The Paramedic Paradox: Is Less Really More?

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Now Faith is the assurance
Of things hoped for
The belief in
Things unseen.

-- Hebrews 11:1
Faith-Based EMS Staffing

- Every patient can benefit from a paramedic assessment, ALS is time critical, so more paramedics are better.

- Very few patients actually benefit from ALS and those that do require a very experienced provider, ALS time is less critical than BLS time, fewer paramedics are better.
EMS Today – NC and USA

Paramedic shortage

- 450 paramedic openings in NC
- 330 new paramedics graduated last year

Level of paramedic experience is critical for certain emergencies

More experience is better than less
What We Have Learned

- Not all EMS requests for service are the same
  - Some could be prevented
  - Some do not need an emergency department
  - Some require a “maximum response” for good outcome
- Different clinical and physical resources are needed for different patient conditions
- Achieving a balance between speed and experience is the challenge – “the paramedic paradox”
Risk-Frequency of EMS Interventions

HIGH RISK
LOW FREQUENCY
Requires very experienced paramedic;
Often requires more than one paramedic

MODERATE RISK - TIME CRITICAL HIGH FREQUENCY
May be safely handled by a paramedic with limited experience.

LOW RISK HIGH FREQUENCY
May not need to go to the hospital at all.
Some risk due to lack of transport.
Three Types of Interventions

- **Low frequency, high risk:** These encounters require a well-experienced paramedic for optimal outcomes.

  - **Examples include**
    - Advanced airway management
      - Intubation
      - Surgical
    - Cardiac arrest not responsive to defibrillation
      - Complex differential diagnosis
      - Additional drugs
      - Advanced airway maintenance
Three Types of Interventions

- Moderate risk, time critical: These can be safely and effectively performed by paramedics with limited experience.

  Examples:
  - Use of CPAP for congestive heart failure
  - Defibrillation for patients in cardiac arrest
  - Controlling seizures
  - Serious diabetic situations
Three Types of Interventions

- Low risk, high frequency - patients who may not require emergency department transport
  - “Frequent fliers”
  - Minor injuries/illnesses
  - Multi-patient events with large numbers of uninjured
  - Vaccinations, medication refills

- These patients represent some risk just by the lack of transport
How do you maintain paramedic response performance without overburdening the system with paramedics?
Percent Survival Cardiac Arrest

Paramedics per 100,000 vs. Cardiac Arrest Survival

City (Medics/100,000)

- Boston (9.5)
- Seattle (13.5)
- Milwaukee (18)
- Wake (25)
- San Antonio (33)
- Nashville (33)
- Omaha (44)

# Houston Experience

## Table 4

Survival by deployment type

<table>
<thead>
<tr>
<th></th>
<th>Uniform response</th>
<th>Targeted response</th>
<th>( P )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. resuscitation attempts</td>
<td>24</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td>Return of spontaneous circulation</td>
<td>8 (33.3%)</td>
<td>101 (55.8%)*</td>
<td>0.049</td>
</tr>
<tr>
<td>Survival to hospital admission</td>
<td>7 (29.2%)</td>
<td>92 (51.1%)*</td>
<td>0.05</td>
</tr>
<tr>
<td>Survival to hospital discharge</td>
<td>1 (4.2%)</td>
<td>43 (23.9%)*</td>
<td>0.03</td>
</tr>
<tr>
<td>Alive at 1 year</td>
<td>0</td>
<td>27 (15.0%)*</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*D.E. Persse et al. / Resuscitation 59 (2003) 97–104*
Table 2
Critical intervention rates by deployment type

<table>
<thead>
<tr>
<th></th>
<th>Uniform response</th>
<th>Targeted response</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First shocks delivered by first responder</td>
<td>10 (41.7%)</td>
<td>51 (28.2%*)</td>
<td>0.23</td>
</tr>
<tr>
<td>First shocks delivered by paramedic</td>
<td>14 (58.3%)</td>
<td>123 (67.9%*)</td>
<td>0.36</td>
</tr>
<tr>
<td>Successful intubation</td>
<td>22 (91.7%)</td>
<td>174 (99.4%**)</td>
<td>0.04</td>
</tr>
<tr>
<td>Successful i.v.</td>
<td>20 (83.3%)</td>
<td>178 (98.3%)</td>
<td>0.004</td>
</tr>
</tbody>
</table>
Paramedic Paradox

- If we have too many paramedics, the experience level of each paramedic declines.

- If we have too few paramedics, they may not reach the patient in a timely manner.

- The challenge is to match response with need.
Proposal: Maintain and Support First Responders

- Basic Life Support First Response (AED + CPR first response):
  - Goal: First response (fire or law enforcement) in < 5 minutes @ 90th percentile for high acuity calls
  - Utilization of first response in order to reduce trauma scene times (e.g., RFD backboards)
Proposal: Single-Paramedic Transport Ambulances

- One paramedic/one EMT ambulances with current response time goal--11:59 at 90th percentile of calls

- Perform time-critical but moderate-risk interventions
Proposal: Advanced Practice Paramedic

- An “advanced practice paramedic” provides a significantly better match between patient acuity and paramedic experience.
- Experienced paramedic with additional training.
- Assigned a “district” to cover.
  - Respond to critical calls.
  - Deliver services to reduce the number of calls.
  - Arrange alternative (not ED) health care where appropriate.
- Non-transport utility vehicle.
Proposal: Advanced Practice Paramedic

- Advanced practice paramedic (APP) – limited number to ensure appropriate annual experience with high-risk patient encounters
- Response goal 14:59 at 90\textsuperscript{th} percentile for critical calls
- Supervises or performs high risk, low frequency procedures
- Expanded role
  - Alternative transport decisions
  - Preventative measures
  - Advanced pharmacology

JEMS September 2007, p 62-68
How APP Improves Annual Experience/Medic

### Critical Encounters/Medic

<table>
<thead>
<tr>
<th>Procedure Type</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Arrests/Medic</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Airways/Medic</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

**Number per year**

- Current
- Proposed
Summary of Proposed Response

- **BLS first response in 4:59 at 90th percentile**
  - Defibrillation
  - Compression
  - Trauma preparation

- **ALS ambulance in 11:59 at 90th percentile**
  - CPAP
  - I/O
  - IV medications
  - Initial cardiac arrest care

- **Advanced Practice Paramedic in 14:59 at 90th percentile**
  - RSI/drug-facilitated intubation
  - Referrals and alternate destinations
  - Hypothermia
  - Complex cases (cardiac arrest and others)
Other Benefits

- Provides community health assistance (vaccines, well-being checks) in collaboration with Wake County Human Services
- Provide pre-planned disaster preparedness assistance (ventilator checks, O₂ delivery)
- Intervene with frequent consumers of EMS (blood glucose checks, alternate destinations)
- Provide meaningful step on career ladder
Career Ladder

Supervisory/Managerial positions

- Advanced Practice Paramedic
- Lead Paramedic
- EMT (EMT, EMT-I, or JrPM)
Staffing Changes Over Time

Staffing Model Comparison

- Current Model Medics
- Proposed Medics
- Proposed EMTs

Fiscal year vs. Additions per year graph
Issues as we roll out....

- Some personnel will prefer “the old way” with 2 paramedics on 24 hour shifts

- Delayed rollout due to staffing concerns

- Upfront costs