



The History of EMS: Past, Present and Future

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Outline

- ◆ Earlier History of American EMS
 - “Back in the day” before formal EMS Systems
- ◆ Transformative years into the modern era
- ◆ Deep involvement of early medical directors:
Science of Trauma and Cardiac Care
- ◆ Autonomous EMS Systems in the 80s-90s
- ◆ New EMS: Systems, Oversight, Quality
- ◆ Future trends in EMS and interface with EM

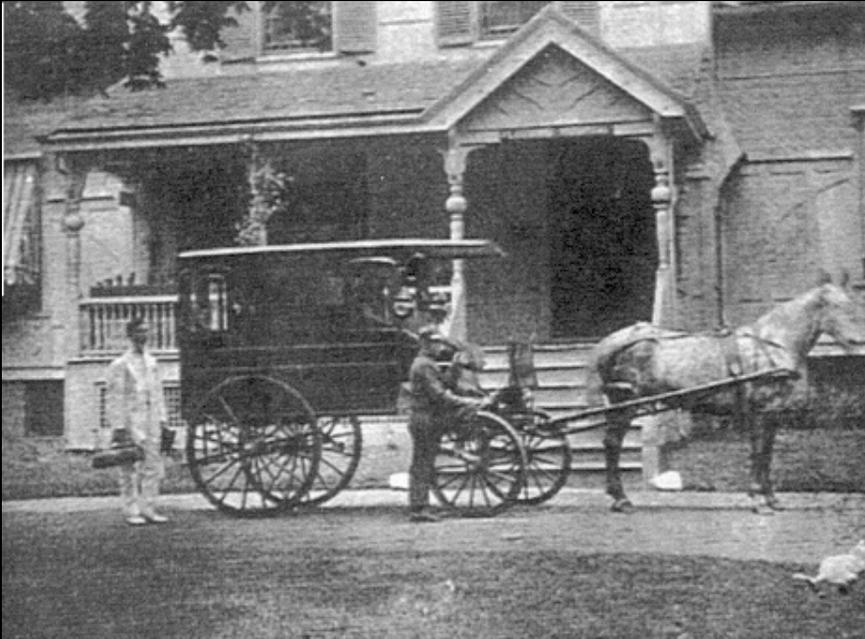
Roots of EMS

- ◆ Battlefield attendance to the military wounded
 - ❖ “*Ambulancias*” – Queen Isabella of Spain 1487
 - ❖ “*Ambulances Volantes*”-Napoleon chief physician 1793
- ◆ Civil War : Origins of American ambulances
 - ❖ Horse drawn buggies: 4 wheel *Rucker Ambos*
 - ❖ Steamboat as temporary ambulance & hospital
 - ❖ Railroad ambulance cars
- ◆ Dedicated Services for First Aid
 - ❖ St Johns Brigade in London and Dublin 1887-1903

Roots of EMS

- ◆ Hospital-based transportation systems
 - ❖ Horse Drawn: Cincinnati General 1865
 - ❖ New York Service at Bellevue 1895
 - ❖ Early motorized ambulances in Chicago 1899
 - ❖ Staffed with residents for purposes of transportation

History of EMS in US



Horse-drawn
ambulance in the Civil
War

Early motorized
ambulance



Precursors for the need for EMS

- ◆ Inevitability of progression of illness or injury
 - ❖ Death on battlefield without evacuation
 - ❖ Frequent deterioration in transportation
- ◆ Difficulty of rescuing victims in distress
- ◆ Delayed mortality before modern medicine
 - ❖ No antibiotics, less surgical techniques
- ◆ Cardiac Arrest was a certain death sentence

Early Basic Life Support History

- ◆ Previous to “transformative years” in US
 - ❖ Variable training in First Aid, uneducated public, little physician input into the out of hospital arena
 - ❖ Hearses in town, some bystander scoop & run
- ◆ Scattered Rescue Squads in early 1930s
 - ❖ Pre-WW II: 1st rescue squad in Roanoke, VA
 - ❖ Post WWII: Similar to Bethesda, MD
 - ❖ Bethesda Chevy Chase Rescue Squad (Video)
- ◆ No dedicated physicians in American EDs
 - ❖ To receive the ill and injured from the field

Genesis of Advanced Life Support

- ◆ Genesis of CPR in Baltimore & Pittsburgh in the late 1950's and early 60s
 - ❖ Rescue Breathing research
 - ❖ Dr. Peter Safar (U Pittsburgh 1950s – A Father of Ventilation) allowed residents to ventilate him
 - ❖ Drs. Knickerbocker, Kouwenhoven, Jude (Fathers of Compressions - at JHU)
- ◆ Early techniques of defibrillation
 - ❖ In house ventricular fib using paddles in the OR
 - ❖ JHU took delivery of 1st field defibrillator 5/11/59–
Weighed > 45 Lbs

