

AMST

	4	5	6
A AIRWAY	E	V	M
E ENDOCRINE	4 O	5 NL	6 OBEYS
I INSULIN	3 V	4 CONT	5 LOCALIZE
U UREMIA/LIVER	2 P	3 WAPPR	4 EDITH draw
T TRAUMA, TUMOR			
I INFEX	1 -	2 INCOM	3 FLEX
P PSYCH		1 -	2 EXTENSION
S-SZ, Shock, STROKE			1 -

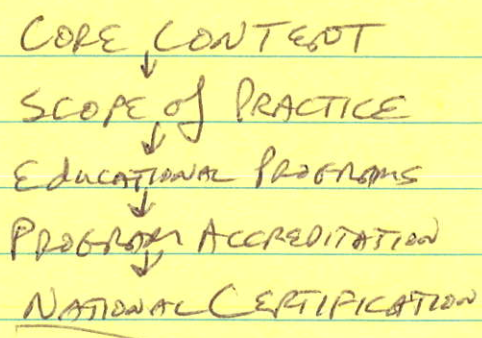
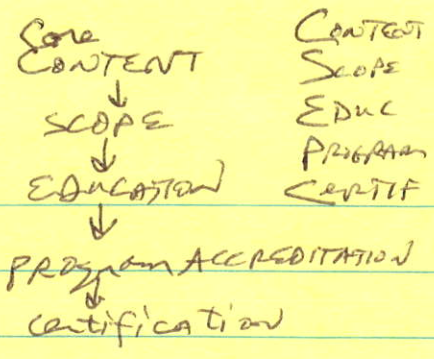
OPEN, VOICE
E: PAIN, Ø

Ni, CONT, INAPP, INCOM
V: VOICE, LOCALIZE, WITHDRAW, FLEX

M: EXTENSION, Ø

3 + 1 + 4

E4	V5	M6
4 O	5 NI	6 Command
3 Voice	4 Confused	5 Localize
2 Pains	3 SUGGER	4 Withdraw
1 -	2 Incomp.	3 Flex
	1 -	2 Extension
		1 -



TICLS

Tone-Interaction -
Consolidity - Look (g)
- Speech

BLS = 88% for ped OK

NFPA 1582 ⇒ Occup. Health

Ryan White Act ⇒ Part G = Notification of Providers

NIMS Courses

AEIOU TIPS - Airway/Endocrine/Insulin/OD/Uremia

TRAUMA-Tumor/Infection/Psych/Sz-Stroke-Shock

Fed Civil Rights 42 USC: Constit Rights

Education: Core Content, Scope of Practice Model

Education Standards, Education Program Accreditation

"National EMS Certification"

TBI: Hypoxia, Hypotension, Hyperventilation

TBI Hypotension: NB < 60, Infant < 70, 5yo < 80, 210 < 90

Therapeutic Hypervent: < 24mo = 30, 2-14 = 25, 15 = 20, to ETCO2 30-35

CONCUSSION: +/- LOC, occurs in <10%

Sx: STARE, delayed ^{VERBAL} motor, confusion, disorientation, slurring, inCOORDINATION, MEMORY, LOC

Resource Management: Preplanning; Credentialing; ^{ALTERED} STANDARDS

Emergency Management: MITIGATION → PREPAREDNESS → RESPONSE → RECOVERY

ESF 9: USAR NATIONAL RESPONSE FRAMEWORK FEMA

HAZWOPER (HAZwaste Operations): Covers IDLH work

TRANSPORT CAPABLE EMS unit at ALL fireground & HAZMAT

Emergency Rehab $\bar{p} \geq 20$ min in protective clothing

NFPA 1584 Rehab Standards: ① 5-10 min rest $\bar{p}$ ② 30-min

SCBA OR 20 min exertion ③ 20 min after 2 30-min

SCBA OR 45 min exertion (not data based; adjust PRV)

* PASSIVE Cooling & garments off OK <75° & low humidity

* Exogenous cooling not required on cool/cold days

Response 4 TIERS: DISPATCH → ^{FIRST} RESPONDERS → TRANSPORT → ^{Selected} APP'S
_{EMTALA} _{NEW TRANSPORT} _{SCAM} _{PARA}

