Demonstrating Return on Investment for Community Health Worker Services: Translating Science into Practice

Katharine London
University of Massachusetts Medical School

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Demonstrating Return on Investment for Community Health Worker Services

Translating Science into Practice

May 11, 2017

The 8th Annual Community Health Worker/Patient Navigator Conference

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Roosa Tikkanen, MPH, MRes, Policy Analyst
Center for Health Law and Economics, UMass Medical School
Opportunity

• Research shows CHWs can improve health outcomes and contain costs

• New payment methods make it easier to fund CHW services
  – Pay-for-Performance
  – Bundled Payments
  – Global Payments

• Providers and payers have flexibility to invest in new approaches if they are confident they will achieve:
  – Improved health outcomes
  – Positive ROI

• MassHealth Investment – time-limited!
### Potential benefits to a variety of stakeholders

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Commonwealth Medicine
Project goals

• Demonstrate the business case for CHW services
• Provide the detailed budget, financial and clinical analysis needed to justify funding
• Provide tools that users can adjust to meet their own specific needs
• Promote widespread adoption of CHW services
Overview of Analysis

- Identified Maine communities with unmet health needs
- Identified cost-effective CHW interventions in other states from published literature
- Applied results from other states to project outcomes in Maine
- Developed models for evidence-based, cost-effective CHW interventions for Maine
Key Terms

- **Financial Return on Investment (ROI):** For every $1 invested in the intervention, how much is returned
  - Calculated as: $\frac{\text{Savings}}{\text{Program cost}}$
  - Positive ROI: For $1$ invested, return is greater than $1$
  - Negative ROI: For $1$ invested, return is less than $1$

- **Social return:** Benefit to society: Healthy days and wages recovered

- **Target population:** People we most want to reach
Target population is key to ROI

➢ To produce a positive ROI, intervention must target people who otherwise would use more services or more expensive services - **a hypothetical example**: 
Developed 4 Models for Maine

1. Diabetes, Washington County
2. Asthma, children in Kennebec County
3. High utilizers, Aroostook County
4. Underserved individuals, Lewiston
Target population: 82 individuals with poorly controlled diabetes, all ages

CHW employer: Federally qualified health center (FQHC)

Model: University of Texas Community Outreach, Laredo, TX, that included home visits, counseling, group education, exercise classes

Program cost of CHW Intervention: $390,000 over 3 years

Projected outcomes (at Year 1):
- 60 percent will achieve good glycemic control
- Savings in direct medical costs: $520,000 over 3 years
- Financial ROI: $1.37 for every $1 invested over 3 years
- Social return: 11 recovered work days/worker, valued at $1,500/worker/year
Proposed Model 2:
Asthma, children in Kennebec County

Target population: 112 children with poorly controlled asthma

CHW employer: Private group practice eligible for bonus payments for meeting asthma improvement targets

Model: Seattle-King County Healthy Homes, WA, 4-month intervention incl. home visits, environmental assessment, asthma supplies

Program cost of CHW Intervention: $220,000 over 3 years

Projected outcomes (at Year 1):
• 46% achieve well-controlled asthma, 53% reduction in hospitalizations
• Savings in direct medical costs: $47,000 over 3 years
• Financial ROI: $1.03 for every $1 invested over 3 years
• Social return: 3 school days & 1 workday/family/year, valued at $170/family

Note: ROI only positive if practice earns bonus payments for meeting quality targets. However, Seattle-King County’s recent model produced positive ROI
Proposed Model 3: High utilizers, Aroostook County

**Target population:** 150 individuals with chronic conditions and high medical spending

**CHW employer:** 3 rural health centers

**Model:** Molina Healthcare/CARE NM, NM, 1-6 month intervention to connect patients to primary care providers and reduce ED visits

**Program cost of CHW Intervention:** $550,000 over 3 years

**Project outcomes (at Year 1):**
- 83% reduction in hospitalizations; 23% increase in diabetes eye exams
- Savings in direct medical costs: $1,275,000 over 3 years
- Financial ROI: $2.31 for every $1 invested over 3 years
- Social return: 11 work days recovered/person/year, valued at $2,000/worker
Proposed Model 4:
Underserved individuals, Lewiston area

Target population: 260 “New Mainers” in the Somali community with language and cultural barriers to accessing health care

CHW employer: CBO working with several health care providers

Model: Cancer screening (cervical, MN; breast, MA; colorectal, TX) to Somali populations, patient navigator (TX), and community outreach (CO) interventions

Program cost of CHW Intervention: $178,000 over 3 years

Projected outcomes (at Year 1):
• Increases in: Mammograms (3x); colonoscopies (2x); primary care (+86%); 46% reduction in ED visits
• Savings in direct medical costs: $274,000 over 3 years
• Financial ROI: $1.54 for every $1 invested over 3 years
• Social return: Not modeled (insufficient data)
Model Development: Methods

Identified interventions from published literature that improve health and lower costs

• **Similar population** with similar needs: condition, insurance status, disease control, age group, ethnicity

• **Similar settings**: FQHC, CBO, hospital

• **Published recently**

• **Strong scientific evidence**
  – Statistically significant effect
  – Ideally: Outcomes vs. individuals who did not receive intervention
  – Reported effects on health care outcomes and cost (or utilization)
Disclaimer

• We made assumptions based on the best available evidence, however there is a risk of introducing error when combining results from different studies

• If these models are implemented, actual results may differ from projections

• There are many other sustainable models. The models presented here are merely examples
Model Development: Diabetes, Washington County

Source of Model

University of Texas developed this Community Outreach model with Mercy Clinic in Laredo, Texas.

