Human Factors-Informed Design of Medical Protocols

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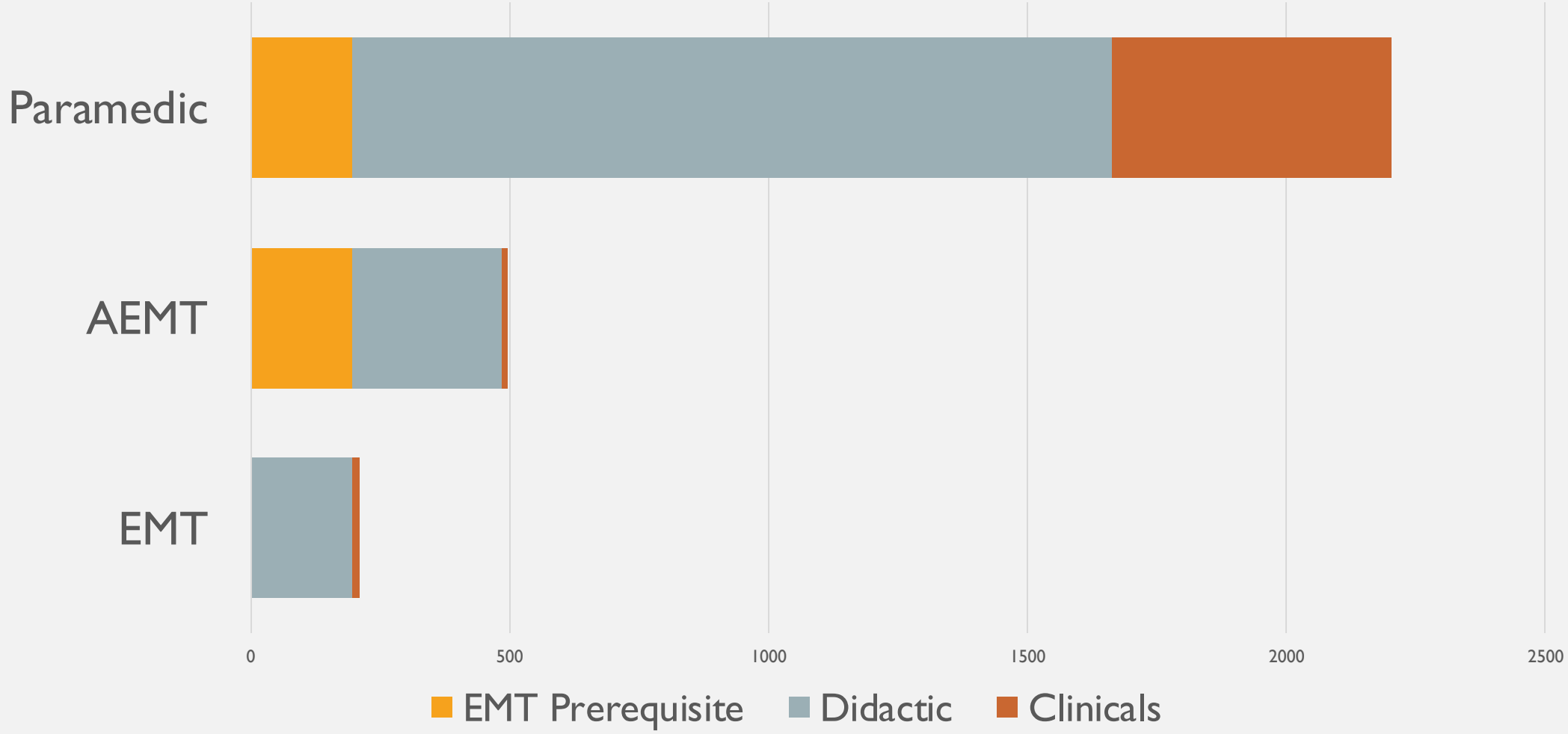
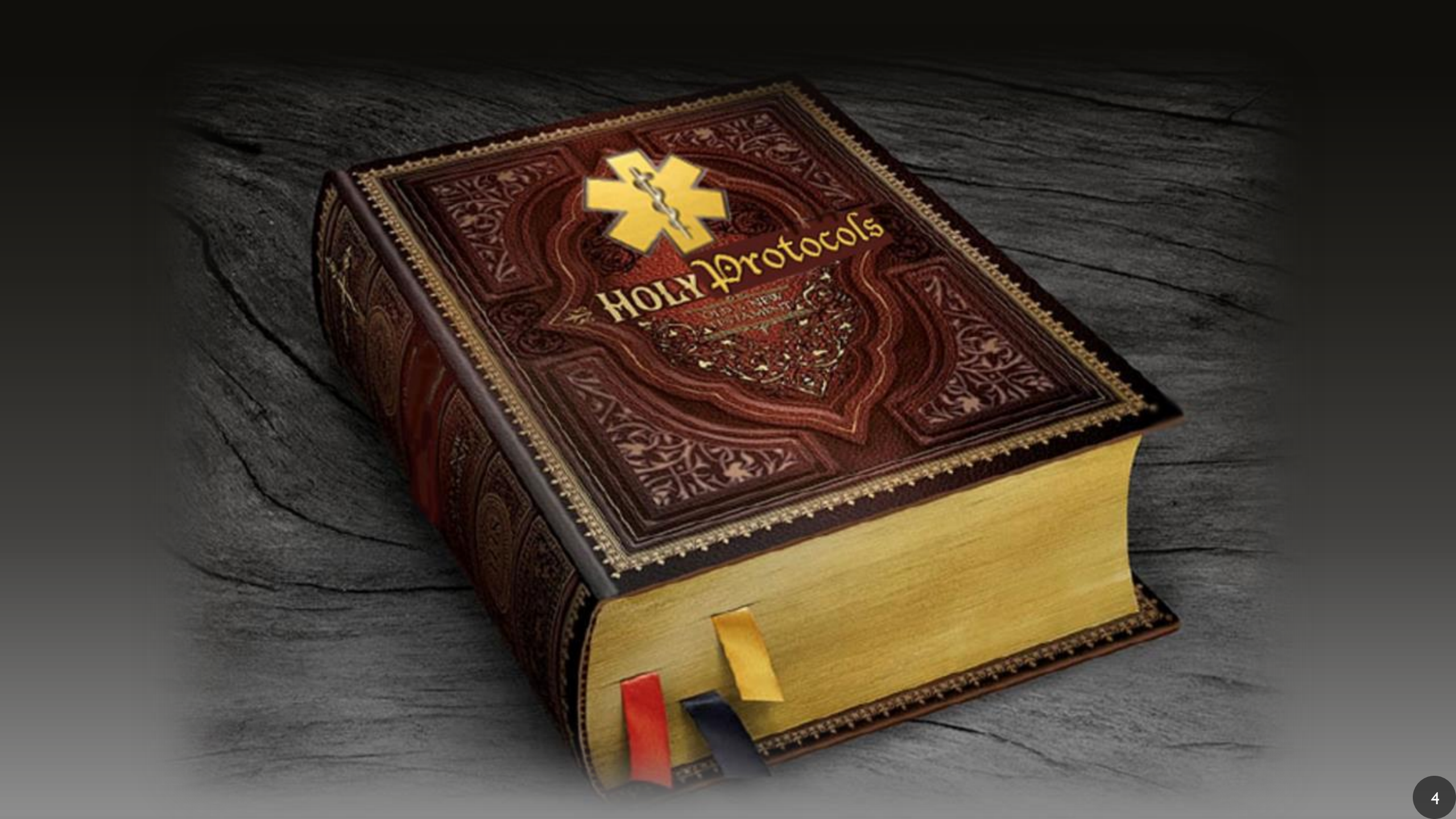
SPEAKER DISCLOSURE / COI STATEMENT

I, Paul Misasi, PhD, MS, am an independent consultant for Hinkley Medical, Inc.

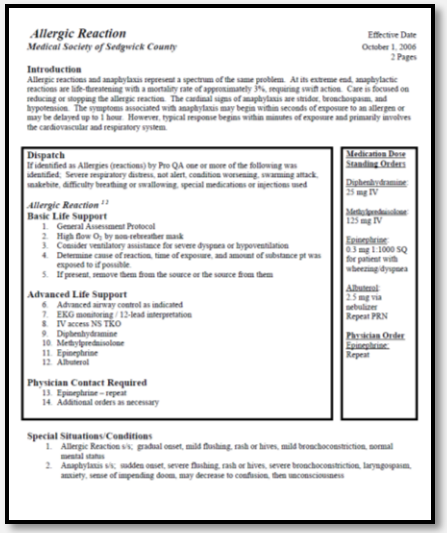
EMS PROVIDER EDUCATION HOURS



Kansas EMS Association (2018)


Holy Protocols

PROBLEM



Allergic Reaction
Medical Society of Sedgwick County

Effective Date
October 1, 2006
2 Pages

Introduction

Allergic reactions and anaphylaxis represent a spectrum of the same problems. At its extreme end, anaphylactic reactions are life-threatening with a mortality rate of approximately 3%, requiring swift action. Care is focused on reducing or stopping the allergic reaction. The cardinal signs of anaphylaxis are stridor, bronchospasm, and hypotension. The symptoms associated with anaphylaxis may begin within seconds of exposure to an allergen or may be delayed up to 1 hour. However, typical response begins within minutes of exposure and primarily involves the cardiovascular and respiratory system.

