ROI of RPM: A New Tool for Analyzing Return on Investment of Remote Patient Monitoring

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Presenters

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Center for Technology and Aging

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Center for Connected Health, Partners HealthCare

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Director, Institute for Applied Research and Education
HealthCare Partners
Program Background

- Joint initiative of Center for Connected Health and Center for Technology and Aging

- Funded by:

- Based on RPM programs at:
  - Sharp Healthcare
  - HealthCare Partners
  - Centura Health at Home
  - Dignity Health
  - Veterans Administration of Central California
Remote Patient Monitoring - ROI

- Many RPM programs are in pilot or research stage – and are not reimbursable
- Question: What is the intrinsic value of RPM to health care organizations—with or without reimbursement?
- Flexible ROI tool created for program owners – evaluating cost inputs and value of outcomes/impact
- ROI model was tested with five organizations, who had very different implementation models
Remote Patient Monitoring - ROI

- Inputs gathered for ROI include:
  - Patient enrollment and growth assumptions
  - Staffing requirements – both fixed and variable
  - Technology costs – including up-front investments required, per patient costs, and assumptions relating to type of technology needed
  - Other operational costs – including inventory management, refurbishment, other administrative costs

- Value of the program measured by change in healthcare utilization – using actual data as assumptions
  - Inpatient admissions
  - Outpatient visits
  - Home visits
Do-it-Yourself Tool

Remote Patient Monitoring ROI Calculator

Start by answering a few questions

GET STARTED

Center for Technology and Aging
Do-it-Yourself Tool

ROI CALCULATOR

Enter the following:

- Initial Enrollment
- Intervention Months (2-12)

5 Year Enrollment Goal

Enrollment Summary

- Year 1
- Year 2
- Year 3
- Year 4
- Year 5

- Total Patient Enrollment
- Concurrent Patient Enrollment

SAVE
LOAD
EXPORT

Center for Technology and Aging

PARTNERS®
CENTER FOR CONNECTED HEALTH
Do-it-Yourself Tool

ROI CALCULATOR

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Human Resources  Fixed Management  Variable Staff  Summary

<table>
<thead>
<tr>
<th>TITLE</th>
<th>SALARY</th>
<th>Case Load per FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology/customer support staff</td>
<td>65,000</td>
<td>120</td>
</tr>
<tr>
<td>Clinical monitoring staff</td>
<td>65,000</td>
<td>120</td>
</tr>
</tbody>
</table>

If you would you like to assume an annual salary increase, enter annual increase as a percentage

3.5 %
### Do-it-Yourself Tool

**ROI CALCULATOR**

#### Technology Costs

- **Type:** Medical Devices (Purchased)
- **Cost:** $0.00
- **Classification:** Lifetime Use
- **Timeframe:** 0.00

- **Type:** Infrastructure
  - **Cost:** $0.00
  - **Classification:** Amortize
  - **Timeframe:** 0.00

- **Type:** ComboBox
  - **Cost:** $0.00
  - **Classification:** ComboBox
  - **Timeframe:** 0.00

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- **Type:** Hardware (Rent)
  - **Cost:** $0.00
  - **Classification:** Annual
  - **Patients on Cellular:** 3.5%

- **Data Cost - Cellular**
  - **Cost:** $0.00

- **Data Cost - Landline**
  - **Cost:** $0.00

- **Data Cost - Other**
  - **Cost:** $0.00

- **Shipping / Refurbishing**
  - **Cost:** $0.00

- **Server Hosting**
  - **Cost:** $0.00

- **Misc. Tech Fees**
  - **Cost:** $0.00

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**CLEAR DATA**
Do-it-Yourself Tool
Do-it-Yourself Tool

ROI CALCULATOR

Summary > ROI Analysis

<table>
<thead>
<tr>
<th>Cost Categories</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-Up Costs</td>
<td>10k</td>
<td>230k</td>
<td>83k</td>
<td>42k</td>
<td>120k</td>
</tr>
<tr>
<td>Technology &amp; Operating Costs</td>
<td>30k</td>
<td>10k</td>
<td>65k</td>
<td>20k</td>
<td>320k</td>
</tr>
<tr>
<td>Human Resource Costs</td>
<td>60k</td>
<td>120k</td>
<td>17k</td>
<td>90k</td>
<td>64k</td>
</tr>
<tr>
<td>Total Program Costs</td>
<td>82k</td>
<td>213k</td>
<td>42k</td>
<td>64k</td>
<td>140k</td>
</tr>
<tr>
<td>Healthcare Utilization Savings</td>
<td>600k</td>
<td>700k</td>
<td>800k</td>
<td>900k</td>
<td>1m</td>
</tr>
</tbody>
</table>