Target population:
• Individuals with poorly controlled Type 2 Diabetes
• Primarily low-income adults, many in rural areas

Intervention:
• CHW home visits
• Classes co-taught by CHW and nurse, dietician or Zumba instructor
  – Diabetes self-management
  – Health education
  – Diet
  – Exercise

Model Development: Choice of model

Why did we choose the ‘University of Texas’ model?

• Dual Intervention focus: Individual goal-setting (home visits, counseling) + group classes
  – Social setting (classes) reinforces individual goals
  – Individual attention reinforces learnings in class

• Estimated the percent (%) of individuals reaching HbA1c levels
  – Allowed us to estimate medical cost savings
  – Based on per-person costs at different HbA1c levels

Model Development: Choice of model

Why did we choose the ‘University of Texas’ model?

Improvement in HbA1c levels (control)

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<th>Percent of individuals at A1c level</th>
<th>Baseline (before)</th>
<th>1 year (after)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>100%</td>
<td>60%</td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Direct medical costs attributable to diabetes / person / year (CT)

- **<7% Good:** $10,805
- **7-9% Moderate:** $11,346 (+16%)
- **>9% Poor:** $13,507 (+20%)

HbA1c control level
(National Committee for Quality Assurance, NCQA)


Model Development: Methods

- Identify target population
- Estimate Caseload: Patients / CHW
- Develop budget: Program costs
- Project health outcomes
- Project savings
- Calculate Financial ROI: Savings / Program costs
- Project social return: Healthy days gained
Identified public health need in community
Diabetes in Washington County

Washington has a:

- Higher rate of diabetes (prevalence)
- Higher rate of ED visits related to diabetes
- Higher rate of hospitalizations from diabetes long-term complications
- Higher rate of deaths related to diabetes

Compared to state-wide.
## Model Development: Diabetes, Washington County

### Caseload

<table>
<thead>
<tr>
<th>Population</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Billable hours per year</strong> (minus admin, holidays, but incl. travel time)</td>
<td>1,696</td>
</tr>
<tr>
<td>CHW hours per total participant (persisting and drop-outs)</td>
<td>35</td>
</tr>
<tr>
<td>Participants per CHW (persisting and drop-outs)</td>
<td>48</td>
</tr>
<tr>
<td><strong>Total participants (2 CHWs)</strong></td>
<td>96</td>
</tr>
<tr>
<td><strong>Persisting participants (2 CHWs)</strong></td>
<td>82</td>
</tr>
<tr>
<td><strong>Caseload / CHW / 1 Year</strong> (persisting participants)</td>
<td>41</td>
</tr>
</tbody>
</table>
Budget based on actual costs in Maine

Interviewed CHWs & Employers:
- Maine Migrant Health Program (FQHC)
- Maine General (Hospital)
- Portland Public Health (municipality)
- Maine Access for Immigrant Network (CBO)
- New Mainers Public Health Initiative (CBO)
- DFD Russell (FQHC)
- Spectrum Generation (CBO - Area Agency on Aging)

<table>
<thead>
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<th>Budget parameters</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours worked by full time CHWs (per week)</td>
<td>36.75</td>
</tr>
<tr>
<td>CHW benefits (% of income)</td>
<td>28%</td>
</tr>
<tr>
<td>CHW salary (hourly)</td>
<td>$19.00</td>
</tr>
<tr>
<td>CHW supervisor salary (hourly)</td>
<td>$24.50</td>
</tr>
<tr>
<td>CHW supervisor % time spent supervising</td>
<td>10%</td>
</tr>
</tbody>
</table>
### Model Development: Diabetes, Washington County