HOSPITAL-BASED: 1994-Amb = ED 2003 = Closest Appr. ED

Agenda for the Future: '96 ⇒ Integration & Clinical Care

EMSC Crossroads (10M): '06 ⇒ Lifesaving & Gatekeeper Functions

UHUR: ^{Hours on Calls} ^{Hours Staffed}

TACTICAL: CARE UNDER FIRE (HOT) → TACTICAL FIELD CARE (WARM) → TACTICAL EVACUATION (COLD)

EMERGENCY MANAGEMENT ASSISTANCE CONTACT: STATES request assistance (from other states)

Federal Assistance for medical = ESF 8

MASS EVACUATION: ESTIMATE → PLAN → EXECUTE → REPEAT

PPE: A = Vapor Resistant SCBA B/C = Splash resistant ^{2 filtering or} supplied air

NIOSH IDLH: likely to cause death or impair or prevent escape from significant ^{effects or prevent escape from significant} environment

CS = Tear Gas & OC (capsicum) = Pepper Spray / O₂ Deficient = <19%

6 P's = PAIN - PALLOR - PARESTHESIAS - PULSELESSNESS - POIKILOOTHERMIA - PARALYSIS

Peds EMS Call = 3-10% / ABC Red Assess Δ = Appearance - Breathing - ^{WORK} CIRCULATION

P-6 to +12 <9 BAD OPEN SKELETAL +2

PEDIATRIC TRAUMA SCORE: SIZE - AIRWAY - GVS - PULSES - ^{WOUNDS} INJURY: +1

REVISED TRAUMA SCORE: (0-4) = GCS, Resp, SBP

ESF's
ALIAS
START
SALT
JUMPSTART
STANDARD
ACT
ADAMS
TRAUMA
SCORES

CARE UNDER FIRE { Hot
Tactical Field { Warm
Tactical Evacuation { Cold

APP
CIRC
Resp

Revised Trauma Score (0-4) = RR, SBP, GCS

Intentional Burns = ~10% of Ped Burns

55-70% of Abusive Fx's in <1 year old



Injury Severity Score: 3 STEPS

(1) Score 1-6 ^{WORST} (2) TOP 3 of 9 regions (3) ISS = $A^2 + B^2 + C^2$ MAX of 75, AND ANY "6's" = AUTO 75

ALTE: (APNEA) + (COLOR Δ) + (Δ in muscle) + (CHOKING OR GAGGING)

ALTE: 10-12 weeks, only 50% have defined cause

SZ mimics: Hypogly, CARDAC, Meds, Myoclonus, PseudoSZ's

Rural Frontier EMS Agenda for the Future: 2004

Military levels: 1 = AID STATION, 2 = Forward Surgical (Blood), 3 = ^{COMBAT} SUPPORT HOSPITAL,

4 = COMPREHENSIVE THEATRE HOSP (SHIPS), 5 = CONUS HOSPITAL

MEDEVAC = ^{COMBAT} CASUALTY EVAL; CASEVAC = ^{COMBAT} EVAC; CCATT ^{CAT CARE} AIR TRANS AND TEAM

MARCH = ^{MASSIVE} HEMORRHAGE - AIRWAY - RESPIRATION - CIRCULATION - ^{HEAD INJURY} Hypothermia

XABC = EXSANGUINATION - A - B - C

NDMS = PART of HHS; DSCA = Defense Support to ^{CIVILIAN} AGENCIES

Federal Aviation Regulations: 91 = ^{General Aviation} Flight Rule, 135 = ^{Pilot Rest, TRAINING} VERIFIER MAINTENANCE COMMISSION ON ACCRET

AIR MEDICAL: FEDERAL PREEMPTION; CARTS of Med Transp. System

VISIBILITY = 1 MILE = 500 ft. ceiling; LZ = 100' x 100'

40% of SARS patients were Healthcare workers!

