ca/wp-content/uploads/2017/06/module_2_slides_v2.5b_2013.pdf

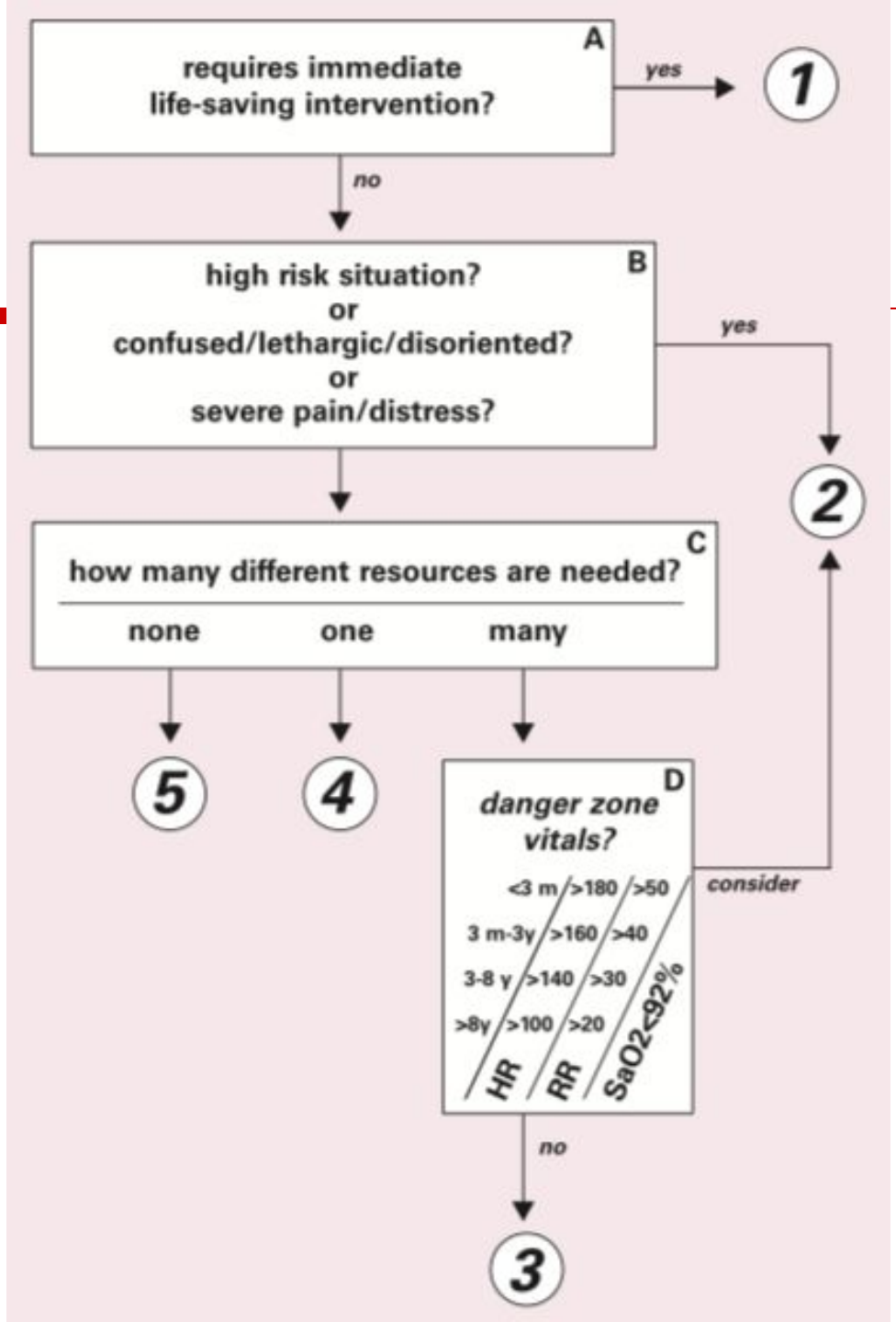
Triage systems

- **CTAS: Canadian Triage Assessment Scale**
- **ESI: Emergency Severity Index**
- **SATS: South African Triage Scale**
- ETAT: Emergency Triage Assessment and Treatment
- IMAI: WHO Integrated Management of Adult/Adolescent Illness
- Australasian Triage Scale
- Manchester Triage Scale
- ...

Emergency Severity Index

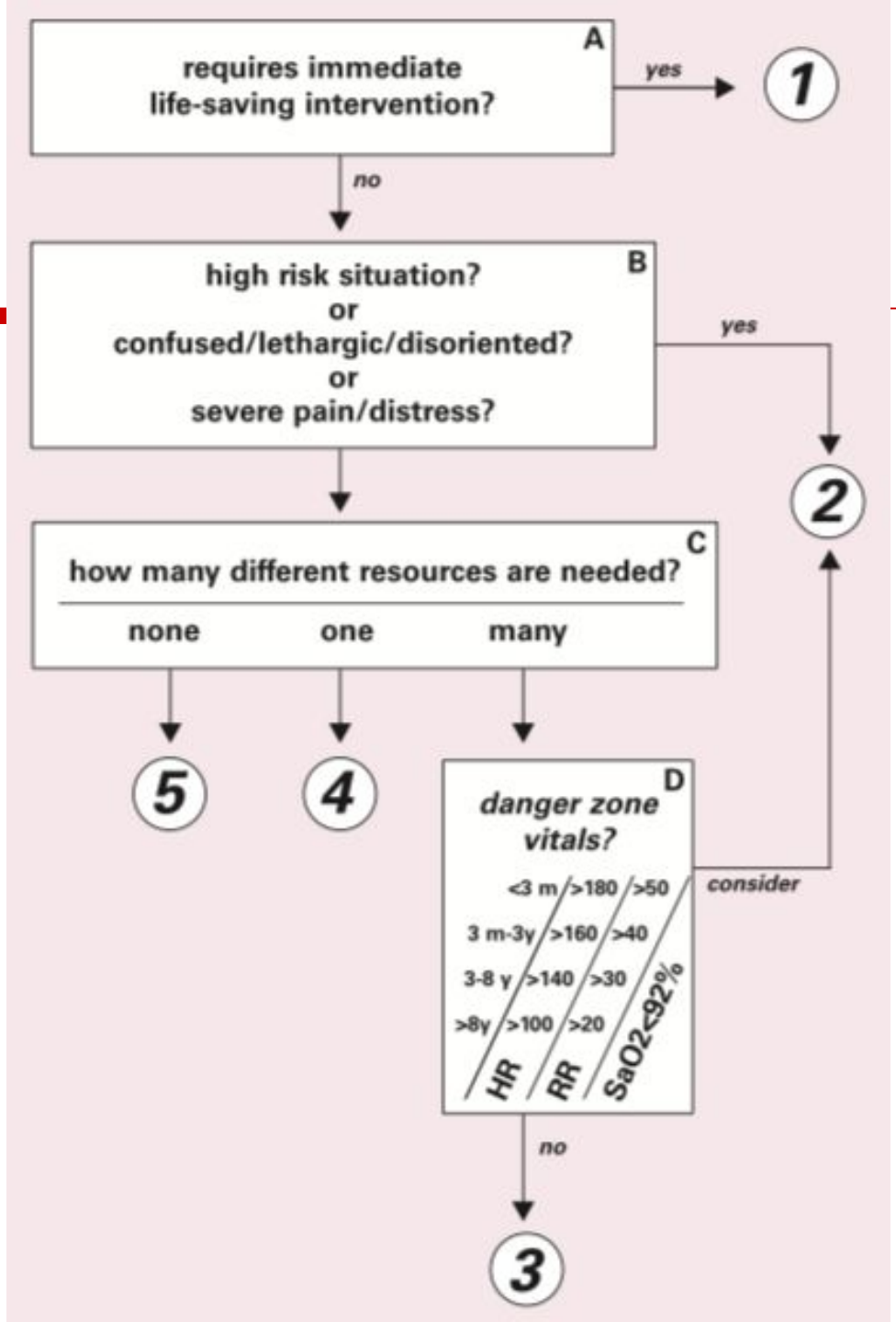
What resources are needed for disposition?

No expected time intervals



Global Health Emergency Medicine

Table 2-1. Immediate Life-saving Interventions	
	Life-saving
Airway/breathing	• BVM ventilation • Intubation • Surgical airway • Emergent CPAP • Emergent BiPAP
Electrical Therapy	• Defibrillation • Emergent cardioversion • External pacing
Procedures	• Chest needle decompression • Pericardiocentesis • Open thoracotomy • Intraoseous access
Hemodynamics	• Significant IV fluid resuscitation • Blood administration • Control of major bleeding
Medications	• Naloxone • D50 • Dopamine • Atropine • Adenocard