Dispatch

If identified as Allergies (reactions) by Pro QA one or more of the following was identified. Severe respiratory distress, not alert, condition worsening, swarming attack, snakebite, difficulty breathing or swallowing, special medications or injections used

Allergic Reaction [2]

Basic Life Support

1. General Assessment Protocol
2. High flow O_2 by non-rebreather mask
3. Consider ventilatory assistance for severe dyspnea or hypoventilation
4. Determine cause of reaction, time of exposure, and amount of substance pt was exposed to if possible.
5. If present, remove them from the source or the source from them

Advanced Life Support

6. Advanced airway control as indicated
7. EKG monitoring / 12-lead interpretation
8. IV access NS TKO
9. Diphenhydramine
10. Methylprednisolone
11. Epinephrine
12. Albuterol

Physician Contact Required

13. Epinephrine – repeat
14. Additional orders as necessary

Medication Dose Standing Orders

Diphenhydramine
25 mg IV

Methylprednisolone
125 mg IV

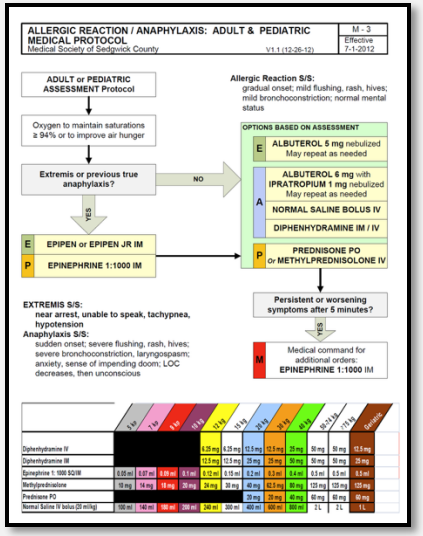
Epinephrine
0.3 mg 1:1000 SQ
for patient with wheezing/dyspnea

Albuterol
2.5 mg via nebulizer
Repeat PRN

Physician Order
Epinephrine:
Repeat

Special Situations/Conditions

1. Allergic Reaction s/s: gradual onset, mild flushing, rash or hives, mild bronchoconstriction, normal mental status
2. Anaphylaxis s/s: sudden onset, severe flushing, rash or hives, severe bronchoconstriction, laryngospasm, anxiety, sense of impending doom, may decrease to confusion, then unconsciousness



ALLERGIC REACTION / ANAPHYLAXIS: ADULT & PEDIATRIC MEDICAL PROTOCOL
Medical Society of Sedgwick County
V1.1 (12-26-12)
M - 3
Effective 7-1-2012

ADULT or PEDIATRIC ASSESSMENT Protocol

Oxygen to maintain saturations ≥ 94% or to improve air hunger

Extremis or previous true anaphylaxis? — NO

YES

E EPIPEN or EPIPEN JR IM
P EPINEPHRINE 1:1000 IM

Allergic Reaction S/S:
gradual onset; mild flushing, rash, hives; mild bronchoconstriction; normal mental status

OPTIONS BASED ON ASSESSMENT

E ALBUTEROL 5 mg nebulized
May repeat as needed

A ALBUTEROL 6 mg with IPRATROPIUM 1 mg nebulized
May repeat as needed

NORMAL SALINE BOLUS IV

DIPHENHYDRAMINE IM / IV

P PREDNISONE PO or METHYLPREDNISOLONE IV

Persistent or worsening symptoms after 5 minutes?

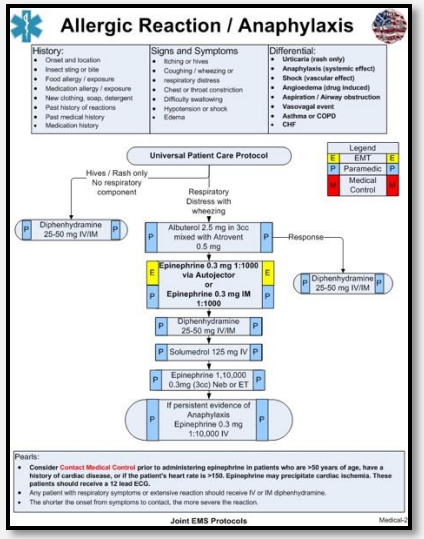
YES

M Medical command for additional orders: EPINEPHRINE 1:1000 IM

EXTREMIS S/S:
near arrest, unable to speak, tachypnea, hypotension

Anaphylaxis S/S:
sudden onset; severe flushing, rash, hives; severe bronchoconstriction, laryngospasm; anxiety, sense of impending doom; LOC decreases, then unconscious

	3 kg	7 kg	9 kg	11 kg	13 kg	15 kg	20 kg	25 kg	30 kg	36-42 kg	43-54 kg	ADULT
Diphenhydramine IV				6.25 mg	6.25 mg	12.5 mg	12.5 mg	25 mg	50 mg	50 mg	50 mg	50 mg
Diphenhydramine IM				12.5 mg	12.5 mg	25 mg	25 mg	50 mg	50 mg	50 mg	50 mg	25 mg
Epinephrine 1: 1000 SQ/IM	0.05 ml	0.07 ml	0.09 ml	0.1 ml	0.12 ml	0.15 ml	0.2 ml	0.3 ml	0.4 ml	0.5 ml	0.5 ml	0.5 ml
Methylprednisolone	10 mg	14 mg	18 mg	20 mg	24 mg	30 mg	40 mg	50 mg	60 mg	125 mg	125 mg	125 mg
Prednisone PO							20 mg	20 mg	40 mg	60 mg	60 mg	60 mg
Normal Saline IV bolus (20 ml/kg)	100 ml	140 ml	180 ml	200 ml	240 ml	300 ml	400 ml	500 ml	600 ml	1 L	2 L	1 L



Allergic Reaction / Anaphylaxis

History:	Signs and Symptoms	Differential:
• Onset and location • Insect sting or bite • Food allergy / exposure • Medication allergy / exposure • New clothing, soap, detergent • Past history of reactions • Past medical history • Medication history	• Itching or hives • Coughing / wheezing or respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotension or shock • Edema	• **Urticaria (rash only)** • **Anaphylaxis (systemic effect)** • **Shock (vascular effect)** • **Angioedema (drug induced)** • **Aspiration / Airway obstruction** • **Vasovagal event** • **Asthma or COPD** • **CHF**

Universal Patient Care Protocol

Legend: E EMT; P Paramedic; Medical Control

Hives / Rash only, No respiratory component → P Diphenhydramine 25-50 mg IV/IM P

Respiratory Distress with wheezing → P Albuterol 2.5 mg in 3cc mixed with Atrovent 0.5 mg P

Response → P Diphenhydramine 25-50 mg IV/IM P

E **Epinephrine 0.3 mg 1:1000 via Autojector** or **Epinephrine 0.3 mg IM 1:1000** E P

P Diphenhydramine 25-50 mg IV/IM P

P Solumedrol 125 mg IV P

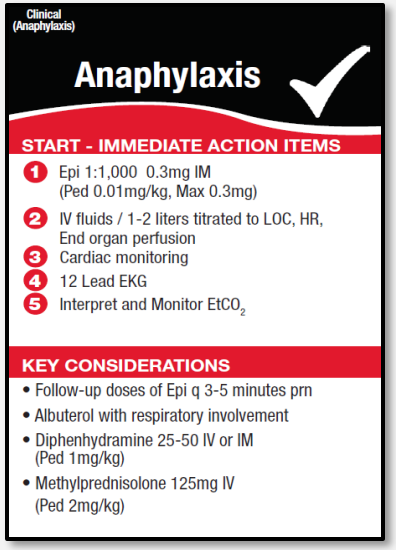
P Epinephrine 1,10,000 0.3mg (3cc) Neb or ET P

P If persistent evidence of Anaphylaxis Epinephrine 0.3 mg 1:10,000 IV P

Pearls:

- Consider Contact Medical Control prior to administering epinephrine in patients who are >50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. These patients should receive a 12 lead ECG.
- Any patient with respiratory symptoms or extensive reaction should receive IV or IM diphenhydramine.
- The shorter the onset from symptoms to contact, the more severe the reaction.

Joint EMS Protocols



Clinical (Anaphylaxis)

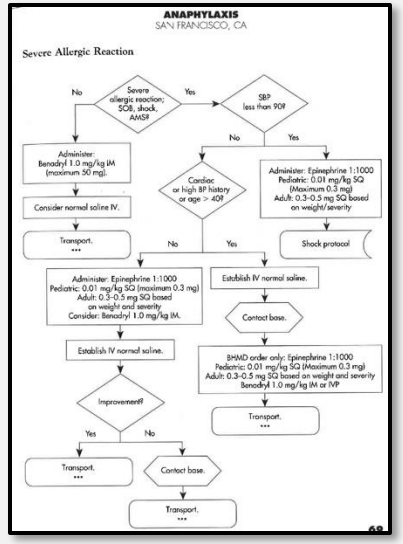
Anaphylaxis

START - IMMEDIATE ACTION ITEMS

1. Epi 1:1,000 0.3mg IM (Ped 0.01mg/kg, Max 0.3mg)
2. IV fluids / 1-2 liters titrated to LOC, HR, End organ perfusion
3. Cardiac monitoring
4. 12 Lead EKG
5. Interpret and Monitor $EtCO_2$

KEY CONSIDERATIONS

- Follow-up doses of Epi q 3-5 minutes prn
- Albuterol with respiratory involvement
- Diphenhydramine 25-50 IV or IM (Ped 1mg/kg)
- Methylprednisolone 125mg IV (Ped 2mg/kg)



ANAPHYLAXIS
SAN FRANCISCO, CA

Severe Allergic Reaction

Severe allergic reaction; SOB, shock, AMS? — No / Yes

SBP less than 90#? — No / Yes

Administer: Benadryl 1.0 mg/kg IM (maximum 50 mg).

