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”

- 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)
- 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)
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

- 1<sup>st</sup> 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
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?
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
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?
“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
“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