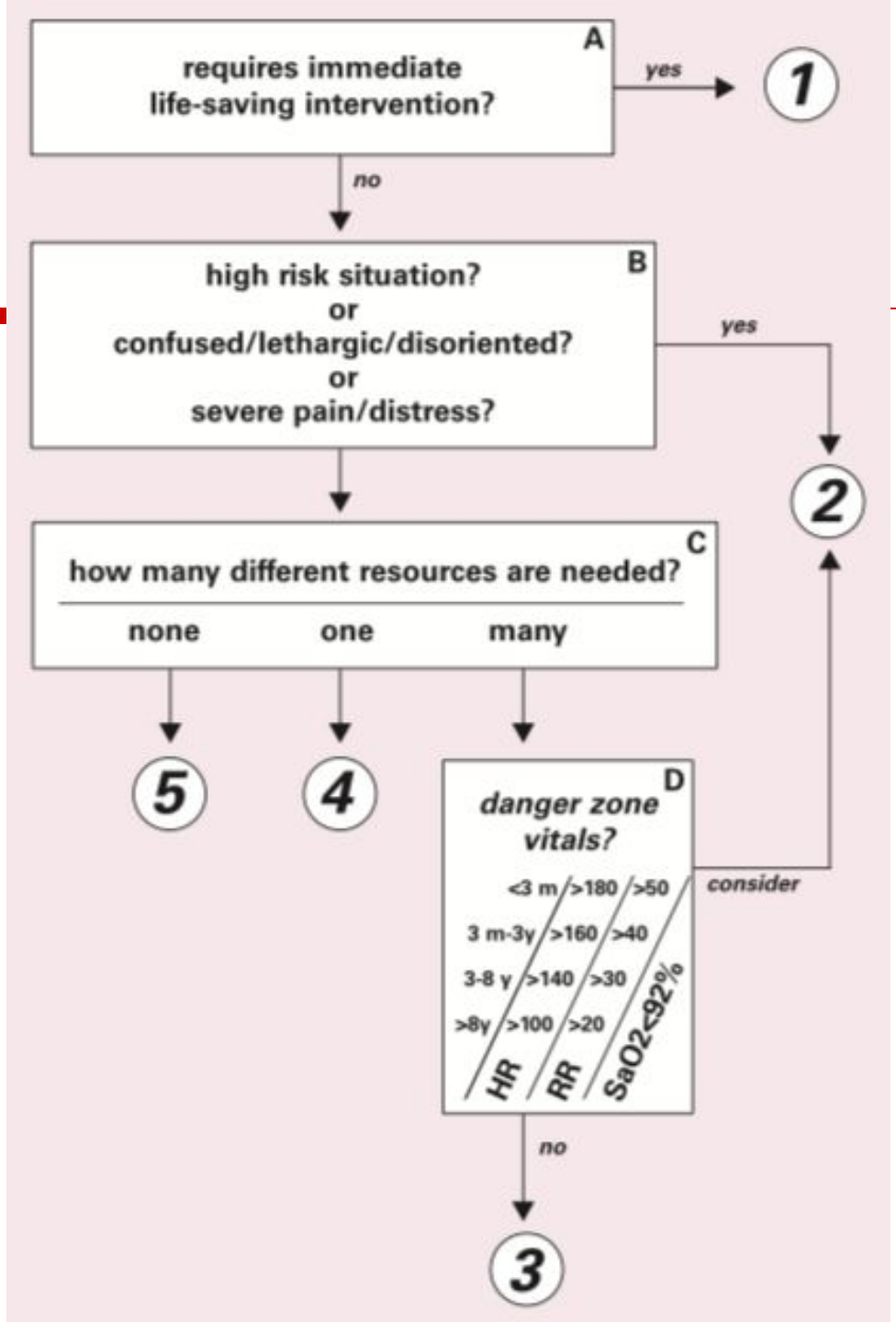


Global Health Emergency Medicine

ESI

Resources	Not Resources
• Labs (blood, urine) • ECG, X-rays • CT-MRI-ultrasound-angiography	• History & physical (including pelvic) • Point-of-care testing
• IV fluids (hydration)	• Saline or heplock
• IV or IM or nebulized medications	• PO medications • Tetanus immunization • Prescription refills
• Specialty consultation	• Phone call to PCP
• Simple procedure =1 (lac repair, foley cath) • Complex procedure =2 (conscious sedation)	• Simple wound care (dressings, recheck) • Crutches, splints, slings

Global Health Emergency Medicine



Global Health Emergency Medicine

ESI level?

21y M, unrestrained driver

Moaning, moving all extremities

BP 74/50, HR 132, RR 36, SPO2 99%, T 36.5℃

ESI level 1

21y M, unrestrained driver

Moaning, moving all extremities moving all extremities

BP 74/50, HR 132, RR 36, SPO2 99%, T 36.5℃

Requires immediate lifesaving intervention. Shock (hypotension, tachycardia, tachypnea) and concerning mechanism; needs fluid/ blood for resuscitation

“ a triage scale developed in one country or region may not be applicable elsewhere”

-Abdelwahab, Rehab, Hannah Yang, and Hareya Gebremedhin Teka. "A quality improvement study of the emergency centre triage in a tertiary teaching hospital in northern Ethiopia." *African Journal of Emergency Medicine* 7.4 (2017): 160-166.

GH EM Global Health Emergency Medicine

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF HEALTH

ETHIOPIAN HOSPITAL REFORM IMPLEMENTATION GUIDELINES

Volume 1, May 2010

Ethiopian Hospital Management Initiative

GH EM Global Health Emergency Medicine

South African Triage Scale

Colour	Red	Orange	Yellow	Green	Blue
TEWS	7 or more	5 - 6	3 - 4	0 - 2	Dead
Target time to treat	Immediate	Less than 10 min	Less than 60 min	Less than 240 min	
Mechanism of injury		High energy transfer			
Presentation		Shortness of breath – acute		All other patients	Dead
		Coughing blood			
		Chest pain			
		Haemorrhage – uncontrolled	Haemorrhage – controlled		
	Seizure – current	Seizure – post ictal			
		Focal neurology – acute			
		Level of consciousness reduced			
		Psychosis/aggression			
		Threatened limb			
		Dislocation – other joint	Dislocation – finger or toe		
		Fracture – compound	Fracture – closed		
	Burn – face/ inhalation	Burn over 20%	Burn – other		
		Burn – electrical			
		Burn – circumferential			
		Burn – chemical			
		Poisoning/overdose	Abdominal pain		
	Hypoglycaemia - glucose less than 3	Diabetic – glucose over 11 & ketonuria	Diabetic – glucose over 17 (no ketonuria)		
		Vomiting – fresh blood	Vomiting – persistent		
		Pregnancy and abdominal trauma or pain	Pregnancy and trauma		
			Pregnancy and PV bleed		
Pain		Severe	Moderate	Mild	
	Senior health care professional's discretion				

