Telehealth in Critical Care: Quality and Cost Outcomes

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TELEHEALTH IN CRITICAL CARE: QUALITY AND COST OUTCOMES
Introduction

- Telemedicine/Telehealth is becoming VERY popular (American Well is used by i.e. Cleveland clinic, Anthem, Cerner, Medtronic, United Healthcare, and many more)
- VA (FY 2018) and Teladoc hit 1 telemedicine million visits
- Used also to increase market share by hospital chains
- More than 800,000 strokes, (1 every 40 sec) in the US (telestroke)
Introduction

ICU Admissions

- 4 million U.S. ICU admissions annually
- $80 billion annually
- 20% of deaths that occur in the hospital
- 2.5 times more costly
Who goes to the ICU?

- 26.9% of hospital stays involve an ICU stay
- 93.3% are respiratory patients with ventilator support
Rural Areas

19.3% of U.S. population lives in a rural area. Rural areas have higher than average health care workforce shortages which limits accessibility to health care services.

Note: Metropolitan and micropolitan statistical areas defined by the Office of Management and Budget as of Jul. 2015, using U.S. Census Bureau county boundaries effective as of Jan. 2013
Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, Nov. 2017
The Red Flags

- Due to aging population usage increasing
- Intensivist shortage rural areas
- Significant difference by rural and urban hospitals
Leap Frog Group

➢ Fortune 500 companies and Robert Wood Johnson Foundation
➢ ICU intensivists who provide care exclusively in the ICU have 24-hour coverage
Telehealth and ICU

- Telehealth
  - Only 17% of hospitals utilized in 2016
  - $2-$5 million set up costs
- Reimbursement model changes
The purpose of this study was to assess the potential for the implementation of telehealth in the ICU to determine its impact on quality of care and overall healthcare costs.
Methodology

The primary hypothesis of this study was that telehealth would be linked with lower ICU LOS and hospital mortality rates among critically ill patients.
Methodology

- Databases searched: PubMed, EBSCO, ProQuest, Google, and Google Scholar
- Keywords: ‘telehealth’ or ‘telemedicine’ or ‘tele-ICU’ and ‘critical care’ or ‘clinical quality’ or ‘mortality rates’ or ‘financial impact’ or ‘cost’ or ‘cost savings’
- Literature review: 40 total articles found; 23 used
Clinical Impact

- Mortality
- Length of Stay
Clinical Impact: Mortality

➢ Large Community Hospital
  ➢ 7.9% to 3.8%
➢ Medicare billing data of those that implemented
  ➢ 12.1% showed reduction
  ➢ 81.1% no significant change
  ➢ 6.1% worst mortality
Clinical Impact

➢ Decreasing medication errors,

➢ Increasing patient safety when adopted and implemented in hospitals.
Clinical Impact: Length of Stay

➢ ICU stay -1.26 days

➢ Hospital -0.6 days
Financial Impact: Outlay

➢ Cost of Implementation
➢ First-year operational cost

1. VHA
2. Sentara Health care
<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Monitoring Facility (74 beds)</th>
<th>Hospital 1,2 ICU (23 beds)</th>
<th>Hospital 2 (10 beds)</th>
<th>Hospital 3 (6 beds)</th>
<th>Hospital 4 (16 beds)</th>
<th>Hospital 5 (5 beds)</th>
<th>Hospital 6 (5 beds)</th>
<th>Hospital 7 (9 beds)</th>
<th>System Total (8 ICUs, 74 beds)</th>
<th>% of Grand Total</th>
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</thead>
<tbody>
<tr>
<td>Hardware/Upgrades</td>
<td>331,593.79</td>
<td>185,493.62</td>
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<td>129,039.04</td>
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<td>72,584.46</td>
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<td>115,263.67</td>
<td>66,736.05</td>
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<td>47,889.20</td>
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<td>Installation Fees</td>
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<td>72,864.00</td>
<td>1,494,826.20</td>
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<td>Equipment and Network</td>
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<td>Technology Total</td>
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<td>N/A</td>
<td>N/A</td>
<td>26,635.00</td>
<td>...</td>
</tr>
</tbody>
</table>
Financial Impact: Costs

Industry Associated Costs

➢ Software
➢ Equipment
➢ Staffing
➢ Miscellaneous
Table 1. Tele-intensive care unit cases studied, implementation costs, and outcomes

<table>
<thead>
<tr>
<th>Institution</th>
<th>Setting</th>
<th>Implementation costs (US dollars)</th>
<th>Major results/outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentara Healthcare</td>
<td>Sentara Healthcare,(^a) academic tertiary care medical center with 5 ICUs, 103 critical care beds</td>
<td>1 million</td>
<td>Decreased ICU LOS by 17%; decreased hospital mortality by 26.4(^{33,36})</td>
</tr>
<tr>
<td>New England Healthcare Institute and Massachusetts Technology Collaborative</td>
<td>University of Massachusetts Memorial Medical Center, academic hospital with 5 adult ICUs, 130 beds, 7000 ICU patients</td>
<td>7.12 million</td>
<td>Decreased ICU LOS (from 13.3 to 9.8 days); decreased mortality from 13.6% to 11.8%; recovered costs of implementation; lowered rates of complications(^{36})</td>
</tr>
<tr>
<td>Resurrection Health Care</td>
<td>Community hospitals with 14 ICUs, 182 critical care beds Pre- and postimplementation design; preimplementation: n = 2034 patients; postimplementation: n = 2134</td>
<td>7 million</td>
<td>6 months after implementation: 38% decrease in ICU LOS, approximately $3 million in cost savings(^{37,38})</td>
</tr>
</tbody>
</table>

\(^{a}\) Includes both Sentara Norfolk General Hospital and Sentara Hampton General Hospital.

ICU = intensive care unit; LOS = length of stay.

Financial Impact: Savings

Savings to Medicare
Financial Impact: Savings

Decrease in Length of Stay
Conclusion

• The benefits of telehealth are still encouraging in both the financial and clinical areas.

• In a specialty such as critical care with increasing demand, telehealth could be a viable option for struggling critical care programs.