Consider normal saline IV.

Transport.

Cardiac or high BP history or age > 40#? — No / Yes

Administer: Epinephrine 1:1000 Pediatric: 0.01 mg/kg SQ (Maximum 0.3 mg) Adult: 0.3-0.5 mg SQ based on weight/severity

Shock protocol

Administer: Epinephrine 1:1000 Pediatric: 0.01 mg/kg SQ (maximum 0.3 mg) Adult: 0.3-0.5 mg SQ based on weight and severity Consider: Benadryl 1.0 mg/kg IM.

Establish IV normal saline.

Contact base.

Establish IV normal saline.

BHMD order only: Epinephrine 1:1000 Pediatric: 0.01 mg/kg SQ (Maximum 0.3 mg) Adult: 0.3-0.5 mg SQ based on weight and severity Benadryl 1.0 mg/kg IM or IVP

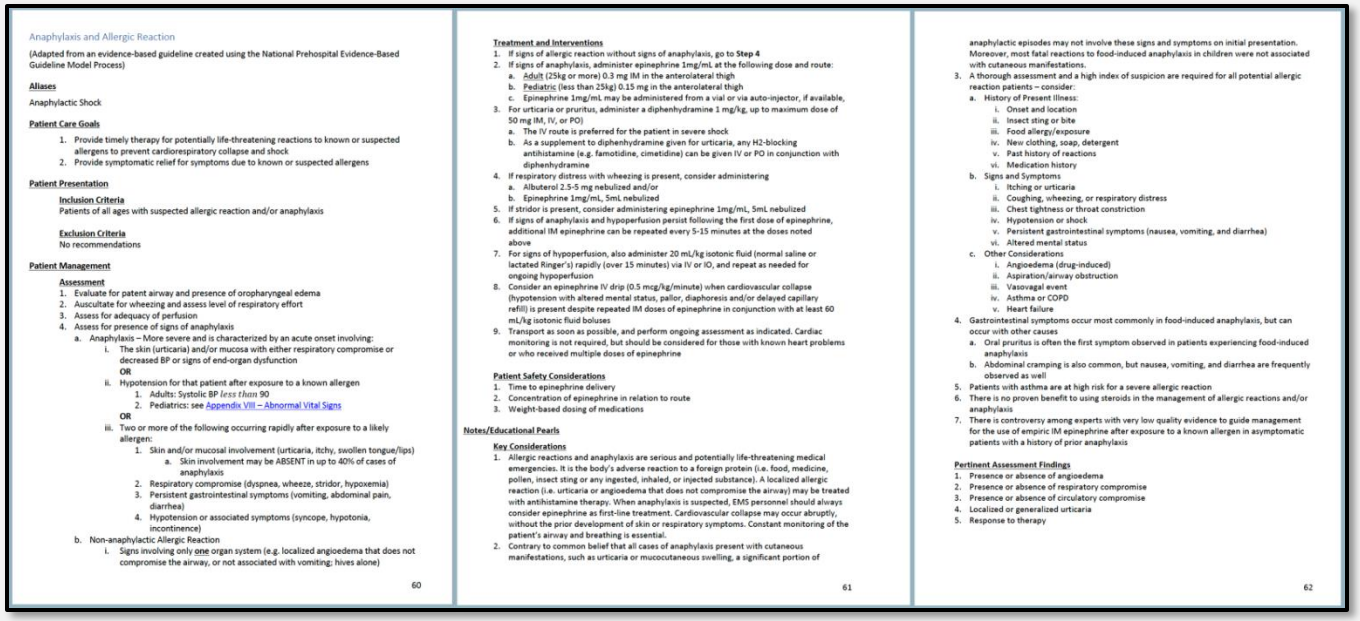
Improvement? — Yes / No

Transport.

Transport.

Contact base.

Transport.



Anaphylaxis and Allergic Reaction

(Adapted from an evidence-based guideline created using the National Prehospital Evidence-Based Guideline Model Process)

Aliases

Anaphylactic Shock

Patient Care Goals

1. Provide timely therapy for potentially life-threatening reactions to known or suspected allergens to prevent cardiorespiratory collapse and shock
2. Provide symptomatic relief for symptoms due to known or suspected allergens

Patient Presentation

Inclusion Criteria
Patients of all ages with suspected allergic reaction and/or anaphylaxis

Exclusion Criteria
No recommendations

Patient Management

Assessment

1. Evaluate for patent airway and presence of oropharyngeal edema
2. Auscultate for wheezing and assess level of respiratory effort
3. Assess for adequacy of perfusion
4. Assess for presence of signs of anaphylaxis
   a. Anaphylaxis – More severe and is characterized by an acute onset involving:
      i. The skin (urticaria) and/or mucosa with either respiratory compromise or decreased BP or signs of end-organ dysfunction
      OR
      ii. Hypotension for that patient after exposure to a known allergen
         1. Adults: Systolic BP *less than* 90
         2. Pediatrics: see Appendix VIII – Abnormal Vital Signs
      OR
      iii. Two or more of the following occurring rapidly after exposure to a likely allergen:
         1. Skin and/or mucosal involvement (urticaria, itchy, swollen tongue/lips)
            a. Skin involvement may be ABSENT in up to 40% of cases of anaphylaxis
         2. Respiratory compromise (dyspnea, wheeze, stridor, hypoxemia)
         3. Persistent gastrointestinal symptoms (vomiting, abdominal pain, diarrhea)
         4. Hypotension or associated symptoms (syncope, hypotonia, incontinence)
   b. Non-anaphylactic Allergic Reaction
      i. Signs involving only one organ system (e.g. localized angioedema that does not compromise the airway, or not associated with vomiting; hives alone)

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Treatment and Interventions

1. If signs of allergic reaction without signs of anaphylaxis, go to **Step 4**
2. If signs of anaphylaxis, administer epinephrine 1mg/mL at the following dose and route:
   a. Adult (25kg or more) 0.3 mg IM in the anterolateral thigh
   b. Pediatric (less than 25kg) 0.15 mg in the anterolateral thigh
   c. Epinephrine 1mg/mL may be administered from a vial or via auto-injector, if available,
3. For urticaria or pruritus, administer a diphenhydramine 1 mg/kg, up to maximum dose of 50 mg IM, IV, or PO)
   a. The IV route is preferred for the patient in severe shock
   b. As a supplement to diphenhydramine given for urticaria, any H2-blocking antihistamine (e.g. famotidine, cimetidine) can be given IV or PO in conjunction with diphenhydramine
4. If respiratory distress with wheezing is present, consider administering
   a. Albuterol 2.5-5 mg nebulized and/or
   b. Epinephrine 1mg/mL, 5mL nebulized
5. If stridor is present, consider administering epinephrine 1mg/mL, 5mL nebulized
6. If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, additional IM epinephrine can be repeated every 5-15 minutes at the doses noted above
7. For signs of hypoperfusion, also administer 20 mL/kg isotonic fluid (normal saline or lactated Ringer's) rapidly (over 15 minutes) via IV or IO, and repeat as needed for ongoing hypoperfusion
8. Consider an epinephrine IV drip (0.5 mcg/kg/minute) when cardiovascular collapse (hypotension with altered mental status, pallor, diaphoresis and/or delayed capillary refill) is present despite repeated IM doses of epinephrine in conjunction with at least 60 mL/kg isotonic fluid boluses
9. Transport as soon as possible, and perform ongoing assessment as indicated. Cardiac monitoring is not required, but should be considered for those with known heart problems or who received multiple doses of epinephrine

Patient Safety Considerations

1. Time to epinephrine delivery
2. Concentration of epinephrine in relation to route
3. Weight-based dosing of medications

Notes/Educational Pearls

Key Considerations

1. Allergic reactions and anaphylaxis are serious and potentially life-threatening medical emergencies. It is the body's adverse reaction to a foreign protein (i.e. food, medicine, pollen, insect sting or any ingested, inhaled, or injected substance). A localized allergic reaction (i.e. urticaria or angioedema that does not compromise the airway) may be treated with antihistamine therapy. When anaphylaxis is suspected, EMS personnel should always consider epinephrine as first-line treatment. Cardiovascular collapse may occur abruptly, without the prior development of skin or respiratory symptoms. Constant monitoring of the patient's airway and breathing is essential.
2. Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as urticaria or mucocutaneous swelling, a significant portion of

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anaphylactic episodes may not involve these signs and symptoms on initial presentation. Moreover, most fatal reactions to food-induced anaphylaxis in children were not associated with cutaneous manifestations.