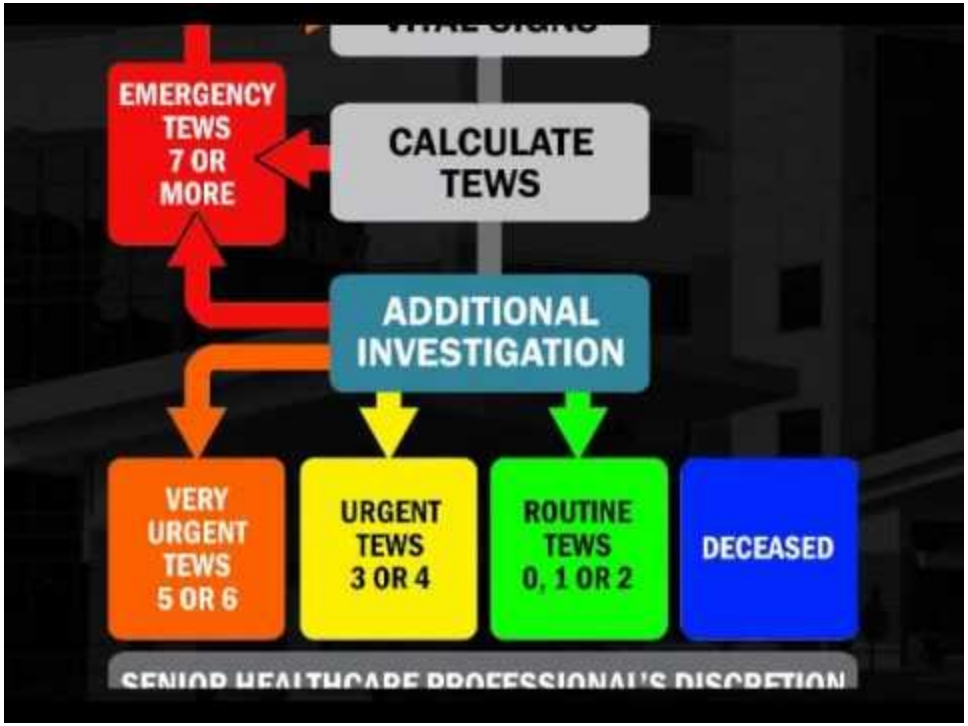
Global Health Emergency Medicine

The five step approach

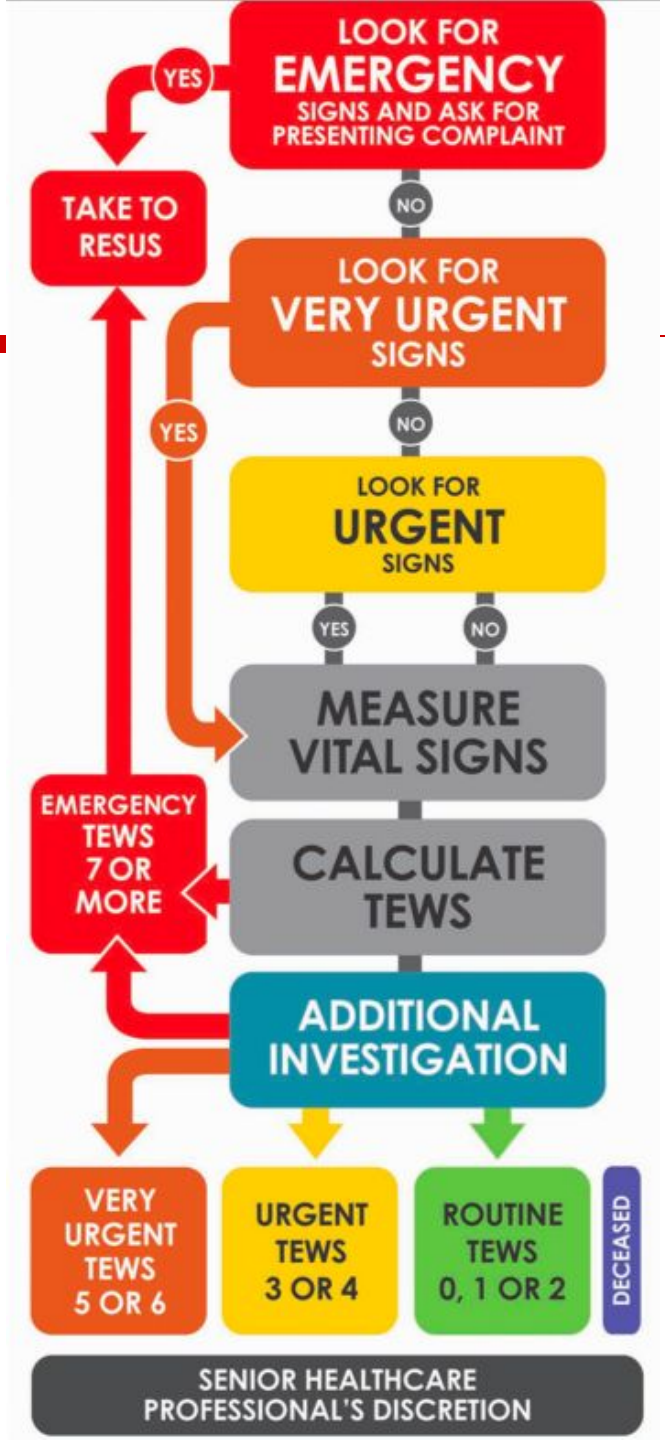
Step 1:	Look for emergency signs and ask for the presenting complaint
Step 2:	Look for very urgent OR urgent signs
Step 3:	Measure the vital signs and calculate the TEWS
Step 4:	Check key additional investigations
Step 5:	Assign final triage priority level

Global Health Emergency Medicine

South African Triage Scale



Global Health Emergency Medicine



Global Health
Emergency Medicine

EMERGENCY

- Obstructed Airway - not breathing
- Seizure- current
- Burn - facial / inhalation
- Hypoglycaemia - glucose less than 3
- Cardiac arrest

VERY URGENT

- High energy transfer (severe mechanism of injury)
- Shortness of beath - acute
- Level of consciousness reduced / confused
- Coughing blood
- Chest pain
- Stabbed neck
- Haemorrhage - uncontrolled (arterial bleed)
- Seizure- post ictal
- Focal neurology - acute (stroke)
- Aggression
- Threatened limb
- Eye Injury
- Dislocation of larger joint (not finger or toe)
- Fracture - compound (with a break in skin)
- Burn over 20%
- Burn - electrical
- Burn - circumferential
- Burn - chemical
- Poisoning / Overdose
- Diabetic - glucose over 11 & ketonuria
- Vomiting fresh blood
- Pregnancy and abdominal trauma
- Pregnancy and abdominal pain
- Severe pain

URGENT

- Haemorrhage - controlled
- Dislocation of finger OR toe
- Fracture - closed (no break in skin)
- Burn - other
- Abdominal pain
- Diabetic- glucose over 17 (no ketonuria)

- Vomiting persistently
- Pregnancy and trauma
- Pregnancy and PV bleed
- Moderate pain

GH EM Global Health Emergency Medicine

Triage Early Warning Score

ADULT TRIAGE SCORE							© South African Triage Group 2008	
	3	2	1	0	1	2	3	
Mobility				Walking	With Help	Stretcher/ Immobile		Mobility
RR		less than 9		9-14	15-20	21-29	more than 29	RR
HR		less than 41	41-50	51-100	101-110	111-129	more than 129	HR
SBP	less than 71	71–80	81-100	101-199		more than 199		SBP
Temp		Cold OR Under 35		35-38.4		Hot OR Over 38.4		Temp
AVPU		Confused		Alert	Reacts to Voice	Reacts to Pain	Unresponsive	AVPU
Trauma				No	Yes			Trauma
over 12 years / taller than 150cm								

Global Health Emergency Medicine

Additional investigations

Tachypnea: O2 saturation

Reduced LOC, change in mobility, recent seizure, hx of diabetes: random glucose

Abdominal pain in female patient: pregnancy test

Chest pain: ECG

Additional tasks

PROBLEM	IMMEDIATE TASKS
1. Temperature 38.5° or more	Paracetamol 1 g orally stat (document in the notes)
2. Temperature 35° or less	Warm the patient with blankets if available
3. Diabetes and hyperglycaemia (glucotest 11 mmol/L or more)	Urine dipstick to check for ketones
4. History of bleeding	Finger prick haemoglobin
5. Bleeding PR, PO or from the site of trauma	Finger prick haemoglobin
6. Abdominal pain or backache in males	Urine dipsticks
7. PV bleeding	Urine dipsticks, Urine preganancy test Finger prick haemoglobin

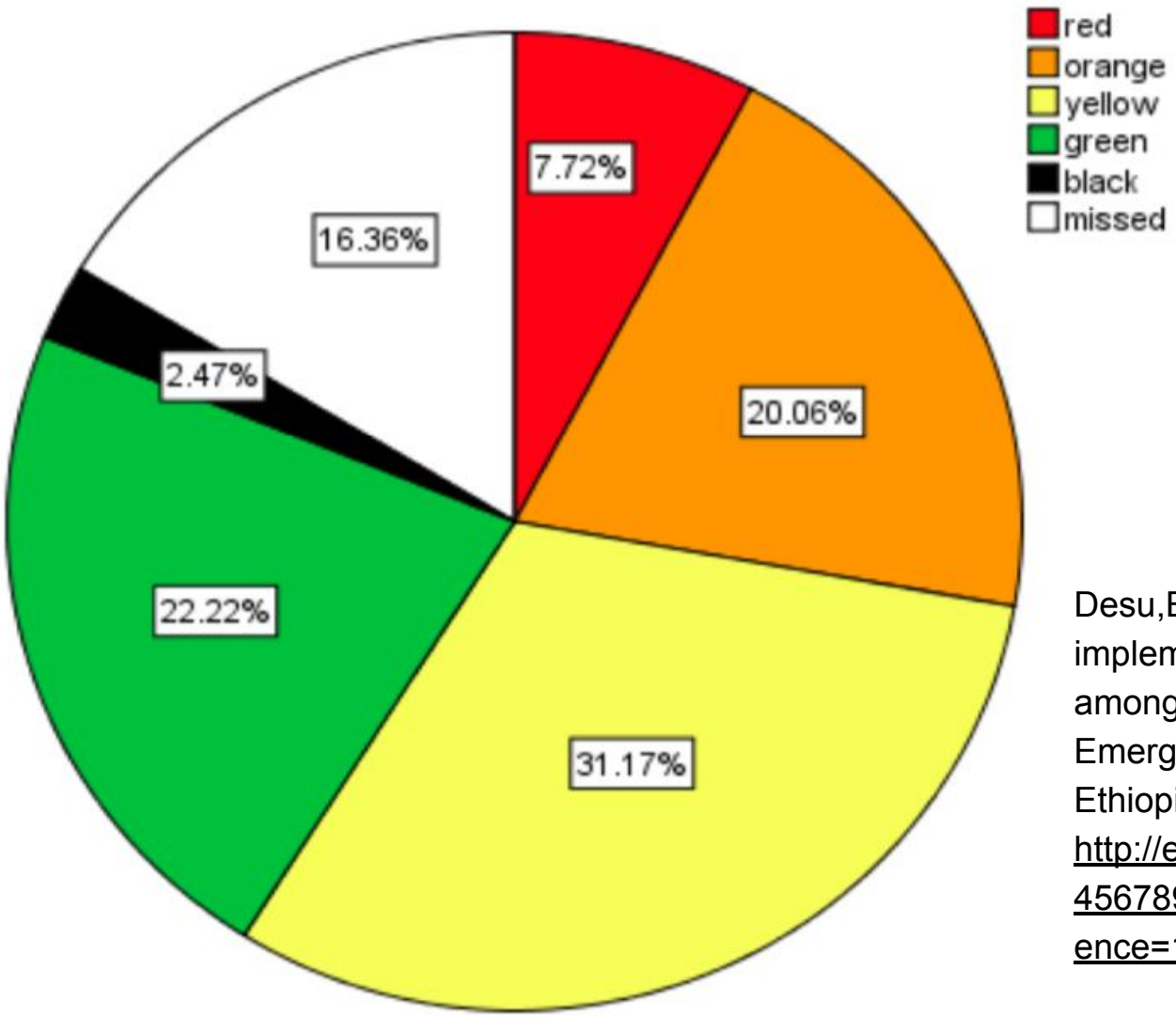
South African Triage Scale

Colour	RED	ORANGE	YELLOW	GREEN	BLUE
TEWS	7 or more	5-6	3-4	0-2	DEAD
Target time to treat	Immediate	less than 10 mins	less than 60 mins	less than 240 mins	
Mechanism of injury		High energy transfer			
Presentation		Shortness of breath - acute		ALL OTHER PATIENTS	
		Coughing blood			
		Chest pain			
		Haemorrhage - uncontrolled	Haemorrhage - controlled		
	Seizure - current	Seizure - post ictal			
		Focal neurology - acute			
		Level of consciousness reduced			
		Psychosis / Aggression			
		Threatened limb			
		Dislocation - other joint	Dislocation - finger or toe		
		Fracture - compound	Fracture - closed		
	Burn – face / inhalation	Burn over 20%	Burn - other		
		Burn - electrical			
		Burn - circumferential			
		Burn - chemical			
		Poisoning / Overdose	Abdominal pain		
	Hypoglycaemia - glucose less than 3	Diabetic - glucose over 11 & ketonuria	Diabetic - glucose over 17 (no ketonuria)		
		Vomiting - fresh blood	Vomiting - persistent		
		Pregnancy & abdominal trauma or pain	Pregnancy & trauma		
			Pregnancy & PV bleed		
Pain		Severe	Moderate	Mild	
	Senior Healthcare Professional's Discretion				