Modern Pre-hospital EMS

- ◆ Genesis of formal BLS systems was validated by CPR research, but also evolving trauma care
- ◆ Ironically jump-started by trauma>medical illness
 - ❖ Dubious distinction of 50,000 deaths on our highways
 - ❖ The Institute of Medicine's "White Paper"
 - ❖ *Accidental Death and Disability: The Neglected Disease of Modern Society (1966)*
- ◆ The EMS Act of 1973
 - ❖ Monies available to create systems, including training
 - ❖ Formal BLS and the national EMT program was born from this
 - ❖ Redesign of Communications, ambulance, hospital systems
- ◆ Maryland's system born from this push

Genesis of Mobile ALS

- ◆ Belfast, Northern Ireland Heart Mobile
 - ❖ Dr. Pantridge (Royal Victoria Hospital 1966)
- ◆ St Vincent's Mobile CCU in NYC
 - ❖ Dr. William Grace and CCU Fellows~ 1969
- ◆ Miami Fire Department Rescue One
 - ❖ Dr. Eugene Nagel (U Miami Jackson 1969)
 - ❖ Proved to Fire Chiefs Medics could intubate
- ◆ Seattle Medic One
 - ❖ Dr. Leonard Cobb (U Washington 1970)
 - ❖ Father of massive layperson training (Medic 2)

Genesis of Emergency Dispatch

- ◆ EMD: The “Zero”th Responder (1981)
- ◆ Original White paper decried lack of any easy to remember access number for help
- ◆ EMS Act suborned the genesis of 911
 - ❖ Help of AT&T
- ◆ Late 1980’s Dispatch Life Support (DLS) born
 - ❖ *Principles of EMD*
 - Clawson et al

History of Physicians in EMS

- ◆ Medical Command/Control (50's-70's)
 - Early science coaches (medical), Military overtones
- ◆ Medical Direction in late 80's to early 90's
 - EMS got more autonomous, pendulum pushed aside docs
- ◆ “EMS Physician” was born (circa 1986)
 - origin: National Assoc EMS Physicians (NAEMSP)
 - Position Paper on Medical Oversight (1998)
- ◆ **Medical Oversight**
 - most modern terminology
 - *Source: Prehospital Care and Medical Oversight (NAEMSP)*

Definitions of Medical Oversight

- ◆ The responsibility of physicians to direct the prehospital system and providers in the overall clinical management of patients E. Racht
- ◆ The result of the legal, moral and medical authority responsible for the provision of pre-hospital care by physician extenders
- ◆ A process whereby a physician director insures that care provided to patients by the EMS system is both appropriate and beneficial - R. Bass
- ◆ The implementation & supervision by a physician of the medical aspects of a system designed to deliver emergency patient care in the out of hospital setting
– R. Stone

Introduction to the Public

- ◆ NOT insignificant how the media can introduce medicine to the lay public
- ◆ For early military trauma care
 - ❖ **"MASH"** and the trauma surgeon and nurse
- ◆ For EMS, paramedics in the living room
 - ❖ **"Emergency!"** for 5 seasons in the 1970's
 - ❖ A whole generation of youngsters grew up wanting to be medics (yours truly-1975)

Pop Culture

- ◆ For EMD, the Dispatcher as the hero
 - ❖ William Shatner's post "Star Trek" life began
 - ❖ **"Rescue 911"**: teacher of public safety access and pre-arrival instructions in the late 1980's
 - ❖ **Rescue 911 "100-200 lives saved"** episodes
- ◆ For Emergency Medicine
 - ❖ **"Emergency!"** and the early ED Doc
 - ❖ **"ER"** in the late 90s and 2000s introduced the specialty itself to American households



Present EMS: Levels of Care



- ◆ 1st Responder
- ◆ Emergency Medical Technician-Basic
- ◆ Emergency Medical Technician-Intermediate (300+ hours)
- ◆ Emergency Medical Technician-Paramedic (600-900 hours)
- ◆ Emergency Medical Dispatcher (EMD)



What should residency graduates know about EMS systems?