CASINO Study on AED's: >50% survival

TIME CRITICAL DIAGNOSES ⇒ STEMI, STROKE, TRAUMA

TRAUMA SYSTEMS PLANNING & CARE ACT of 1990: ^{PL 101-540} DESIGNATED Trauma Systems

NATIONAL HOSPITAL AMBULATORY CARE Survey: 1/3 of HOSPITALS gr. on DIVERST

PUBLIC HEALTH COMPONENTS: Assessment, Policy, Assurance

NDMS = DMATS, global pat medical requirements centers; ¹⁵⁰⁰ Voluntary Hospitals

DSCA = Defense Support to Civilian Agencies

Keraunoparalysis: Lightning paralysis

HOT CARE UNDER FIRE = Hemorrhage / AIRWAY / EXTRACTOR

WARM Tactical Field Care = SPINE / ET / I.V. / EVACUATION

"CALL A CAB 'N GO": ^{CALL for} Help → ^{ABOLISH} THREATS → CAB → NEURO → EXTRICATE

EMS Education: CORE → SCOPE → Educational → PROGRAM → NATIONAL
 Agenda: CONTENT → PRACTICE → STANDARDS → ACCREDITATION → CERTIFICATION

HISTORIC: NATIONAL STANDARD CURRICULUM (1971) C C C

Tactical Combat Casualty Care: CASUALTY → PREVENT → OTHER → MISSION
 CASUALTIES

POSSE COMITATUS: Federal Military not police force against populace

Belmont Report '79: Respect / Beneficence / Justice

STAFFORD ACT '88: Local response → Local Officials →

→ Governor → Regional FEMA → FEMA Admin → POTUS

(THEN): POTUS → FEMA Admin via Sec. HHS → Response Teams
 deploy & setup Joint Field Office

Trauma Systems Planning & Care Act 1990

UTSTEIN 1991 NHTSA Uniform P.H. Dataset '93

EMS Agenda for Future '96 ⇒ 14 Attributes

2006 EMS @ Crossroads

COST per Pat Transport = $\frac{\text{COST PER UNIT HOUR}}{\text{UHU}}$

{AS UHU rises
COST PER PAT TRSP.
DECREASES}

US
PREVENTIVE
TASK FORCE

Level of Evidence: I = RCT, II A = CONTROLLED STUDY, II B = CASE CONTROL COHORT, II C = COHORT, III = OPINION

CLASS of Recommendations: A = GOOD EVIDENCE, B = FAIR EVID. Benefit > Risk, C = FAIR EVID. Benefit > Risk, D = FAIR EVID. Risk > Benefit
 NTDB CODES → NHTSA I = insufficient Evidence

NAT. TRAUMA DATABASE, ACS/COT; CRASH OUTCOME DATA EVAL SYSTEM

PARAMETRIC: NUMERICAL, in Bell Curve, LOGISTICAL = DICHOTOMOUS
 LINEAR = CONTINUOUS STUDENT'S T TEST ANOVA

NON-PARAMETRIC: NOT NORMALLY DISTRIBUTED {WILCOXON RANK SUM, CHI SQUARE, FISCHER'S EXACT TEST}

ENUMERATIVE {CLINICAL STUDIES} Data over a fixed time frame, One action on study

ANALYTICAL {CQI Studies} Provides performance

SPECIAL CAUSE VARIATION: PROVIDER ONLY Common CAUSE VARIATION: CAUSES BY OTHER FACTORS (change equipment, for example)

Type I Error: (ALPHA) LIKELIHOOD OF FALSE POSITIVE Type II Error: LIKELIHOOD OF FALSE NEGATIVE
 (DIFFERENCE SHOWN BUT REALLY WASN'T) (BETN)

Power = PROBABILITY of Detecting an Effect = 1 - BETA .90 .95

Power = (1) SAMPLE SIZE, (2) EFFECT SIZE, (3) VARIABILITY of RESULTS, (4) ALPHA

BONFERRONI CORRECTION: USES A LOWER CUT OFF P = $\frac{.05}{\# \text{ of comparisons}}$