Global Health Emergency Medicine

Priority COLOUR	Target time	Management
RED	IMMEDIATE	Take to the resuscitation room for **emergency** management
ORANGE	< 10 mins	Refer to majors for **very urgent** management
YELLOW	< 1 hour	Refer to majors for **urgent** management
GREEN	< 4 hours	Refer to designated area for non-urgent cases
BLUE	< 2 hours	Refer to doctor for certification

Triage at TASH March-April 2019

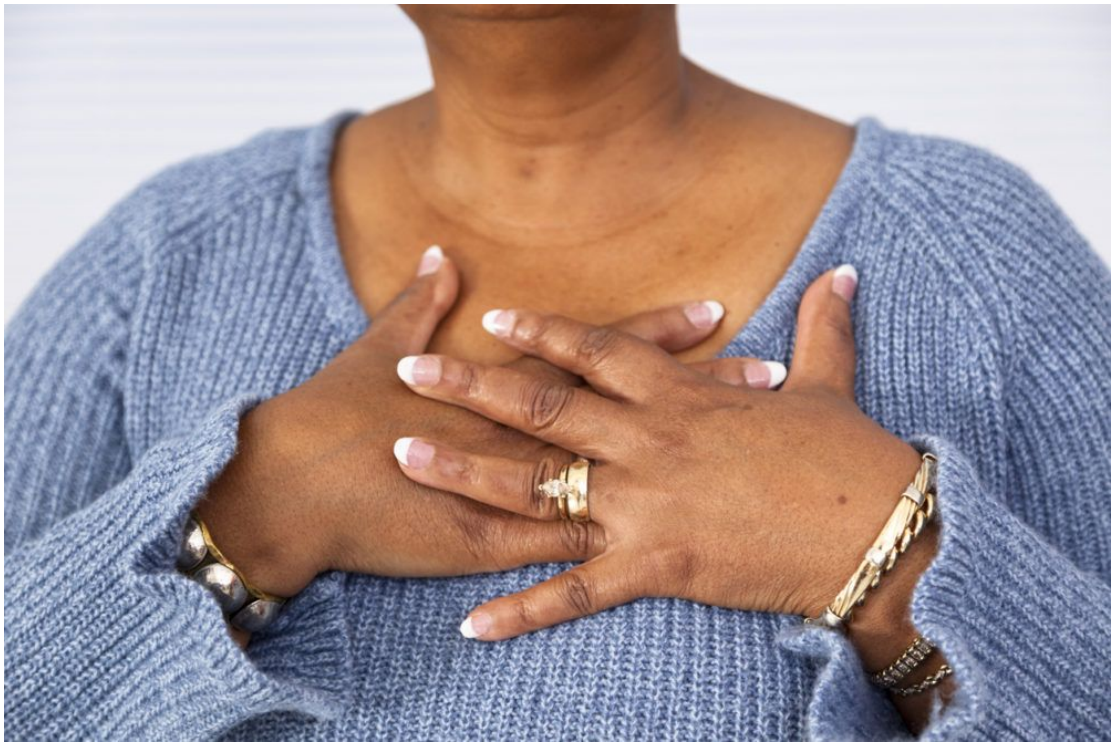


Desu,Birhanu. Assessing triage implementation and factors affecting it among patients visited TASH Adult Emergency Department, Addis Ababa, Ethiopia. Residency thesis. June 2019. http://etd.aau.edu.et/bitstream/handle/123456789/21234/Birhanu%20Desu.pdf?sequence=1&isAllowed=y

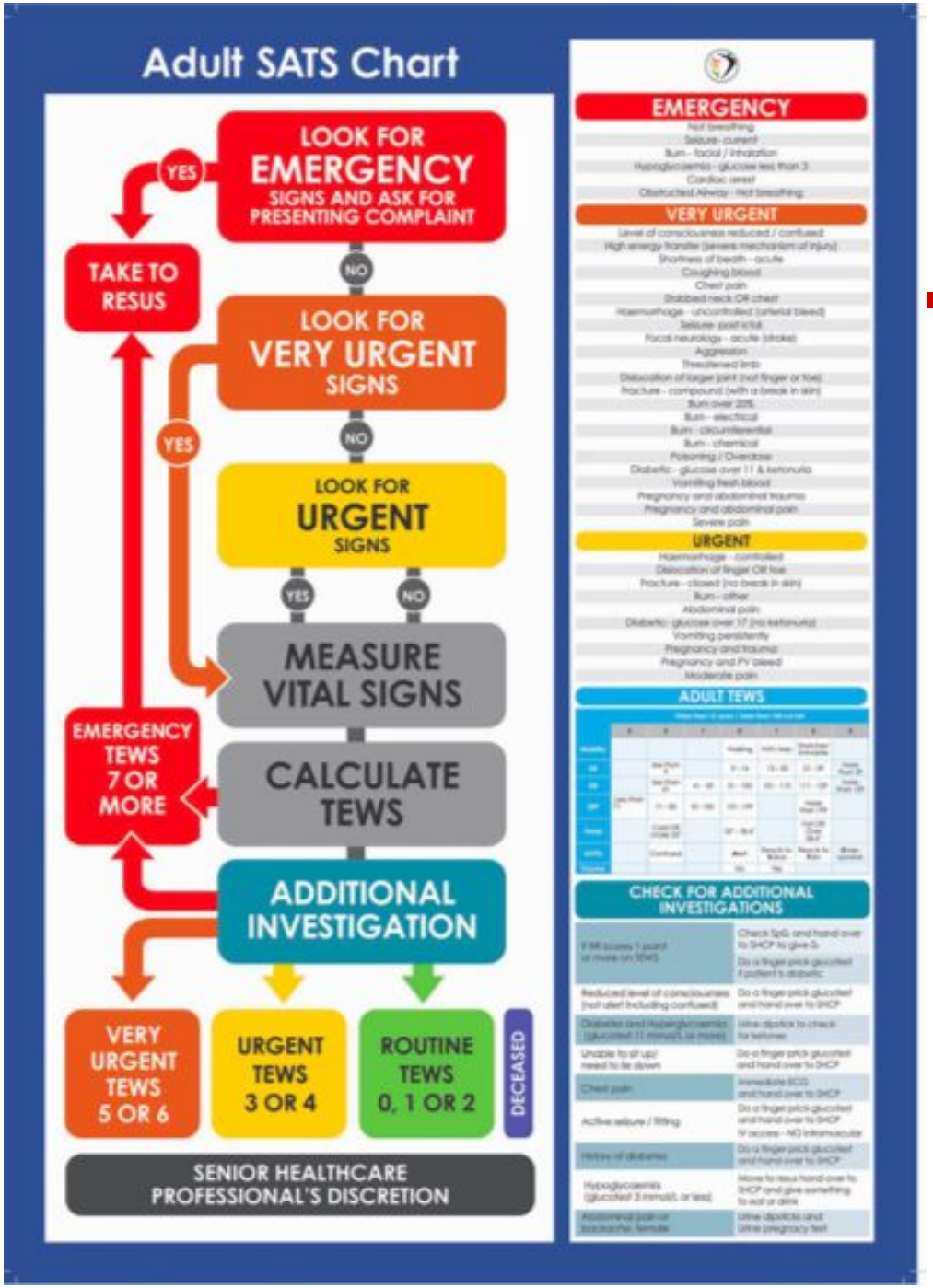
Global Health Emergency Medicine

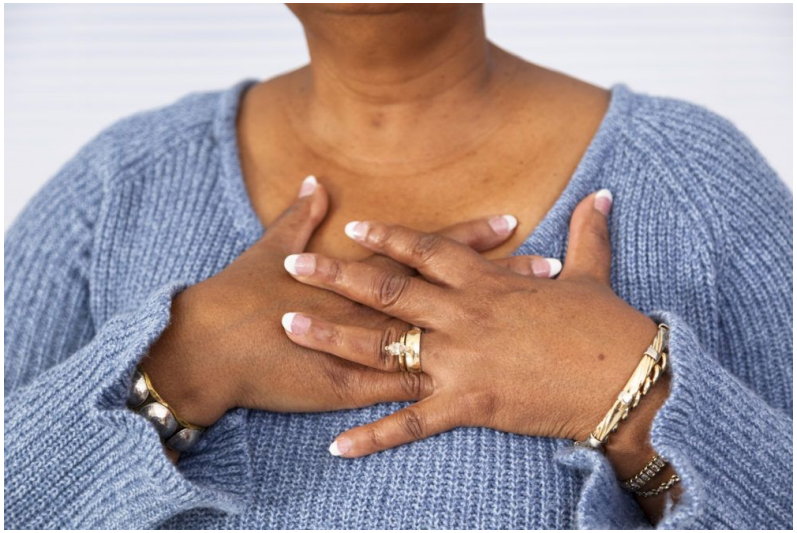
What is your emergency?