- ◆ Existence of state law enabling EMS
 - Larry Weiss “EMS and the Law” Lecture on 11/02/11
- ◆ Local resources and deployment
- ◆ Local protocols
- ◆ Regulations: Access to QA Inquiry process
- ◆ MD COMAR 30 guides all aspects of EMS
 - ❖ 02:Providers;03:Programs;04:Education
 - ❖ 05: Regions; 06:AED; 07:Syscom; 08:Spec Centers
 - Source Maryland COMAR Title 30

Base Stations

- ◆ Cornerstone of **on-line direction**
 - ❖ *Source COMAR Title 30, Subtitle 03, Chapter 06*
- ◆ Surrogate for the medical director's inability to be everywhere all the time
 - ❖ Residency trained front line EPs, 24h/7d
- ◆ In MD, base station course trains us
 - ❖ Gaasch and Lawner - September 2011
 - ❖ Base station medical director (Lawner, Lee)
 - ❖ A mandate for quality review of calls

Present EMS Systems: Specialty Centers

- ◆ The earliest paradigm has been trauma
 - ❖ Maryland is VERY fortunate area of excellence
- ◆ Even to this day, trauma care is scarce
 - ❖ Average American 100+ minutes from a Center
- ◆ Newest Field Triage Guidelines
 - ❖ Guidelines call for 4 categories (*MMWR* 2006)
 - ❖ Revised in 2011: Seriously injured to Level 1
- ◆ In Maryland: Trauma Decision Tree

EMS Specialty Centers

- ◆ The next paradigm has been for CVA
- ◆ NINDS Study kicked off the B.A.T concept
 - ❖ “Time is brain”
- ◆ Barriers remain access to care in 3 hours
 - ❖ Public education: call 911 or get to an ED
 - ❖ Ability to deliver the t-PA even if transferring
- ◆ Access to appropriate aftercare: Neuro ICU
 - ❖ Neurology consultations & comprehensive care

EMS Specialty Centers

- ◆ The concept of MI Care: STEMI Centers
- ◆ Rapid ID of the culprit ECG since 2000 AHA
- ◆ Access to a door to balloon of 90 minutes
- ◆ Again Maryland is fortunate exception
 - ❖ 20/48 hospitals are now PCI capable, +3 out of State
- ◆ Many areas are still underserved
 - ❖ Develop thrombolytic stabilization protocols
 - ❖ Includes some areas in Maryland

Future Trends in EMS

- ◆ Regionalization of Care in Trauma
- ◆ With updated CDC Guidelines
 - ❖ Level 1 centers do not grow on trees
 - ❖ Cannot overtax Level 1 centers
- ◆ So where do EMS systems go?
 - ❖ Level 2's provide more care to serious injuries
 - ❖ Level 3 stabilization centers?
- ◆ Idea of differential triage will be challenge

Future Trends in EMS

- ◆ Regionalization in Cardiac Care
- ◆ From STEMI Centers to “Resuscitation” Centers for ROSC: New Paradigm
 - ❖ Counter-intuitive to by-pass for post codes
 - ❖ Wake County, NC experience (Brent Myers)
 - ❖ PCI after CPR, Continue hypothermia
- ◆ Pendulum swinging back to BLS
 - ❖ Is Cardiac arrest back to a BLS disease?
 - Dr Abella’s Lecture- June Research day 2011

Study To Consider

N Engl J Med. 2004 Aug 12;351(7):647-56.

Stiell et al

EMT-D programs impact cardiac arrests
as much as the average EMT-P

Advanced cardiac life support in out-of-hospital cardiac arrest

- ❖ **“OPALS” Study presented at NAEMSP 2004**
- ❖ The addition of full ALS no better in cardiac arrest than adding AEDs to EMT-B skill-set
- ❖ **ALS valuable in the deteriorating Priority 1 patient**

Alternate Transport Destinations

- ◆ Where can EMS go to decompress EDs?
- ◆ Studies in the early 2000's could not prove non 24 h facilities were effective
 - ❖ Worries about insufficient resources
 - ❖ Need to be admitted, under-triage in the field
 - ❖ Patient satisfaction and self-triage
- ◆ Now we have several models of Freestanding Emergency Facilities FSED

– Presented AAEM SA 2011- Drs. Browne & Ybarra

Freestanding EDs

◆ Hospital Satellites

- ❖ Maryland: SGAH Germantown, SHS Queen Anne's

◆ Private Emergency Medicine practices

- ❖ TX and Yale

◆ Urgent Care with resources on site

◆ Challenges

- ❖ Need to create EMS to transfer the admissions
- ❖ Over and under-triage rate will always exist

◆ Will these truly decompress the ED or just drain revenue from them?

Stone, McAdams, Lawner et al

Prehosp Emerg Care. 2010 Jan-March

Can EMS providers accurately triage low acuity patients to a new Freestanding Emergency Facility?