3. A thorough assessment and a high index of suspicion are required for all potential allergic reaction patients – consider:
   a. History of Present Illness:
      i. Onset and location
      ii. Insect sting or bite
      iii. Food allergy/exposure
      iv. New clothing, soap, detergent
      v. Past history of reactions
      vi. Medication history
   b. Signs and Symptoms
      i. Itching or urticaria
      ii. Coughing, wheezing, or respiratory distress
      iii. Chest tightness or throat constriction
      iv. Hypotension or shock
      v. Persistent gastrointestinal symptoms (nausea, vomiting, and diarrhea)
      vi. Altered mental status
   c. Other Considerations
      i. Angioedema (drug-induced)
      ii. Aspiration/airway obstruction
      iii. Vasovagal event
      iv. Asthma or COPD
      v. Heart failure
4. Gastrointestinal symptoms occur most commonly in food-induced anaphylaxis, but can occur with other causes
   a. Oral pruritus is often the first symptom observed in patients experiencing food-induced anaphylaxis
   b. Abdominal cramping is also common, but nausea, vomiting, and diarrhea are frequently observed as well
5. Patients with asthma are at high risk for a severe allergic reaction
6. There is no proven benefit to using steroids in the management of allergic reactions and/or anaphylaxis
7. There is controversy among experts with very low quality evidence to guide management for the use of empiric IM epinephrine after exposure to a known allergen in asymptomatic patients with a history of prior anaphylaxis

Pertinent Assessment Findings

1. Presence or absence of angioedema
2. Presence or absence of respiratory compromise
3. Presence or absence of circulatory compromise
4. Localized or generalized urticaria
5. Response to therapy

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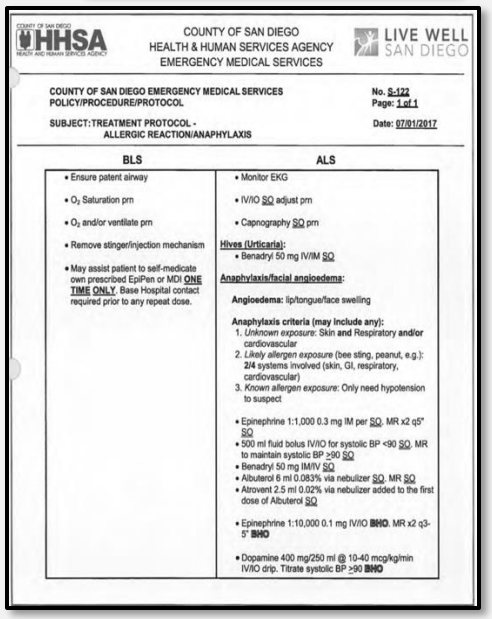


COUNTY OF SAN DIEGO
HEALTH & HUMAN SERVICES AGENCY
EMERGENCY MEDICAL SERVICES

LIVE WELL SAN DIEGO

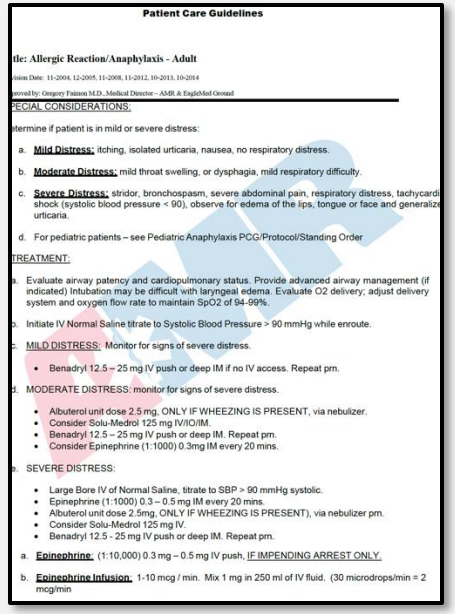
COUNTY OF SAN DIEGO EMERGENCY MEDICAL SERVICES POLICY/PROCEDURE/PROTOCOL

No. S-122
Page: 1 of 1

SUBJECT: TREATMENT PROTOCOL - ALLERGIC REACTION/ANAPHYLAXIS

Date: 07/01/2017

BLS	ALS
• Ensure patent airway • O_2 Saturation prn • O_2 and/or ventilate prn • Remove stinger/injection mechanism • May assist patient to self-medicate own prescribed EpiPen or MDI ONE TIME ONLY. Base Hospital contact required prior to any repeat dose.	• Monitor EKG • IV/IO SQ adjust prn • Capnography SQ prn **Hives (Urticaria):** • Benadryl 50 mg IV/IM SQ **Anaphylaxis/facial angioedema:** **Angioedema:** lip/tongue/face swelling **Anaphylaxis criteria (may include any):** 1. *Unknown exposure:* Skin and Respiratory and/or cardiovascular 2. *Likely allergen exposure* (bee sting, peanut, e.g.): 2/4 systems involved (skin, GI, respiratory, cardiovascular) 3. *Known allergen exposure:* Only need hypotension to suspect • Epinephrine 1:1,000 0.3 mg IM per SQ. MR x2 q5" SQ • 500 ml fluid bolus IV/IO for systolic BP <90 SQ. MR to maintain systolic BP >90 SQ • Benadryl 50 mg IM/IV SQ • Albuterol 6 ml 0.083% via nebulizer SQ. MR SQ • Atrovent 2.5 ml 0.02% via nebulizer added to the first dose of Albuterol SQ • Epinephrine 1:10,000 0.1 mg IV/IO BHO. MR x2 q3-5" BHO • Dopamine 400 mg/250 ml @ 10-40 mcg/kg/min IV/IO drip. Titrate systolic BP >90 BHO



Patient Care Guidelines

tle: Allergic Reaction/Anaphylaxis - Adult

ision Date: 11-2004, 12-2005, 11-2008, 11-2012, 10-2013, 10-2014

proved by: Gregory Fintzen M.D., Medical Director – AMR & EagleMed Ground

PECIAL CONSIDERATIONS:

termine if patient is in mild or severe distress:

a. **Mild Distress:** itching, isolated urticaria, nausea, no respiratory distress.

b. **Moderate Distress:** mild throat swelling, or dysphagia, mild respiratory difficulty.

c. **Severe Distress:** stridor, bronchospasm, severe abdominal pain, respiratory distress, tachycardi shock (systolic blood pressure < 90), observe for edema of the lips, tongue or face and generaliz urticaria.

d. For pediatric patients – see Pediatric Anaphylaxis PCG/Protocol/Standing Order

REATMENT:

a. Evaluate airway patency and cardiopulmonary status. Provide advanced airway management (if indicated) Intubation may be difficult with laryngeal edema. Evaluate O2 delivery; adjust delivery system and oxygen flow rate to maintain SpO2 of 94-99%.

b. Initiate IV Normal Saline titrate to Systolic Blood Pressure > 90 mmHg while enroute.

c. MILD DISTRESS: Monitor for signs of severe distress.
   - Benadryl 12.5 – 25 mg IV push or deep IM if no IV access. Repeat prn.

d. MODERATE DISTRESS: monitor for signs of severe distress.
   - Albuterol unit dose 2.5 mg, ONLY IF WHEEZING IS PRESENT, via nebulizer.
   - Consider Solu-Medrol 125 mg IV/IO/IM.
   - Benadryl 12.5 – 25 mg IV push or deep IM. Repeat prn.
   - Consider Epinephrine (1:1000) 0.3mg IM every 20 mins.

e. SEVERE DISTRESS:
   - Large Bore IV of Normal Saline, titrate to SBP > 90 mmHg systolic.
   - Epinephrine (1:1000) 0.3 – 0.5 mg IM every 20 mins.
   - Albuterol unit dose 2.5mg, ONLY IF WHEEZING IS PRESENT), via nebulizer prn.
   - Consider Solu-Medrol 125 mg IV.
   - Benadryl 12.5 - 25 mg IV push or deep IM. Repeat prn.

a. **Epinephrine:** (1:10,000) 0.3 mg – 0.5 mg IV push, IF IMPENDING ARREST ONLY.

b. **Epinephrine Infusion:** 1-10 mcg / min. Mix 1 mg in 250 ml of IV fluid. (30 microdrops/min = 2 mcg/min

Eight example varieties of the **same** medical protocol: *Allergic Reaction / Anaphylaxis*

PROBLEM

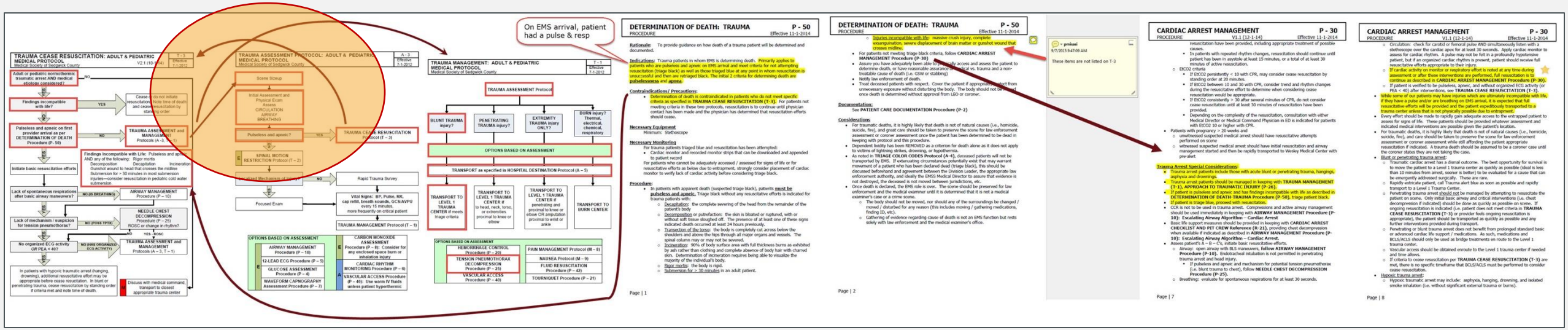
"…the greatest harm to patients stems from something far more challenging to study: **flawed decision making by EMS providers**."