- 50y F
- 1h severe chest pain
- Radiates to her left shoulder



Global Health Emergency Medicine





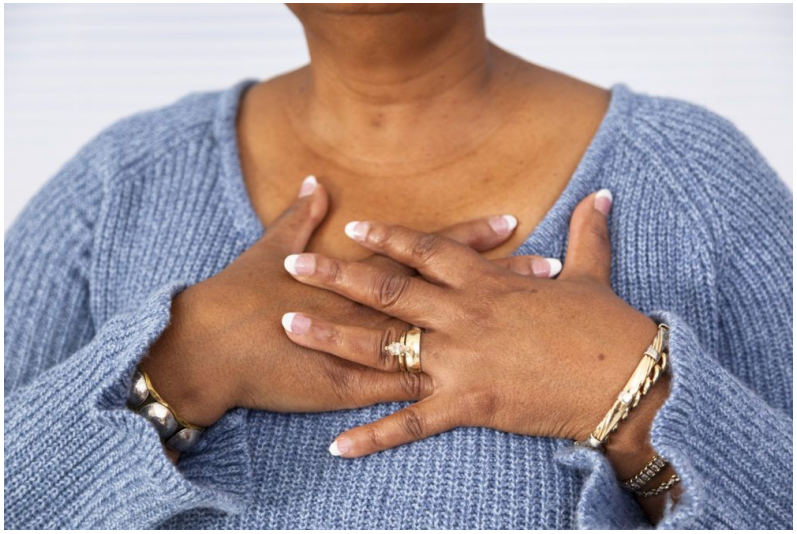
Global Health Emergency Medicine

EMERGENCY

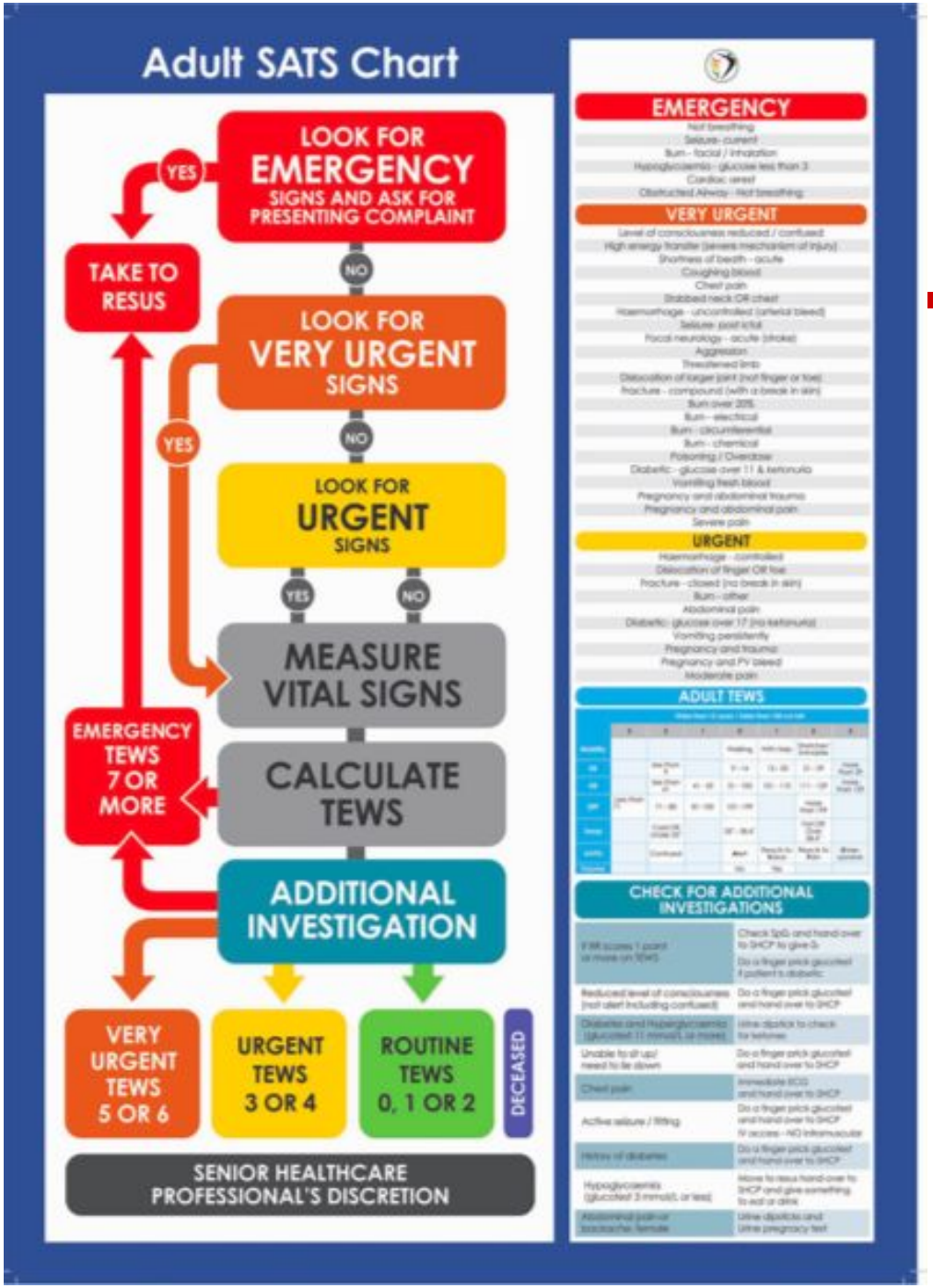
Not breathing
Seizure- current
Burn - facial / inhalation
Hypoglycaemia - glucose less than 3
Cardiac arrest
Obstructed Airway - Not breathing

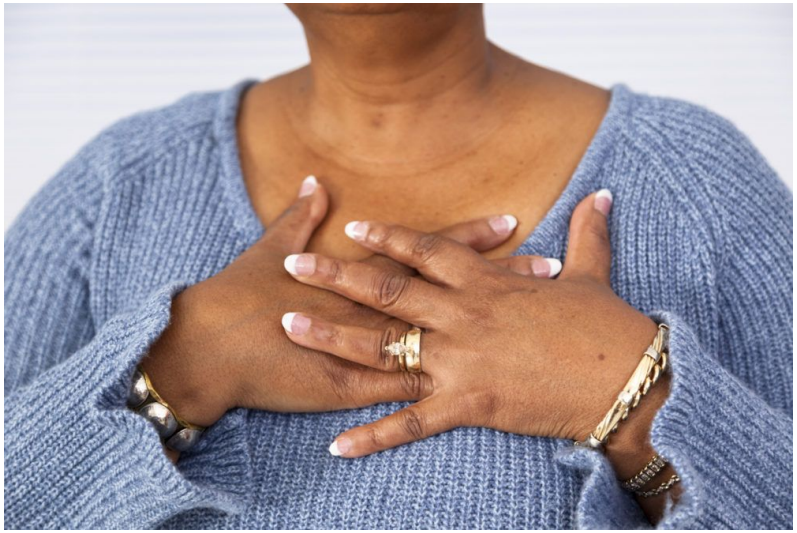
VERY URGENT

Level of consciousness reduced / confused
High energy transfer (severe mechanism of injury)
Shortness of beath - acute
Coughing blood
Chest pain
Stabbed neck OR chest
Haemorrhage - uncontrolled (arterial bleed)
Seizure- post ictal
Focal neurology - acute (stroke)
Aggression
Threatened limb
Dislocation of larger joint (not finger or toe)
Fracture - compound (with a break in skin)
Burn over 20%
Burn - electrical
Burn - circumferential
Burn - chemical
Poisoning / Overdose
Diabetic - glucose over 11 & ketonuria
Vomiting fresh blood
Pregnancy and abdominal trauma
Pregnancy and abdominal pain
Severe pain



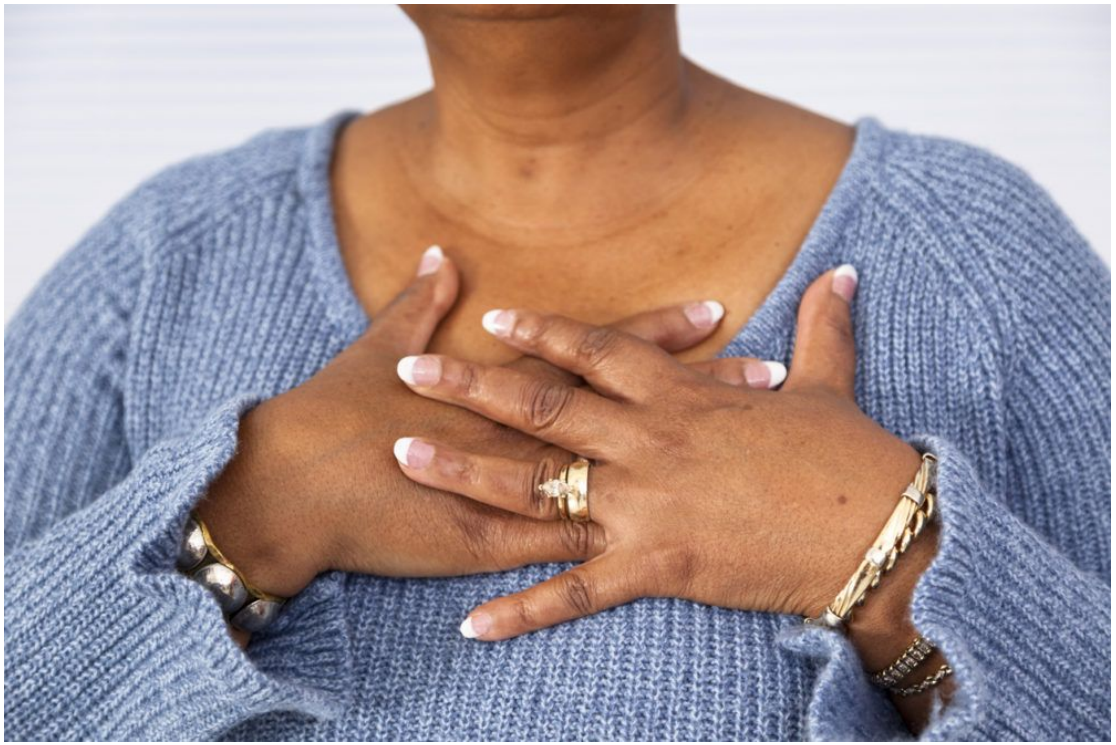
GH EM Global Health Emergency Medicine





Global Health Emergency Medicine

- RR16
- HR 105
- BP145/90 mmHg
- T 36.2°C
- AVPU: Alert



Global Health Emergency Medicine

Triage Early Warning Score=?