DATA = NUMERICAL (CONTINUOUS) CATEGORICAL {ORDINAL, aka linearly ORDERED, CATEGORICAL, like RACE, BINARY}

NUMERICAL {STUDENT'S T, ANOVA} ORDINAL {WILCOXON, KRASKAL-WALLIS} CATEGORICAL {SMALL SQUARES}

ECLAMPSIA = HBP + S₂ Mag 4 g IV over 10-15 min + Benz

Post Partum Hemorrhage is > 500cc

Type False
1 +
2 -

APGAR: APPEARANCE - PULSE - GRIMACE - ACTIVITY - RESP, RATION

0	BLUE	ABSENT	NO GRIMACE	FLACID	ABSENT
1	ACAD	<100	GRIMACE	EXTRA FLEXION	SLOW
2	PINK	>100	CRYING	ACTIVE	GOOD

Pediatric ETT = $4 + \left(\frac{AGE}{4}\right)$

Parkland
4 x Kg x %

PORTABLE Vent SETTINGS: $F_i O_2$ 40-60%, P_{EAK} INSP PRESSURE < 35cm, P_{aO_2} 60-90, P_{aCO_2} 40, pH 7.35-7.45

Parkland Formula: $(4 \times \text{kg}) \times \text{TBSA} \% \text{ per } 24 \text{ hrs}$, 1/2 in first 8 Compartment Pressures: < 10 ml, 10-20 tolerable, 30 DAMAGE Threshold

MAGNET: PACER = FIXED RATE, AICD = Turn off Defibrillator

Pediatric T.S. = Size - Airway - CNS - SRAT Wounds - Fx's

CINCINATTI = FACE DROOP - ARM DROPT - Slurred SPEECH

LA = Age + (Age > 45) + (NO SZ's) + (NOT BED RIDDEN/WC) + (GLUCOSE 60-400) + (Symptoms < 24hr)

MORRISON BLS TOR = (3 periods CPR) + (3AUST on AED) + (NO RESC)

LIVING WILL: Pt's WISHES when COMA; DURABLE POWER = Designating to Another Individual

POLST = medical orders for pt preference transition OP → IP

~~Methoxy~~ Ethylene glycol = fomepizole, Iron = desferrioxime

Methemoglobinemia = methylene blue, Lewisite = RAL

Cyanide = Mitochondrial cytochrome oxidase A3, Heat/Cold most, aerobic & susceptible

Concentration > 130 ppm fatal in an hour, OSHA 10 ppm over 8hrs

C.O. = RA 4-6 hrs, 100% OVRB - 80 min, HBO - 22 min

Vesicants = latent period 2-48 hrs, Lewisite = No Bone Marrow

Hydrocarbons = Surfactant loss cause Injury

Toluene = RTA & ↓ K⁺, Chloral Hydrate = Polysymptomatic VT

Methylene Chloride → turns to CO in liver, Carbon Tet = VF/VT

ANTHRAX = Cipro/Doxy 60 days, RICE = (G.I., Flu, Shock = 4-12 hrs)

HF Grade 1 = WHITE MARK, Erythema, Pain/Grade 2 = Same + Erythema, Blistering, Grade 3 = Same + Necrosis

Shin X = Ca⁺ Gluconate bel (OR) Mg Hydroxide

HF deaths = Dysrhythmias from Low Ca⁺, Low Mg⁺, PK⁺, ↑ H⁺ acing

BURN CENTER = Partial Th > 10%, Face/hands/feet, Genet, perineum, joint, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th

Hypothermia = CORE < 35; Moderate AMS, Severe = ARREST; 37-39C WATER BATH

Boyle = Pressure
 Dalton = Altitude
 Henry = Gas out of liquid
 Charles = Temp effect
 Graham = Diffusion

Boyle's Law = $V = 1/P$ (Gases expand on going up)
 Dalton's Law = Altitude effect on O₂ availability
 Henry's Law = Gas equilib. 2 pressure Δ's = Decompression Sickness
 Charles Law = Temp effect on gas volume
 Graham's Law = Diffusion of gases from ↑ to ↓ Concentration