"A patient safety culture encouraging clear communication where the use of **tools such as protocol books**… is viewed positively and may help to reduce these potential risks."

Bigham, B. L., Morrison, L J., Maher, J., Brooks, S. C., Bull, E., Morrison, M., Burgess, R., Atack, L., & Shojania, K. (2009). Patient safety in emergency medical services: Advancing and aligning the culture of patient safety in EMS. Edmonton, AB: Canadian Patient Safety Institute.

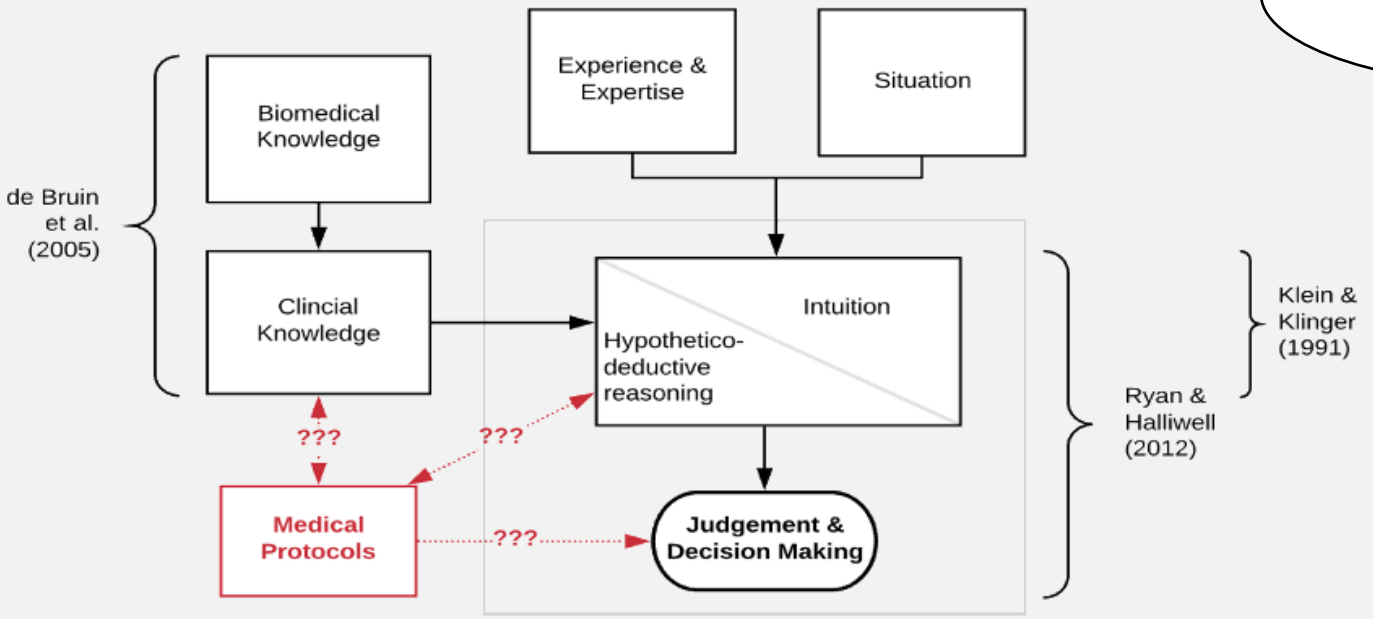
Why did they transport the patient in traumatic arrest?

As above / See below

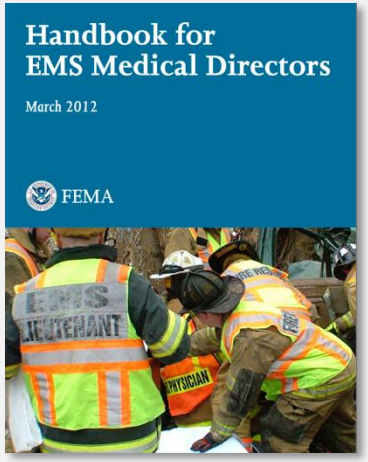


Protocol 1 Protocol 2 Protocol 3 Protocol 4

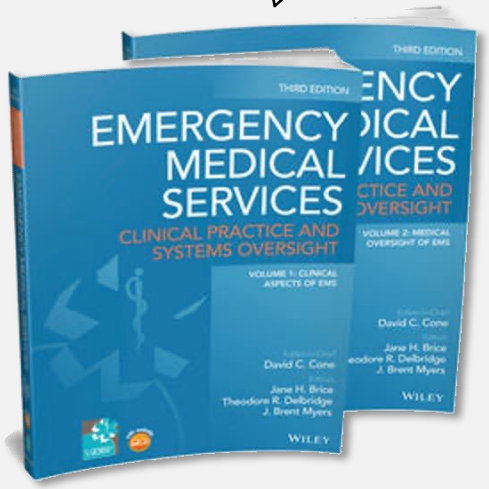
LITERATURE

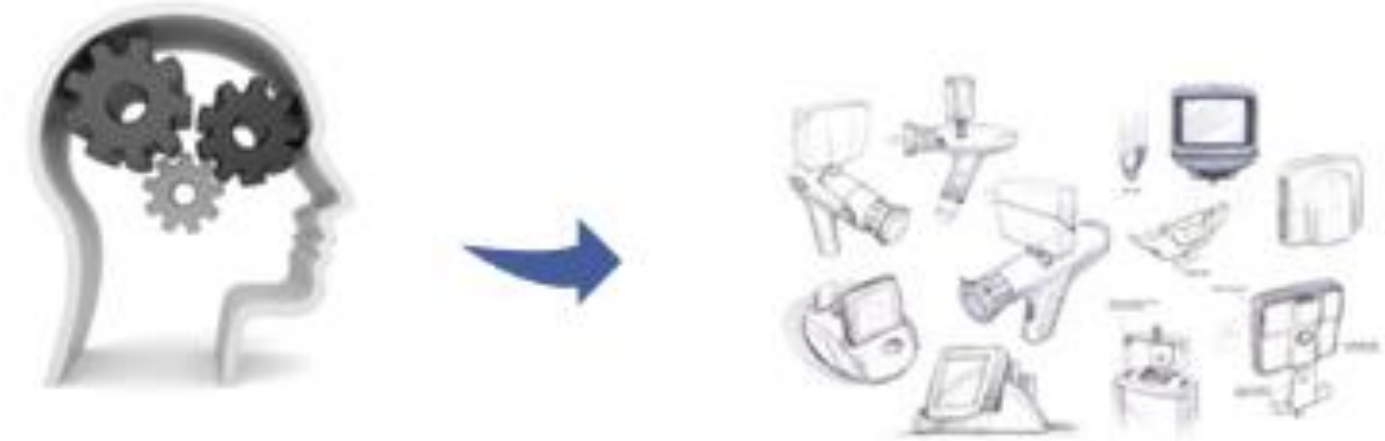


"Develop protocols!"
[45x]



"Develop protocols!"
[746x]