Return On Investment

-5  0  15  20  15
Do-it-Yourself Tool
## Results

<table>
<thead>
<tr>
<th>Organization</th>
<th>Year 1 ROI</th>
<th>Year 5 ROI</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centura Health at Home</td>
<td>2.6</td>
<td>3.9</td>
<td>Chronic disease pts; 49% of returns due to RN visit reduction; 1.5 month intervention</td>
</tr>
<tr>
<td>Dignity Health</td>
<td>0.4</td>
<td>5.2</td>
<td>Year 1 returns/pt = $9882</td>
</tr>
<tr>
<td>HealthCare Partners</td>
<td>1.3</td>
<td>18.9</td>
<td>COPD patients; IVR, opt out patient enrollment</td>
</tr>
<tr>
<td>Sharp HealthCare</td>
<td>1.6</td>
<td>1.7</td>
<td>Underinsured CHF pts</td>
</tr>
<tr>
<td>VA Central California</td>
<td>0.1</td>
<td>0.2</td>
<td>Randomized trial; 12 month intervention</td>
</tr>
</tbody>
</table>

Unless stated otherwise: 1) savings attributable to reduced hospital admits; 2) pre-post comparison design; 3) primarily CHF patients
Results

- All five organizations found ROI tool useful for:
  - RPM program value analysis and optimization
  - Sensitivity analysis
  - Accurately capturing RPM inputs and outcomes
  - QI strategy discussions on how to...
    - Meet readmissions reduction targets
    - Achieve Triple Aims
  - Influencing/informing management decisions regarding program expansion and sustainability
Case Study: HealthCare Partners

- HCP’s RPM program is an interactive voice response (IVR) based program targeting primarily patients with COPD and CHF
- Patients are enrolled for an average of 6 months, during which time they receive up to 3 calls per week to answer symptom-based questions
- Program is managed by existing in-house teams
- CCH received data on 70 patients showing pre and post program hospitalizations and outpatient visits
### Case Study – HealthCare Partners

#### Cost Summary

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Enrollment:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Patient Enrollment</td>
<td>90</td>
<td>268</td>
<td>445</td>
<td>623</td>
<td>800</td>
</tr>
<tr>
<td>Concurrent Patient Enrollment</td>
<td>45</td>
<td>134</td>
<td>223</td>
<td>311</td>
<td>400</td>
</tr>
<tr>
<td><strong>Technology &amp; Other Operating Costs:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Technology and Operations Costs</td>
<td>$31,594</td>
<td>$2,105</td>
<td>$2,617</td>
<td>$3,128</td>
<td>$3,639</td>
</tr>
<tr>
<td>Total Technology and Operations Costs/Patient</td>
<td>$351.05</td>
<td>$7.87</td>
<td>$5.88</td>
<td>$5.02</td>
<td>$4.55</td>
</tr>
<tr>
<td><strong>Personnel Costs:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telehealth Coordinator</td>
<td>$37,000</td>
<td>$37,000</td>
<td>$37,000</td>
<td>$46,250</td>
<td>$45,880</td>
</tr>
<tr>
<td>Nurses</td>
<td>$98,400</td>
<td>$98,400</td>
<td>$98,400</td>
<td>$123,000</td>
<td>$122,016</td>
</tr>
<tr>
<td>Management Resources</td>
<td>$4,920</td>
<td>$4,920</td>
<td>$4,920</td>
<td>$4,920</td>
<td>$4,920</td>
</tr>
<tr>
<td>Total Personnel Cost</td>
<td>$140,320</td>
<td>$140,320</td>
<td>$140,320</td>
<td>$174,170</td>
<td>$172,816</td>
</tr>
<tr>
<td>Personnel Cost/Patient</td>
<td>$1,559</td>
<td>$525</td>
<td>$315</td>
<td>$280</td>
<td>$216</td>
</tr>
<tr>
<td><strong>Total Cost:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Operating Cost</td>
<td>$171,914</td>
<td>$142,425</td>
<td>$142,937</td>
<td>$177,298</td>
<td>$176,455</td>
</tr>
<tr>
<td>Operating Cost/Patient</td>
<td>$1,910.16</td>
<td>$532.43</td>
<td>$321.21</td>
<td>$284.82</td>
<td>$220.57</td>
</tr>
</tbody>
</table>
## Case Study – HealthCare Partners

### Outcomes

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalizations</td>
<td>48</td>
<td>22</td>
</tr>
<tr>
<td>Outpatient Visits</td>
<td>446</td>
<td>581</td>
</tr>
<tr>
<td>Hospitalization rate</td>
<td>68.57%</td>
<td>31.43%</td>
</tr>
<tr>
<td>Inpatient Admissions Cost/Patient</td>
<td>$8,529</td>
<td>$3,909</td>
</tr>
<tr>
<td>Outpatient Visits Cost/Patient</td>
<td>$765</td>
<td>$996</td>
</tr>
<tr>
<td>Total Return/Patient</td>
<td>$4,388</td>
<td></td>
</tr>
</tbody>
</table>

**Change Pre-Post**

- Inpatient Admissions: ($4620)
- Outpatient Visits: $231
## Case Study – HealthCare Partners

### Summary

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<td>$142,937</td>
<td>$177,298</td>
<td>$176,455</td>
</tr>
<tr>
<td>Total Return:</td>
<td>$394,948</td>
<td>$1,173,872</td>
<td>$1,952,797</td>
<td>$2,731,721</td>
<td>$3,510,646</td>
</tr>
<tr>
<td>ROI:</td>
<td>1.30</td>
<td>7.24</td>
<td>12.66</td>
<td>14.41</td>
<td>18.90</td>
</tr>
</tbody>
</table>
Beta Testing

Please contact us to be a beta user

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Center for Technology and Aging
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