Unity of Command = Each person, 1 boss
 Span of Control = Each leader 3-7 people
 ICS = Life Safety, Incident Stabilization, Property Conservation
 Bounded / Focused Event = Higher patient presentation
 Unbounded / Unfocused = Lower patient presentation
 LA = (Cincinnati) + (Age > 45) + (No SG) + (No WLE Bad Bound) + (Phone 60-400) + (< 24 hrs)
 VF = 50-100 mA, "Let go" = 6-9 mA

Lichtenberg = feathered burn, Keratoparalysis = lightening paralysis
 Haddon Matrix = [Human Factors - Equipment - Environment] vs. [PRE - DURING - POST (RASH)]
 $KE = \frac{1}{2} MV^2$; PROJECTILE = DIRECT → PRESSURE WAVE → CAVITATION

Zone 1 = CLAVICLE { CRICOID TO (NORMAL EXPOSED VASCULAR) OBSERVE } Zone 2 = MANDIBLE { CRICOID TO (SASx OR SLOPE ANGLE) OPERATE } Zone 3 = SKULL TO MANDIBLE { (SLOPE ANGLE) OBSERVE }
 TBI = $\frac{1}{3}$ TRAUMA DEATHS; MILD = (GCS 14-15), MODERATE = (GCS 9-13), Severe = (GCS < 8)

Rabies PEP = Skunk, foxes, raccoons, bats; Dogs, Cats, ferrets = OBS 100 days
 Heat: CONDUCTION, CONVECTION, RADIATION, EVAPORATION

MAP = $DP + \frac{1}{3}(SP - DP)$ which equals $DP + \frac{1}{3} PP$; Shock Index = $\frac{Pulse}{Systolic}$
 4 TYPES of Hypersensitivity → 1 = Allergic, 2 = Cytotoxic, 3 = Immune complex, 4 = Delayed

Anaphylaxis: EPI IM > SQ
 $PPV = \frac{\# \text{ TRUE POSITIVES}}{\# \text{ POSITIVE CALLS}} = \frac{TP}{TP + FP}$ / $NPV = \frac{TN}{TN + FN}$

Concerning HA: Recent trauma, AMS, fever, focal neuro
 Antiarrhythmic Drugs: 1 = Na, 2 = ββ, 3 = K⁺, 4 = Ca⁺⁺, 5 = other
 PHAILS = PESTICIDES, Hydrocarbons, ACIDS, ALKALIS, ALCOHOLS, IRRITANTS, LITHIUM, SOLVENTS
 Plague = *Yersinia pestis* / Tularemia = *Cytophaga*
 TTIV = 166 IV → 50 L/m + 20 B/m = 950 cc

Tube Thoracostomy: >1000 cc int or >300 cc/hr = OR
 SURGICAL CRICH & PERICARDIOCENTESIS NOT Scope of Practice
 IABP = $\downarrow$ afterload, $\uparrow$ CO = 30%; limb ischemia, hemorrhage
 IABP transport: Power, Helium, Timing
 Special Duty to Patients

Due Process: ① The affected private interest, ② Risk of erroneous action, ③ Government's interest
 → "Due process only req'd of state entities, or private acting on state matters"

Preponderance of evidence is standard of proof

NIMS: Preparedness/Communicator/Resource/Command/Logistics

MACS (within NIMS): Multi-Agency Coordination System

NIMS: Began 2004, revised 2008

Common Rule: Uniform Research Federal {FWA, IRB, IACUC}

Final Rule: Provides rule for ethics research

System Design: Clinic Software - Best Timing - Economic Reliability

Latent vs. Near Misses

PPR/HVE

Exposures

HIV
 Varicella (5 days)
 Give VZV by pregnant

Had den's
 Ash Bulance collisions
 Hyman Vehicle/Environmental
 Pre During Post

Allogenic Rxn = welts but stalk

Wilderness

Mass Gathering

Put Pres. Rate
 PPR/1000
 EOH 1. minimum, paid
 → 5 min walk
 1 Source #39 / 1500 people
 1 Team for Effective Alcohol Management
 1 med Action Plan ≥ 30d PT
 3 domains: Biomed, environ, psychosocial