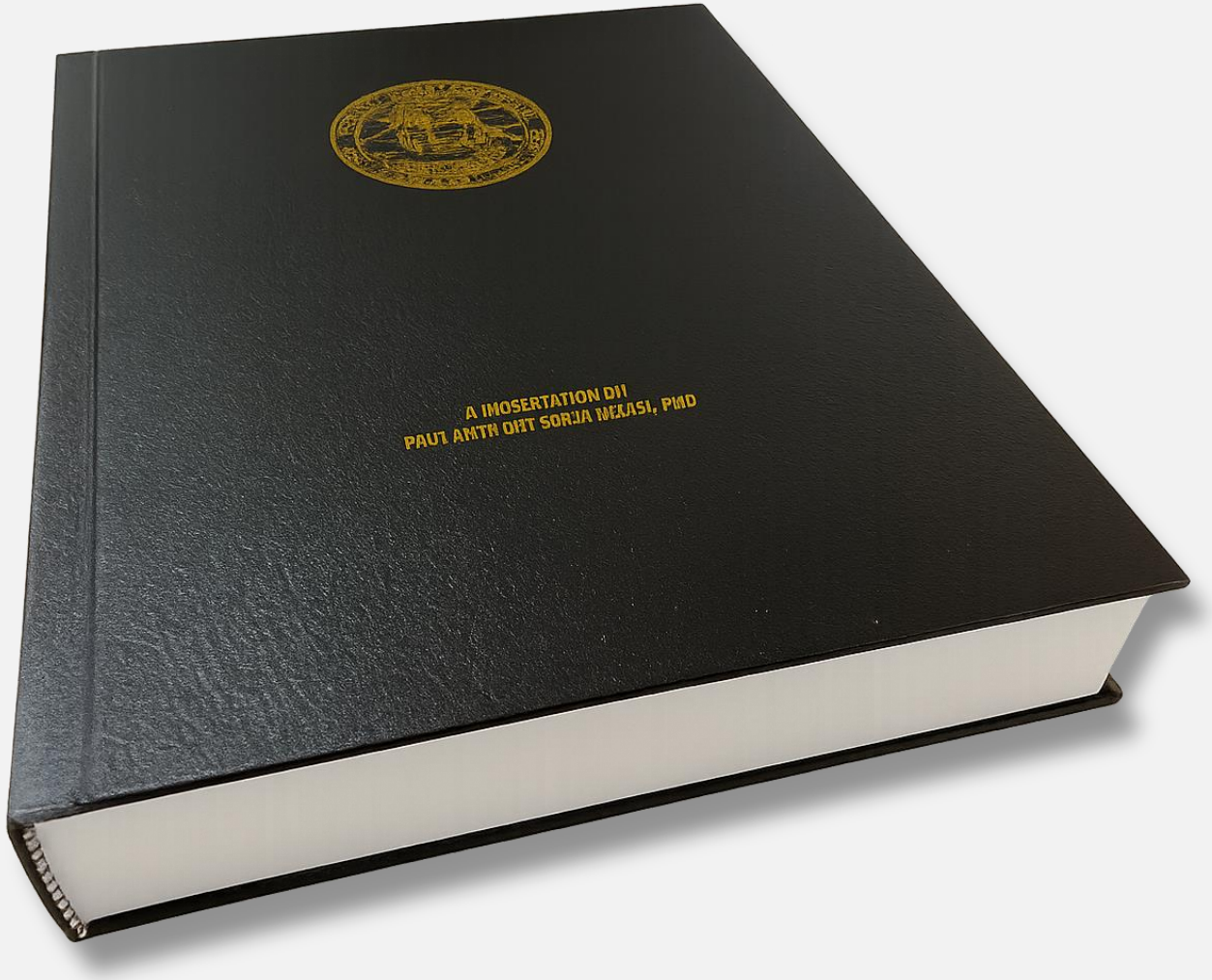
Psychology applied to **Engineering**

Knowledge of human capabilities, limitations and predispositions

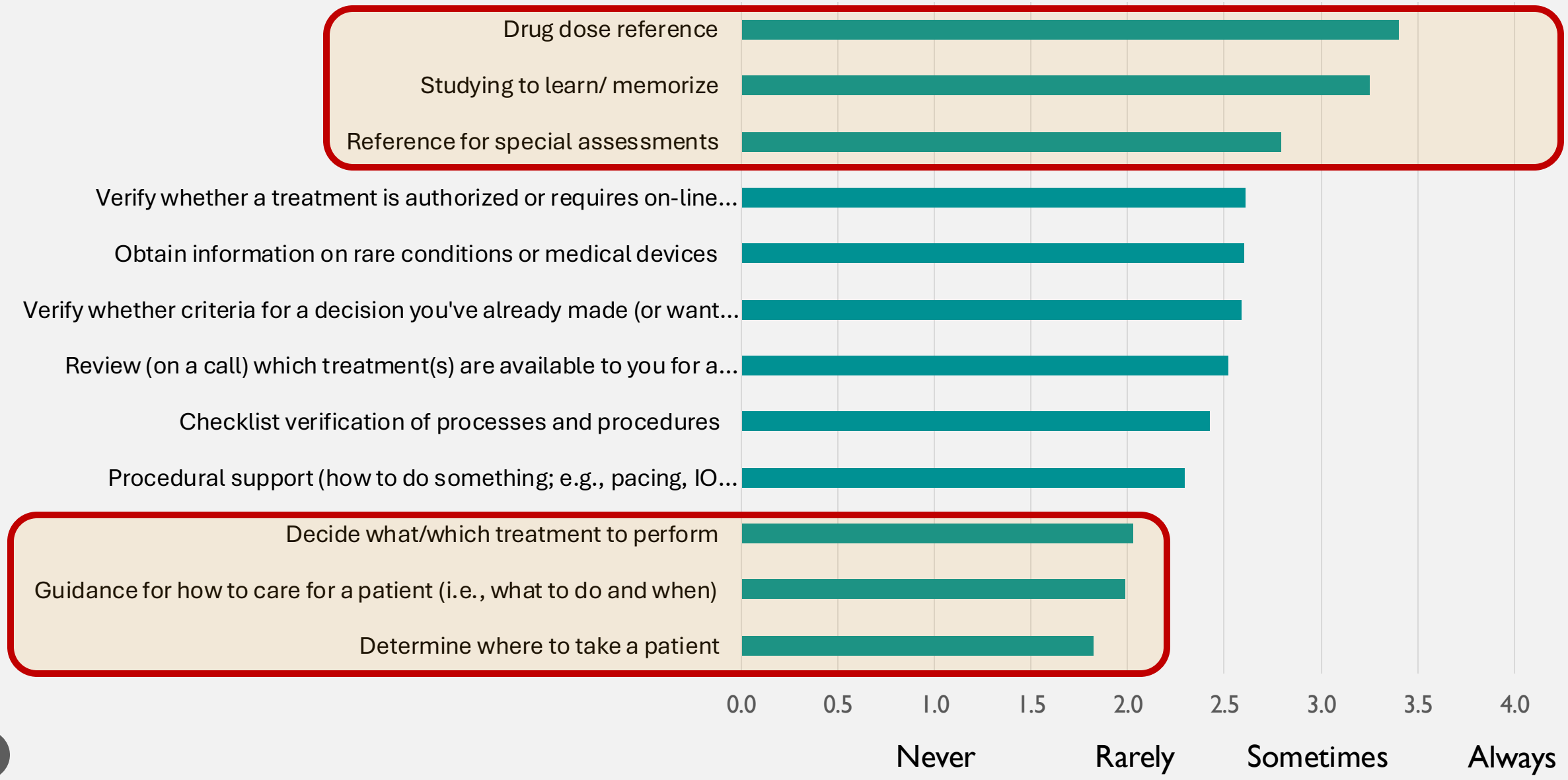
The design of tools, work environments & systems

HUMAN FACTORS

THE DETAILS



What do paramedics "use" their protocols for anyway?



Misasi's 15

Protocol Design Guidelines & Considerations

1. Menu of options
2. Flexibility/adaptability
3. Quick reference for drug dosing/ authorization verification
4. Memorability/minimize mental operations
5. Diagnostic support
6. Do not teach with the protocols
7. Maintain paper *and* electronic versions
8. Algorithms ***when appropriate***
9. Eliminate procedures
10. Checklist support
11. Rare condition information
12. Pediatric section
13. Establish & specify care goals & priorities
14. Reduce cross-referencing
15. Support novice decision making without confining expert decision making

See: Alfred et al. 2024.
Checking all the Boxes.
BMJ Quality & Safety
(or just call me!)

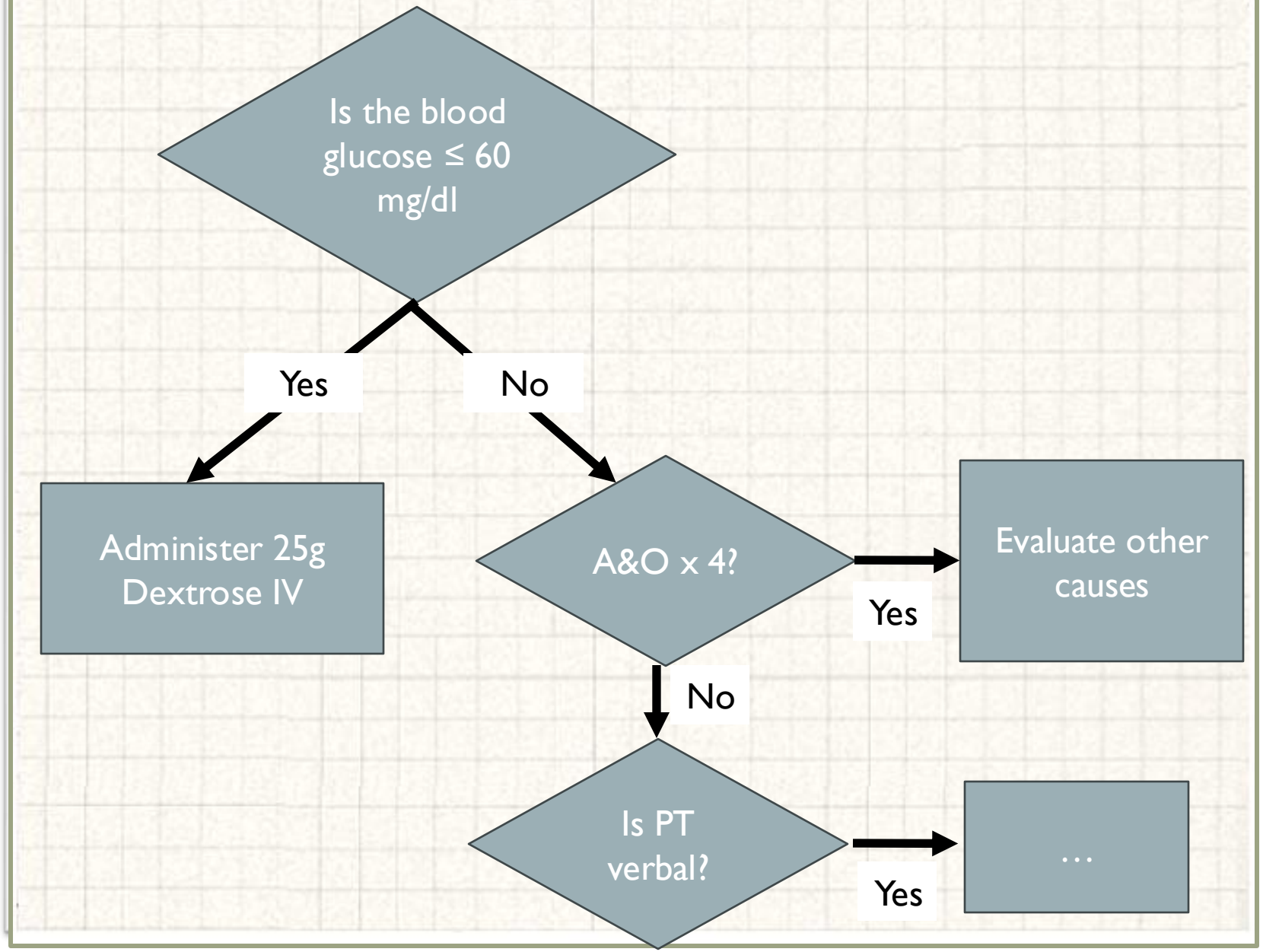
Design is like a joke…
If you have to explain it,
it's not that good!