**Budget for 1-year intervention**

<table>
<thead>
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<th>Budget for 1-year intervention (82 individuals retained, 2 FTE CHWs)</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHW Costs:</strong></td>
<td></td>
</tr>
<tr>
<td>CHW Salary (2 FTEs @ ME median)</td>
<td>$77,800</td>
</tr>
<tr>
<td>CHW Fringe (28% for 2 FTEs)</td>
<td>$21,800</td>
</tr>
<tr>
<td>Travel, supplies, training</td>
<td>$4,200</td>
</tr>
<tr>
<td><strong>Total cost for 2 CHWs for 1 year</strong></td>
<td>$107,300</td>
</tr>
<tr>
<td>Supervision costs (ME median + fringe)</td>
<td>$13,000</td>
</tr>
<tr>
<td>Nurse/dietitian educator costs</td>
<td>$6,000</td>
</tr>
<tr>
<td><strong>Total Cost – Year 1</strong></td>
<td>$126,300</td>
</tr>
<tr>
<td><strong>TOTAL COST - YEARS 1–3</strong></td>
<td>$385,600</td>
</tr>
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See Report Chapter 6 and Technical Appendix for further details on methods and model development.
Model Development: Choice of model

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<td>&gt;9% Poor: $13,507 (+20%)</td>
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HbA1c control level
(National Committee for Quality Assurance, NCQA)

Projected savings in medical costs for 82 enrollees over 1 year:
Assuming all participants have poor control at baseline (HbA1c >9%),* 60% achieve good control (<7%), 20% remain with poor control.**

<table>
<thead>
<tr>
<th>Cost savings</th>
<th>Baseline</th>
<th>Year 1</th>
<th>Cost vs. Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical cost without CHW intervention</td>
<td>$1,079,000</td>
<td>$1,108,000</td>
<td>+ $29,000</td>
</tr>
<tr>
<td>(Assuming no change in HbA1c)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical cost with CHW intervention</td>
<td>$1,079,000</td>
<td>$939,000</td>
<td>- $140,000</td>
</tr>
<tr>
<td>Total savings</td>
<td></td>
<td></td>
<td>- $168,000</td>
</tr>
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</table>

Group costs are rounded to the nearest thousand; costs have been adjusted for medical inflation using Medicare Economic Indices published by CMS.

* Poor control (HbA1c > 9%), definition by the National Committee for Quality Assurance (NCQA).
** Based on results from model study (Brown HS et al., *Prev Chronic Dis* 2012).
Model Development: Diabetes, Washington County
Projected Return on Investment (Year 1)

Year 1

$49,000

Cost increase

Baseline  $1,079,000
With no CHW intervention $1,108,000
After CHW intervention $939,000

Medical costs
Program costs
Saving
Projected Return on Investment (ROI): Calculation

\[
\text{ROI} = \frac{\text{savings}}{\text{program costs}} = \frac{$520,000}{\$379,000} = 1.37
\]

Savings from direct medical costs divided by program costs of CHW intervention.
Model Development: Diabetes, Washington County

Projected Return on Investment (ROI)

Expected ROI of CHW Intervention over 3 years

<table>
<thead>
<tr>
<th>Return on Investment</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total Years 1-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings from direct medical costs</td>
<td>$168,000</td>
<td>$173,000</td>
<td>$178,000</td>
<td>$520,000</td>
</tr>
<tr>
<td>Expected costs of CHW intervention</td>
<td>($119,000)</td>
<td>($128,000)</td>
<td>($131,000)</td>
<td>($379,000)</td>
</tr>
<tr>
<td>Projected financial ROI</td>
<td>$1.41</td>
<td>$1.35</td>
<td>$1.36</td>
<td>$1.37</td>
</tr>
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Costs are rounded to the nearest thousand. Costs in years 2 and 3 increase relative to year 1 because they have been adjusted for inflation.

For $1 invested, CHW intervention is expected to return $1.37

*(does not include Social Return)*
Model Development: Diabetes, Washington County

Social Return

### Improvement in HbA1c levels (control)

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### Days absent from work, per person per year:

- <7%: 6.9 days
- 7-9%: 10.0 days
- >9%: 21.7 days


Model Development: Diabetes, Washington County

Projected social return

Based on number of days lost from work by patient A1c control level,* valued at average wages in Washington County (BLS data).

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<th>Baseline (per person)</th>
<th>Year 1 (per person)</th>
<th>Saving vs. Baseline</th>
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<tr>
<td>Estimated number of working adults</td>
<td>48</td>
<td>48</td>
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<tr>
<td>Recovered work days: No CHW intervention (Assuming no change in HbA1c)</td>
<td>$2,900</td>
<td>$3,000</td>
<td>- $100</td>
</tr>
<tr>
<td>Recovered work days: With CHW intervention</td>
<td>$2,900</td>
<td>$1,400</td>
<td>+ $1,500</td>
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<tr>
<td>Total recovered value of workdays</td>
<td></td>
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<td>+ $1,500</td>
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Costs and days have been rounded; costs have been adjusted for inflation.

* Based on glycemic control results (HbA1c) obtained in model CHW study (Brown HS et al., Prev Chronic Dis 2012) and average work days lost at each level of glycemic control (Tunceli K et al., Diabetes Care, 2007).
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Full report available at:

Full URL: https://commed.umassmed.edu/our-work/2016/11/01/sustainable-financing-models-community-health-worker-services-maine

Tiny URL: bit.ly/2o0yC5W
Discussion & Feedback