The Epidemiology of Mortality in Patients Transported by Emergency Medical Services (EMS)

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No Conflicts of Interest

Background

- Modern EMS systems have evolved to become an important link between the community and the health care system
- A historical focus of EMS research has been on specific conditions, often those with a high mortality
- Little is known about the epidemiology of mortality of all transported EMS patients
To describe characteristics of EMS patients who after transport, die in a health care facility.

Study Aim

• ALS/BLS system serving approximately 2 million
• One year of data 2015/2016
• Deterministic linkage to health outcome
• Mortality at hospital discharge
• Descriptive statistics including risk of mortality and proportion of those that died

Methods

• ALS/BLS system serving approximately 2 million
• One year of data 2015/2016
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Results
Results

Overall

Emergency Department

In-Patient

Determinant

Risk

% Died

Male

4% 50%

5% 60%

10% 51%

Female

3% 47%

<1% 37%

10% 49%

Results – AMPDS Determinant

Determinant

Risk

% Died

Echo

3% 7%

19% 31%

14% 2%

Delta

4% 21%

4% 31%

17% 34%

Charlie

4% 31%

<1% 17%

12% 34%

Bravo

1% 8%

<1% 4%

8% 6%

Alpha

2% 18%

<1% 6%

8% 21%

Omega

1% <1%

2% 2%

<1%
Results – ED Diagnosis

<table>
<thead>
<tr>
<th>ED Diagnosis</th>
<th>Overall Mortality % Died</th>
<th>ED Mortality % Died</th>
<th>In-Patient Mortality % Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other forms of heart disease (I30-I52)</td>
<td>20%</td>
<td>67%</td>
<td>10%</td>
</tr>
<tr>
<td>Cerebrovascular diseases (I60-I69)</td>
<td>8%</td>
<td>4%</td>
<td>9%</td>
</tr>
<tr>
<td>Influenza and pneumonia (J09-J18)</td>
<td>6%</td>
<td>4%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Results – ED Diagnosis

- Overall mortality rate of 3.3% (95% CI 3.2, 3.4)
  - For every 30 transports there is one death
  - For every one ED death there are five in-patient deaths
- Starting point for future research to identify patients that may be amenable to EMS treatment and mortality reduction

Limitations

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Selection bias from linkage</td>
<td>Systematic bias of patients with a high risk of mortality resulting in an underestimate of mortality rate.</td>
</tr>
<tr>
<td>External validity</td>
<td>Interpretive caution is required in inferring results to other systems.</td>
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<tr>
<td>Conditions amenable to EMS treatment versus normal course of disease</td>
<td>This study reports all-cause mortality from all-comers.</td>
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Conclusions

There are important clinical differences in the characteristics of EMS patients who after transport die in a health care facility.

This is an early example of a North American EMS system linking prehospital data to health system outcomes for all-comers to EMS and a foundation for future research.