THE EASY STUFF:

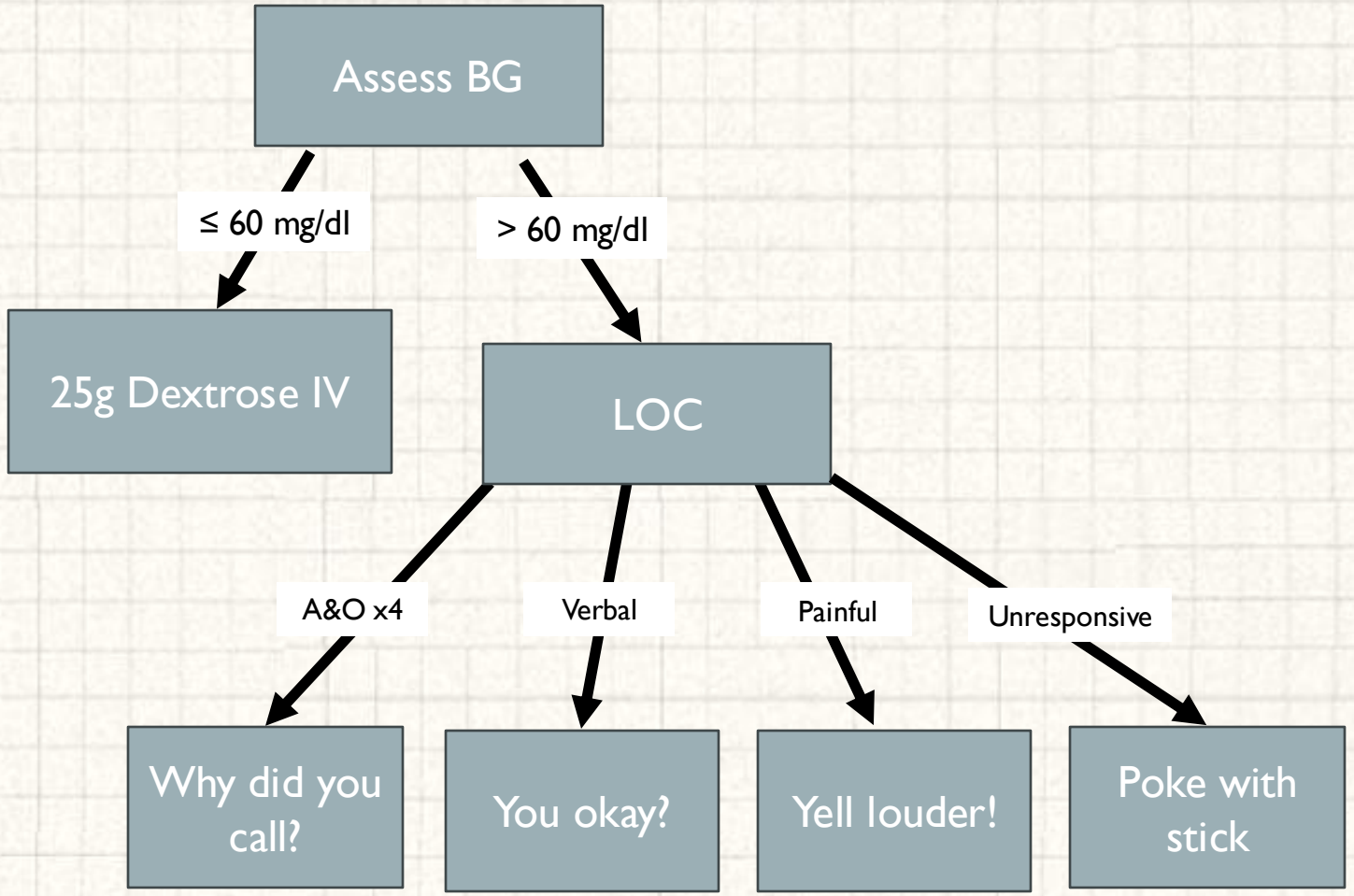
1. Separate pediatrics from adult protocols
2. Use good design principles:
   i. Color: Desaturate (contrast ratio)
   ii. Use color in a meaningful, consistent way (& sparingly, ≤ 7)
   iii. Data:Ink (signal:noise)
   iv. Minimize clutter
   v. CHILL OUT WITH THE CAPS, **bold**, underlined, or **ALL OF THEM**
3. Don't not use positive language!
4. San serif font for screens

5· Minimize mental operations

Forcing everything into a yes/no response increases mental operations!



5. Minimize mental operations



See what I did there?

The harder stuff

6. **Design for the display & expected use conditions** (paper, app, electronic PDF)

   One design does not fit all

7. **Design for the expert, scaffold the novice**

   ✓ Flexibility

   ✓ Menu of options

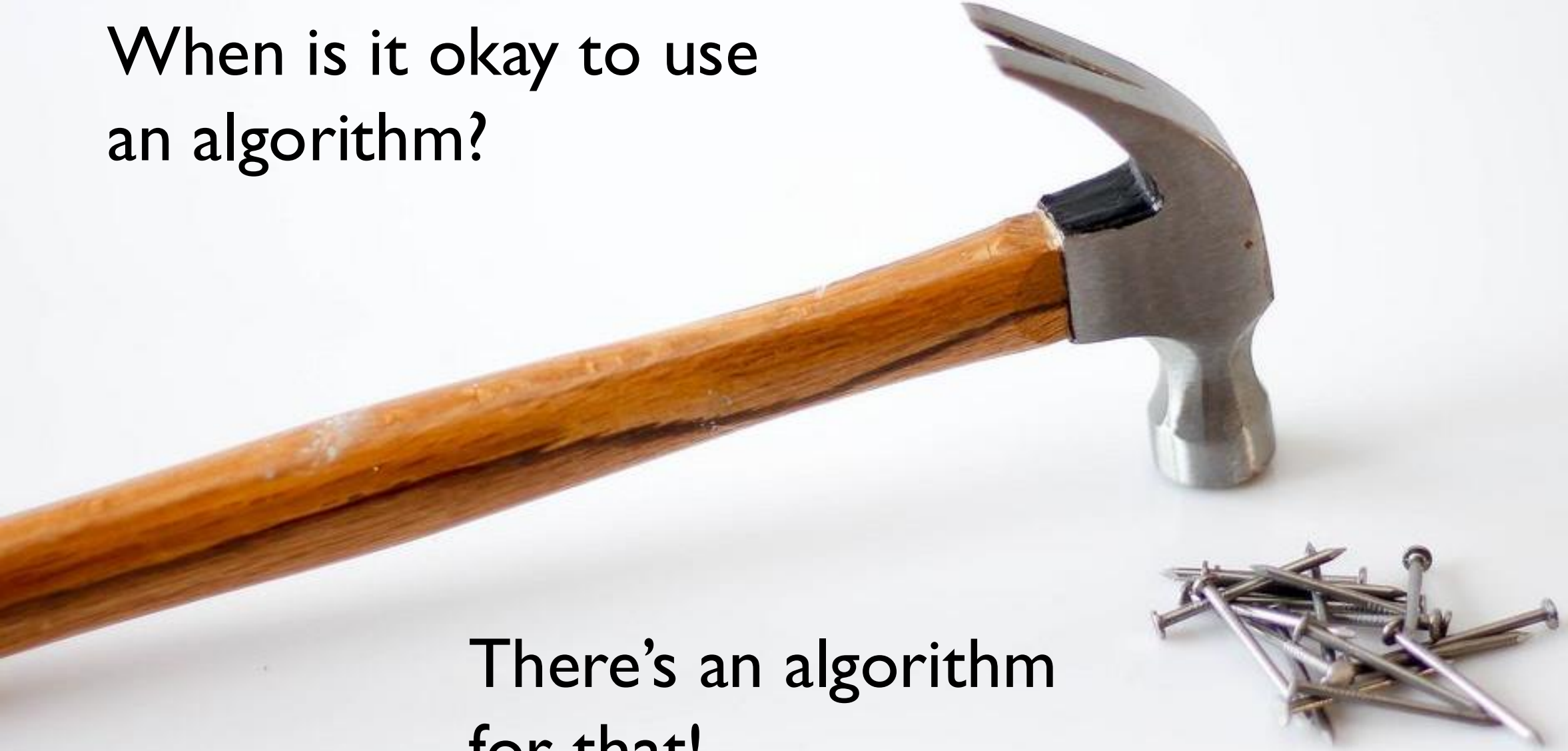
   ✓ Establish goals & priorities of care