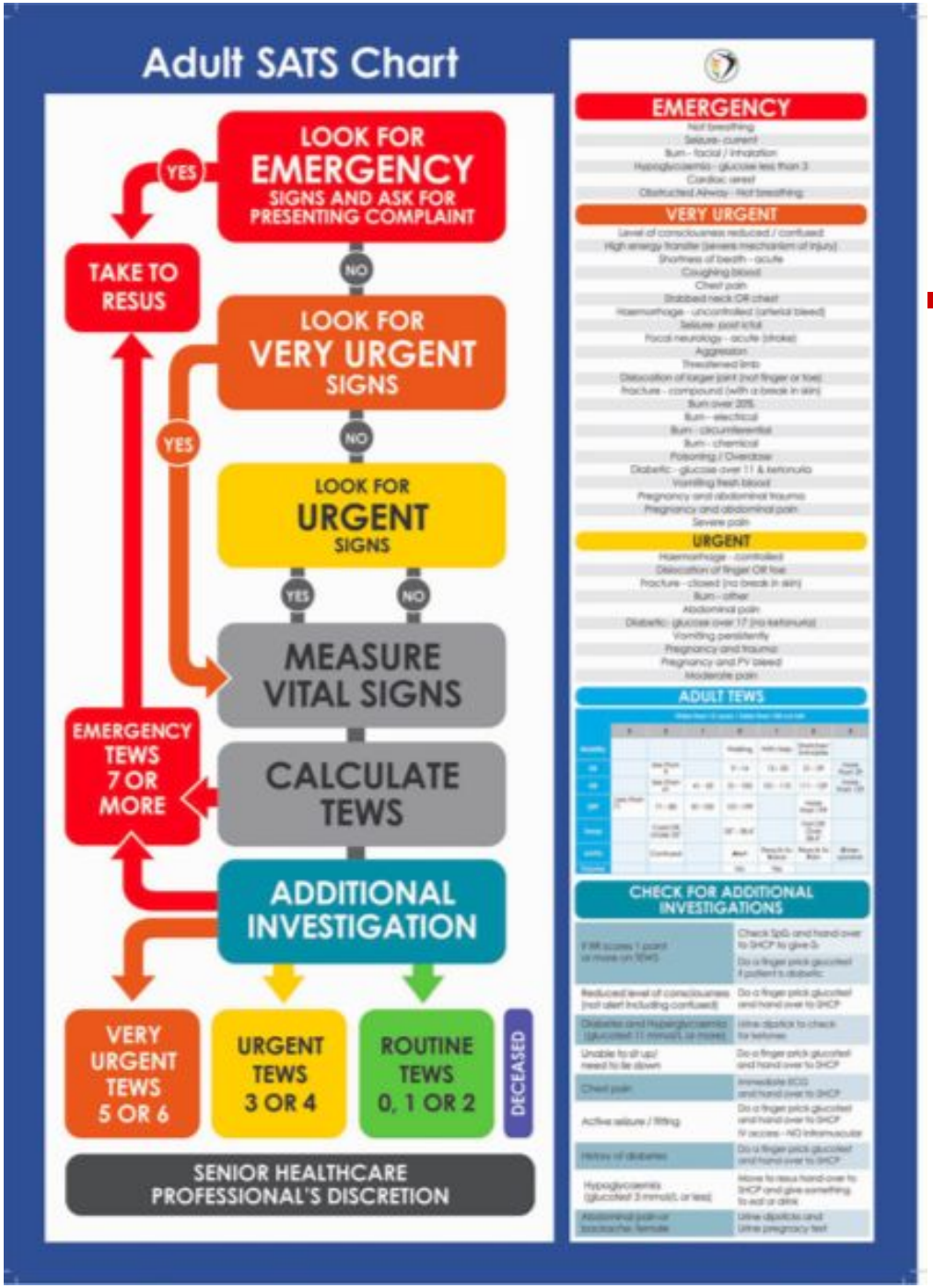
ADULT TRIAGE SCORE								© South African Triage Group 2008
	3	2	1	0	1	2	3	
Mobility				Walking	With Help	Stretcher/ Immobile		Mobility
RR		less than 9		9-14	15-20	21-29	more than 29	RR
HR		less than 41	41-50	51-100	101-110	111-129	more than 129	HR
SBP	less than 71	71–80	81-100	101-199		more than 199		SBP
Temp		Cold OR Under 35		35-38.4		Hot OR Over 38.4		Temp
AVPU		Confused		Alert	Reacts to Voice	Reacts to Pain	Unresponsive	AVPU
Trauma				No	Yes			Trauma
over 12 years / taller than 150cm								

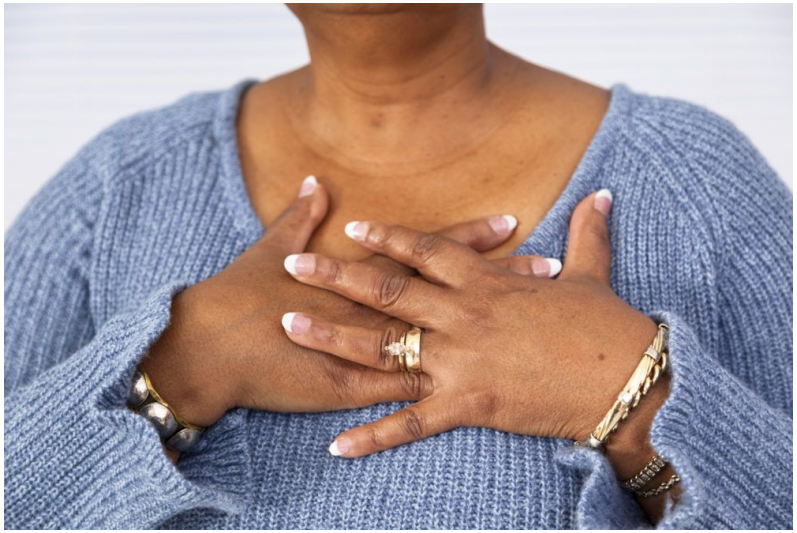
RR16, HR 105, BP145/90 mmHg, T 36.2°C, AVPU: Alert

Triage Early Warning Score=2

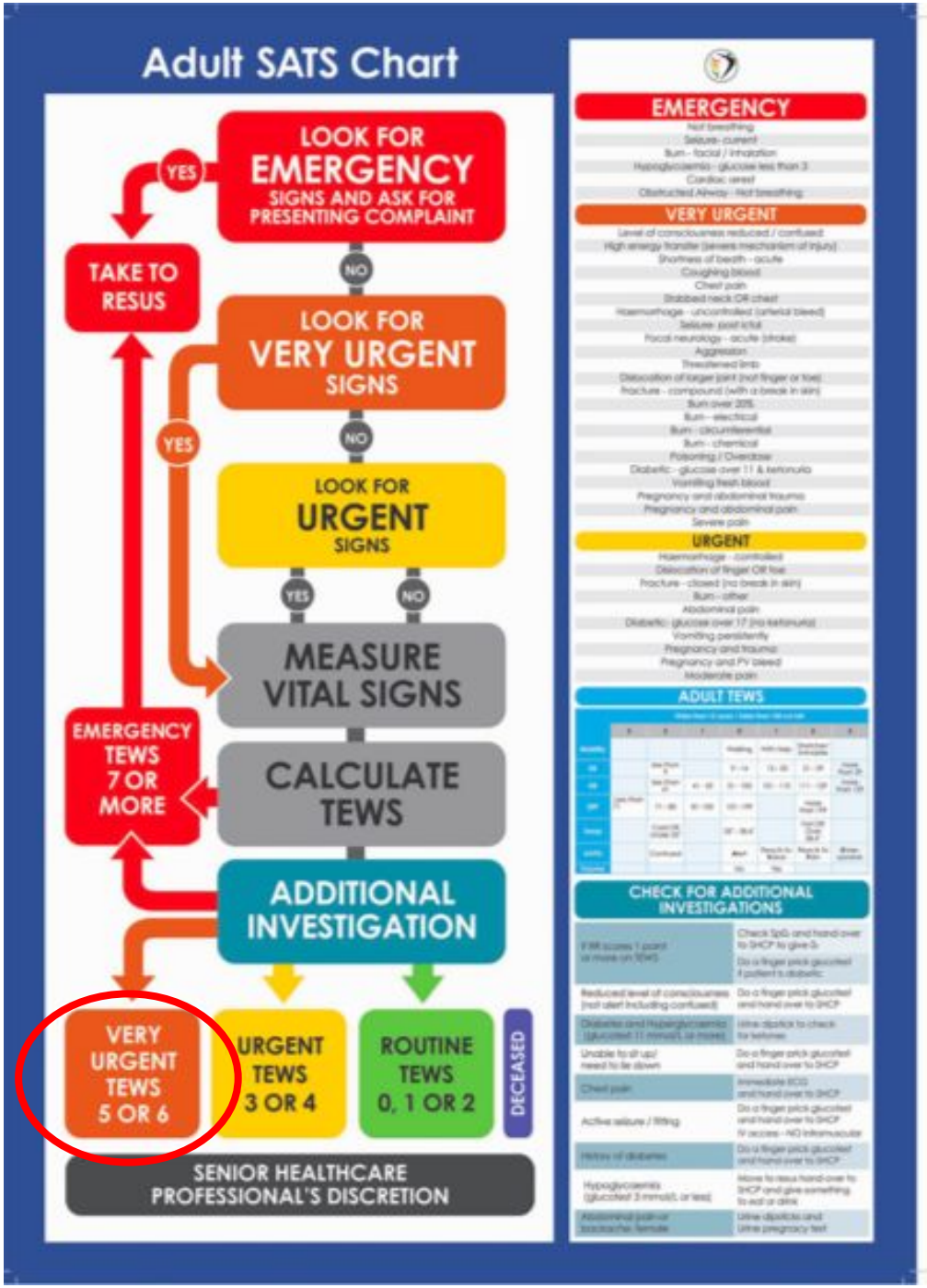
ADULT TRIAGE SCORE © South African Triage Group 2008								
	3	2	1	0	1	2	3	
Mobility				Walking	With Help	Stretcher/ Immobile		Mobility
RR		less than 9		9-14	15-20	21-29	more than 29	RR
HR		less than 41	41-50	51-100	101-110	111-129	more than 129	HR
SBP	less than 71	71–80	81-100	101-199		more than 199		SBP
Temp		Cold OR Under 35		35-38.4		Hot OR Over 38.4		Temp
AVPU		Confused		Alert	Reacts to Voice	Reacts to Pain	Unresponsive	AVPU
Trauma				No	Yes			Trauma
over 12 years / taller than 150cm								