- ❖ New FEMF at Germantown= 22,933 Census
- ❖ N=1,533 Admissions needing secondary Transport
- ❖ Top two reasons were cardiac and GI
- ❖ Only 144 brought in by EMS; Musculoskeletal and GI
- ❖ EMS is 3x less likely to under-triage than public
- ❖ Biggest issues in EMS include triage skills



Future EMS Scope of Practice

- ◆ Future Levels of Care based on NHTSA
- ◆ The First Responder
- ◆ The EMT (replaces EMT-B)
- ◆ The Advanced EMT (Abolish the EMT-I)
 - ❖ Ceiling of skills less advanced than EMT-I: No intubation
- ◆ The Paramedic (replace the EMT-P)
 - ❖ Add Chest Tube and Foley Care
 - ❖ Professionalize the paramedic as allied health practitioner
- ◆ Many states will or will not adopt exactly
 - Their EMT-Intermediates are the backbone of ALS

The Future of Paramedicine

- ◆ Enhanced Public Health practitioner?
- ◆ In the era of Health Care reform
 - ❖ Public Health Medics preventing the 911 call
 - ❖ Following up on 911 users, homeless
- ◆ Less on-line direction, more independence
- ◆ Treat and release
 - ❖ Will we ever leave the non-emergent on scene?
 - ❖ Previous studies have not shown this safe

Studies

EMS “Treat and Release” programs are risky

- ❖ 10 studies presented at NAEMSP 2003
- ❖ In Maryland, study found 2000 ICD-9 codes were encountered by medics in Baltimore
- ❖ The best under triage rate for treat & release 10%
- ❖ **So how do we allow ALS or BLS to decide not to transport?**

Bissell, Seaman et al.

Prehosp Emerg Care. 1999 Apr-Jun;3(2):140-9.

- ◆ “Change the scope of practice of paramedics? An EMS/public health policy perspective”
- ◆ 5259 patients transported by city ambulance
- ◆ ED records available for 3329 (63%)
- ◆ Top 51 diagnoses accounted for 53.56%
 - 82.5% of these involve infections, general patient evaluations, and injuries
 - Each additional diagnosis accounts for less than one-third of 1% of cases

Author's Comments

- ◆ “The sheer breadth of diagnoses demonstrated a complexity beyond the grasp of any provider without numerous laboratory, diagnostic, and treatment resources.”
- ◆ How can an EMS provider at any level identify the benign amongst such a high number of illnesses without more training?

(Stone '05)

The Future of Dispatch

- ◆ Public Health surveillance tool
 - ❖ Pandemic Flu, SARS (MPDS Card 36)
- ◆ What about the “no send” protocols?
 - ❖ Already used in London
 - ❖ Must be backed up with a way to offer follow-up
 - ❖ Richmond looking at this since 2009
- ◆ Can it work without legal reforms?
- ◆ Without national health care access?

The Future of Physician Oversight

- ◆ Grand Rounds March 2011
- ◆ Approval of EMS as Newest Subspecialty
- ◆ EMS Fellowships 12-24 months
 - ❖ Pendulum swinging back towards involved physicians
 - ❖ Board Exam 2013 or 2014
- ◆ The vocation will be much more on-line
 - ❖ Off-line duties were not enough to call a specialty
- ◆ Opportunities for every EM physician to be involved in EMS, EMS interface, EMS Policy

Task Areas: **Scope of Medical Practice**

! Authority to impact quality of care

- Medical decisions about assessment & treatment protocols, as well as equipment
- Medical support for dispatch protocols
- Medical consultant for training programs
- Authority to locally credential providers
 - Medical liaison to all physicians in the community
 - Link EMS to academic ties within emergency medicine
 - Linkage of EMS to Public Health initiatives

Future Scope of Medical Practice

- Oversight of any medical aspect of each subsystem aimed at delivering care
- Physician consultant in the Streets
 - Specialist to understand unique challenges of practice in austere environments
- ICS physician
 - @ MCIs, drills, mass gatherings, multiple alarms
- Will be a true vocation with ? Practice rights?
 - AAEM EMS Committee crafting a position statement

Questions?

- ◆ Summary
- ◆ EMS ancestry: Roots in Battle
- ◆ EMS past: Remember the “White Paper”
- ◆ EMS present: True Systems
 - ❖ BLS, ALS, EMD, EM, EDs, specialty centers
- ◆ EMS future
 - ❖ New Scope: allied health practitioner
 - ❖ New EDs, FSEDs, newest specialty referral centers
 - ❖ New Physicians EMS specialists more involved