8. **Design for behavior:**

   - Fast, skilled, automatic, procedural
   - Slow, effortful, diagnostic reasoning

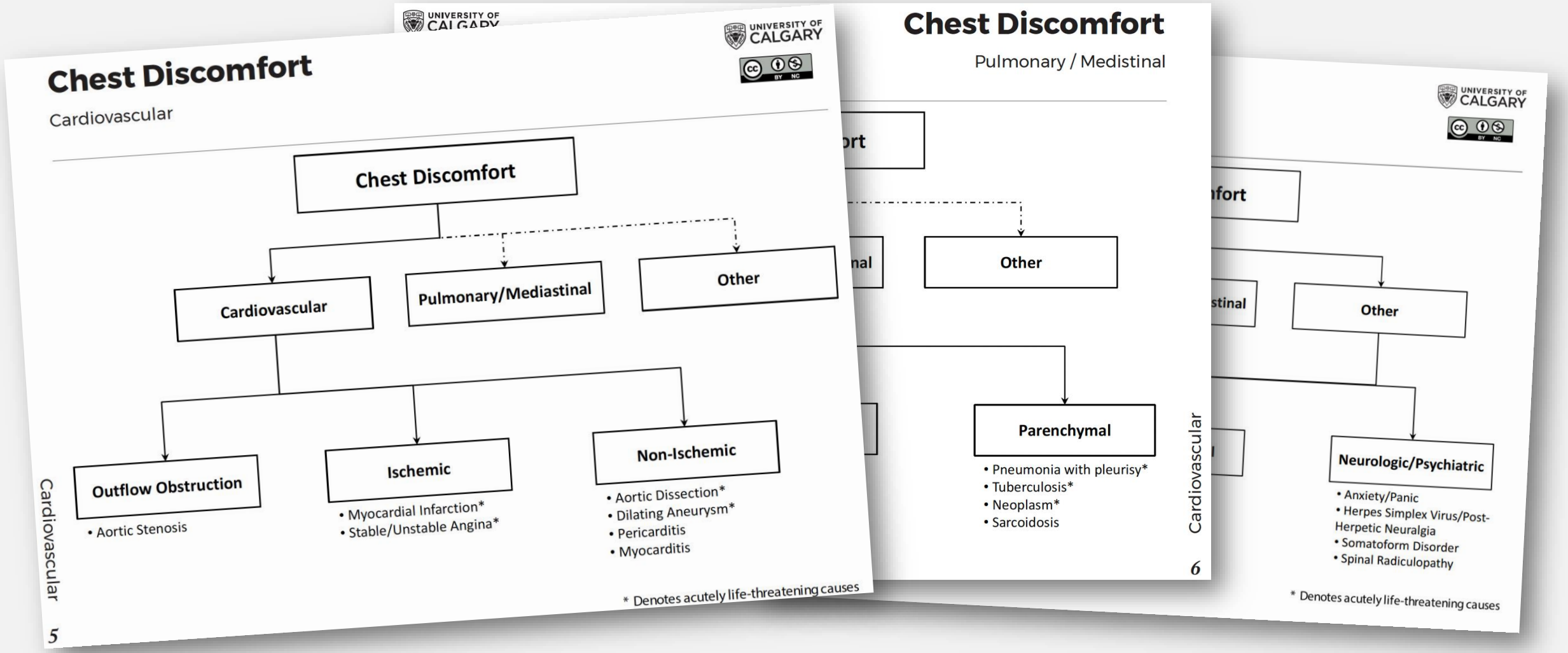
     ↳ Diagnostic support

When is it okay to use an algorithm?



There's an algorithm for that!

Calgary Black Book



BBB Identification Criteria

	Type	Lead	Method	Features	Example
QRS > 120 ms	Right	I	Shape	□ Narrow R wave □ Broad, terminal S wave □ Slurring of QRS below iso. line	
		V_1	Turn Signal	□ rsR' morphology □ left R < right R'	
	Left	I	Shape	□ Slurred RS wav □ QRS *not* negat □ T wave opposi	
		V_1	Turn Signal	□ ST elevation < □ Negative QRS □ Monophasic/	

QUICK REFERENCE FOR TIDAL VOLUME | ♀ FEMALE

HEIGHT	INCHES	PBW	8 mL/KG	6 mL/KG	4 mL/KG
4'6"	54	31.7	260	190	130
4'7"	55	34.0	270	210	140
4'8"	56	36.3	290	220	150
4'9"	57	38.6	310	230	160
4'10"	58	40.9	330	250	170
4'11"	59	43.2	350	260	180
5'0"	60	45.5	370	270	180
5'1"	61	47.8	380	290	190
5'2"	62	50.1	400	300	200
5'3"	63	52.4	420	320	210
5'4"	64	54.7	440	330	220
					230
					240
					250
					260
					270
					280
					290
					290
					300
					310
					320
					330

OLL

Rapid Arterial oCclusion Evaluation (RACE)

PT	Assessment	Instruction	Result		Score
All Patients	Facial palsy	Smile/ show teeth	Absent:	Symmetrical smile	0
			Mild:	Slight assymetry	1
			Severe:	Complete assymetry	2
	Arm function	Extend arms (10 seconds)	Mild:	Upheld > 10 sec	0
			Moderate:	Upheld < 10 sec	1
			Severe:	Cannot lift	2
	Leg function	Extend legs (5 seconds)	Mild:	Upheld > 5 sec	0
			Moderate:	Upheld < 5 sec	1
			Severe:	Cannot lift	2
	Head & gaze deviation	Observe or track finger	Absent:	No head deviation *OR* normal bilateral head movement	0
			Present	Eyes *AND* head deviation	1
Right Deficit	Aphasia	Follow two commands: 1) Close eyes 2) Make a fist	Normal:	Performs tasks correctly	0
			Moderate:	Performs one task correctly	1
			Severe:	Cannot perform either task	2
Left Deficit	Agnosia	Ask (about affected arm): 1) Whose arm is this? 2) Can you move your arm?	Normal:	Recognizes and attempts	0
			Moderate:	Does not recognize *OR* unaware	1
			Severe:	Does not recognize *AND* unaware	2

Low (0-4) High (5-9) ← Total

Kg	Amidate mg	m L	Ketamine IV mg	m L	Rocuron		Succ	
35	10.5	5.25	70	0.7	21-42	2	80	4
40	12	6	80	0.8	24-48	2.4-4.8	80	4
45	13.5	6.75	90	0.9	27-54	2.7-5.4	90	4.5
50	15	7.5	100	1	30-60	3.0-6.0	100	5
55	16.5	8.25	110	1.1	33-66	3.3-6.6	110	5.5
60	18	9	120	1.2	36-72	3.6-7.2	120	6
70	21	10.5	140	1.4	42-84	4.2-8.4	140	7
80	24	12	160	1.6	48-69	4.8-9.6	160	8
90	27	13.5	180	1.8	54-108	5.4-10.8	180	9
100	30	15	200	2	60-120	6.0-12.0	200	10
110	33	16.5	220	2.2	66-132	6.6-13.2	220	11
120	36	18	240	2.4	72-144	7.0-14.4	240	12
130	40	20	260	2.6	78-156	7.8-15.6	260	13
140	40	20	280	2.8	84-168	8.4-16.8	280	14
150	40	20	300	3	90-180	9.0-18.0	300	15

AMIDATE No absolute contraindications
Caution in the elderly and in pts with hepatic disease, sepsis, shock

KETAMINE Hypersensitivity
Caution if: ETOH, advanced age, Cardiac Disease, Significant Tachycardia & HTN, Schizophrenia, Pr

Rocuronium Known neuromuscular disease (relative), obesity, myasthenia gravis

Succinylcholine Pts at risk for hyperkalemia; Major burns >48 hours old, Chronic paralysis or any other condition t
muscle groups, renal failure, crush injuries, potential for rhabdomyolysis (excited delirium, prolor
acetylcholinesterase deficiency (prior anesthesia taking an exorbitantly long time to wear off), known or familial history of
malignant hyperthermia, penetrating injury to the eye

Sgarbossa STEMI Criteria

With BBB or Pacemaker	Concordant ST elevation ≥ 1 mm	5 pts
	Discordant ST depression ≥ 1 mm (V_1-V_3)	3 pts
	Discordant ST elevation ≥ 5 mm	2 pts

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