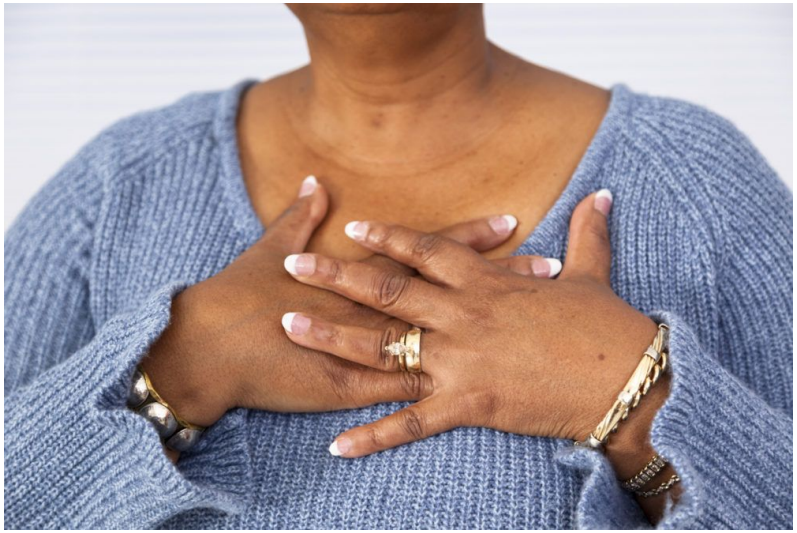
RR16, HR 105, BP145/90 mmHg, T 36.2°C, AVPU: Alert





Global Health Emergency Medicine



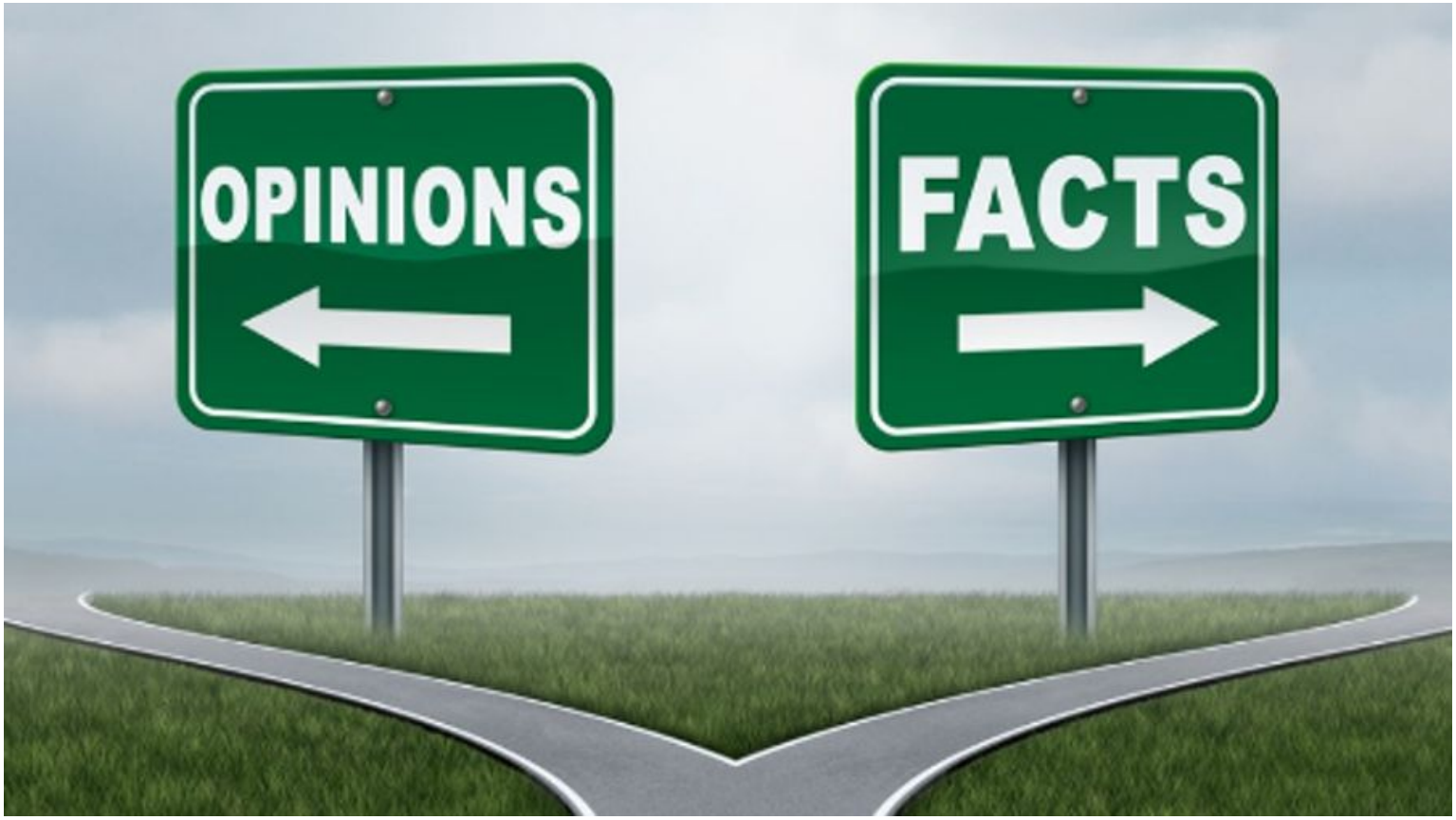


Global Health Emergency Medicine

Questions so far?

Global Health
Emergency Medicine

Triage controversies



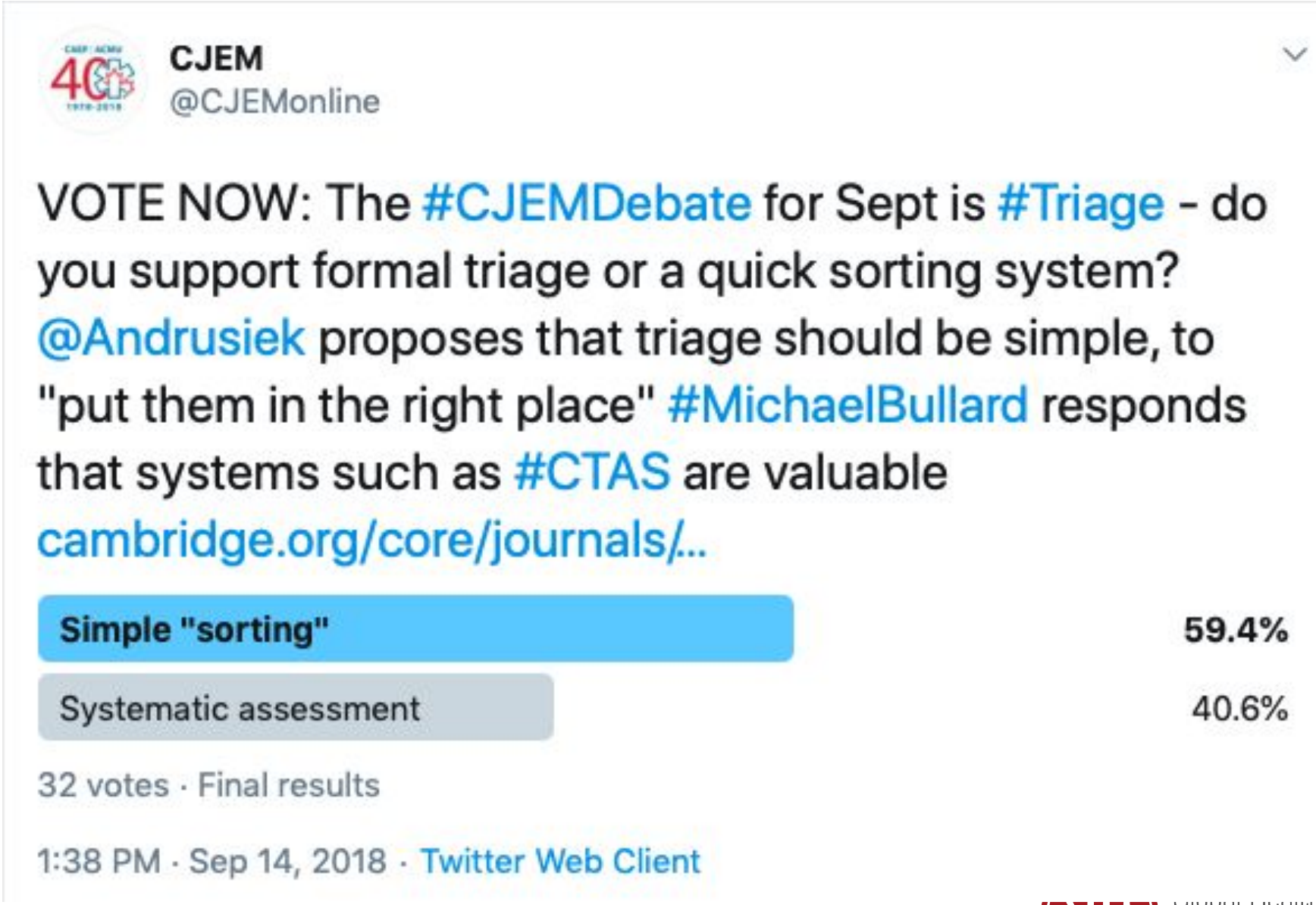
Global Health
Emergency Medicine

Limitations of triage

Access block

Subjectivity (uptriage, downtriage)

Undertriage of special populations


CJEM
@CJEMonline
VOTE NOW: The #CJEMDebate for Sept is #Triage - do you support formal triage or a quick sorting system? @Andrusiek proposes that triage should be simple, to "put them in the right place" #MichaelBullard responds that systems such as #CTAS are valuable cambridge.org/core/journals/...
Simple "sorting"
59.4%
Systematic assessment
40.6%
32 votes · Final results
1:38 PM · Sep 14, 2018 · Twitter Web Client

What do the data tell us?

- Successful completion of triage tool
- Interrater reliability
- Prediction of patient outcome

Over and undertriage

American College of Surgeons:

- Overtriage 25-35%
- Undertriage 5% or less

Over and undertriage

SATS in Ghana, 5.4% undertriaged, 0.3% overtriaged one year after implementation

Rominski S, et al. The implementation of the South African Triage Score (SATS) in an urban teaching hospital, Ghana. Afr J Emerg Med. 2014, Jun;4(2):71–5.
https://www.sciencedirect.com/science/article/pii/S2211419X14000020

Over and undertriage

- Ayder, three years after SATS implementation
- 42.1% had triage form completed
- Incorrect completion of all triage forms and high rates of over and undertriage

Abdelwahab R, Yang H, Teka HG. A quality improvement study of the emergency centre triage in a tertiary teaching hospital in northern Ethiopia. Afr J Emerg Med. 2017 Dec;7(4):160–6.https://www.sciencedirect.com/science/article/pii/S2211419X16302099

Global Health Emergency Medicine

Over and undertriage at TASH

Over and undertriage at TASH

- 263 patients
- 115 (43.7%) were incorrectly triaged
- 29 (11%) were over triaged while 86 (32%) were under triaged
- Without a calculated TEWS more likely to overtriage

Desu,Birhanu. Assessing triage implementation and factors affecting it among patients visited Tikur Anbessa Specialized Hospital Adult Emergency Department, Addis Ababa, Ethiopia. Resident thesis. June 2019. http://etd.aau.edu.et/bitstream/handle/123456789/21234/Birhanu%20Desu.pdf?sequence=1&isAllowed=y

Interrater reliability

Kappa 0.50-0.61 interrater agreement on SATS

Dalwai, Mohammed, et al. "Inter-rater and intrarater reliability of the South African Triage Scale in low-resource settings of Haiti and Afghanistan." *Emergency Medicine Journal* 35.6 (2018): 379-383.

https://emj.bmj.com/content/35/6/379?rss=1&hootPostID=5e9e6ea67e18ff7d929a4a70761ccf2b&itm_content=consumer&itm_medium=cpc&itm_source=trendmd&itm_term=0-A&itm_campaign=emj

Global Health Emergency Medicine

Training and triage

Increased triage skill level associated with knowledge about triage, education level, and training experience.

Kerie, Sitotaw, Ayele Tilahun, and Alemnesh Mandesh. "Triage skill and associated factors among emergency nurses in Addis Ababa, Ethiopia 2017: a cross-sectional study." *BMC research notes* 11.1 (2018): 658.https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-018-3769-8

Global Health Emergency Medicine

Prediction of patient outcome

SATS had a sensitivity of 92.2% and specificity of 37.7% for predicting admission, death, or discharge

Wangara, Ali A., et al. "Implementation and performance of the south african triage scale at kenyatta national hospital in nairobi, kenya." *International Journal of Emergency Medicine,* 12.1 (2019): 5. https://link.springer.com/article/10.1186/s12245-019-0221-3

Global Health Emergency Medicine

Prediction of patient outcome

- Predicted an increase in the likelihood of mortality and hospitalisation across incremental acuity levels
- ED outcomes for ‘green’ and ‘red’ patients matched the predicted ED outcomes in 84%–99% of cases

Dalwai, Mohammed, et al. "Is the South African Triage Scale valid for use in Afghanistan, Haiti and Sierra Leone?." *BMJ global health* 2.2 (2017): e000160.https://gh.bmj.com/content/bmjgh/2/2/e000160.full.pdf

ED crowding and wait times

- Waiting times were significantly reduced in all but the lowest priority category
- Patients triaged “red” (highest priority) demonstrated a mean reduction in waiting time from 216 min to 38 min

Bruijns, S. R., L. A. Wallis, and V. C. Burch. "Effect of introduction of nurse triage on waiting times in a South African emergency department." *Emergency Medicine Journal* 25.7 (2008): 395-397.

ED crowding and wait times

Conflicting evidence about whether triage systems that only prioritize patients, without providing any treatment, improve overall patient flow

Harding, Katherine E., Nicholas F. Taylor, and Sandra G. Leggat. "Do triage systems in healthcare improve patient flow? A systematic review of the literature." *Australian Health Review* 35.3 (2011): 371-383.https://www.ncbi.nlm.nih.gov/books/NBK82718/

Global Health Emergency Medicine

Improving triage effectiveness

- Consistent medical record-keeping
- Clinically experienced trieurs
- Training program and skill upkeep

Future of triage

- increased interventions at triage
- e-triage
- triage liaison physicians
- advances in triage of special populations
- team triage
- triage simplification

Questions or comments?

Global Health
Emergency Medicine

Summary

- Purpose of triage in the ED
- A process of prioritizing patients based on the severity of their condition.
- Rapidly assess patients with urgent, life-threatening conditions
- Rationing patient treatment efficiently when resources are insufficient for all to be treated immediately.

Thank you!

Global Health
Emergency Medicine

References

Iserson, Kenneth V., and John C. Moskop. "Triage in medicine, part I: concept, history, and types." *Annals of emergency medicine* 49.3 (2007): 275-281. https://www.researchgate.net/profile/Kenneth_Iserson/publication/262637907_Triage_Ethics-Part_1/links/0f3175384caa07fc8a000000.pdf

Robertson-Steel, Iain. "Evolution of triage systems." *Emergency Medicine Journal* 23.2 (2006): 154-155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2564046/pdf/154.pdf

Abdelwahab, Rehab, Hannah Yang, and Hareya Gebremedhin Teka. "A quality improvement study of the emergency centre triage in a tertiary teaching hospital in northern Ethiopia." *African Journal of Emergency Medicine* 7.4 (2017): 160-166. https://www.sciencedirect.com/science/article/pii/S2211419X16302099#b0005

Rominski, Sarah, et al. "The implementation of the South African Triage Score (SATS) in an urban teaching hospital, Ghana." *African journal of emergency medicine* 4.2 (2014): 71-75. https://www.sciencedirect.com/science/article/pii/S2211419X14000020

Wallis, L. A., et al. "The cape triage score-a triage system for South Africa." *South African Medical Journal* 96.1 (2006): 53-56. https://journals.co.za/docserver/fulltext/m_samj/96/1/m_samj_v96_n1_a17.pdf?expires=1591309678&id=id&accname=guest&checksum=1F94B67A7153C05A3BCFBB4FB8BC07F1

Bullard, Michael J., et al. "Revisions to the Canadian emergency department triage and acuity scale (CTAS) guidelines 2016." *Canadian Journal of Emergency Medicine* 19.S2 (2017): S18-S27. https://pdfs.semanticscholar.org/3fb1/ad39efe0ae67b38a540eae44ca73ff50cdbe.pdf

Zachariasse, Joany M., et al. "Performance of triage systems in emergency care: a systematic review and meta-analysis." *BMJ open* 9.5 (2019): e026471.https://bmjopen.bmj.com/content/9/5/e026471?int_source=trendmd&int_medium=cpc&int_campaign=usage-042019

AAU Health Sciences Library Institutation Repository of Postgraduate Projects: http://etd.aau.edu.et/handle/123456789/218

Global Health Emergency Medicine

Extra reading

Triage in a pandemic, https://blogs.bmj.com/bmj/2020/03/09/covid-19-triage-in-a-pandemic-is-even-thornier-than-you-might-think/

Kahn, Christopher A., et al. "Does START triage work? An outcomes assessment after a disaster." *Annals of emergency medicine* 54.3 (2009): 424-430. https://escholarship.org/content/qt89p3t51j/qt89p3t51j.pdf

Systematic review of triage system performance: https://bmjopen.bmj.com/content/9/5/e026471.full

SATS training videos and introduction to triage https://emssa.org.za/special-interest-groups/the-south-african-triage-scale-sats/

Global Health Emergency Medicine