Evaluating Innovations in Real Time: Packaging and Spreading Innovation

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Outline

• Innovation and diffusion: “a perfect complexity”
• Implications for evaluation
• Examples from the literature
• Summary
General Internal Medicine: *e pluribus unum*

- Value-adding activities of primary care
  - Triage
  - Navigation
  - Primary prevention
  - Screening
  - Acute care
  - Chronic illness management
  - End-of-life care
  - Psychosocial care

Life on “Eye Street”

- Innovation
- Intervention
- Implementation
- Improvement
Challenge to Evaluators: “Doubling Down” on Complex Interventions

- Payment scheme
- Practice management redesign
- Staffing change
- Clinician behavior modification program
- Patient behavior modification program
- Communications project
- Health information technology project

What is an innovation?

Idea, practice, or tool that is perceived as new by the individual or other “unit of adoption”
Entrepreneurial Innovation: Prototype Evaluation

Idea generation → Prototype

Refinement (or abandon) → Fail → Test → Pass

Business model ← Proof of concept
Zones and Types of Product Innovation

<table>
<thead>
<tr>
<th>PRODUCT LEADERSHIP ZONE</th>
<th>CUSTOMER INTIMACY ZONE</th>
<th>OPERATIONAL EXCELLENCE ZONE</th>
<th>CATEGORY RENEWAL ZONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruptive Innovation</td>
<td>Line-Extension Innovation</td>
<td>Value-Engineering Innovation</td>
<td>Organic Innovation</td>
</tr>
<tr>
<td>Application Innovation</td>
<td>Enhancement Innovation</td>
<td>Integration Innovation</td>
<td>Acquisition Innovation</td>
</tr>
<tr>
<td>Product Innovation</td>
<td>Marketing Innovation</td>
<td>Process Innovation</td>
<td>Harvest and Exit</td>
</tr>
<tr>
<td>Platform Innovation</td>
<td>Experiential Innovation</td>
<td>Value-Migration Innovation</td>
<td></td>
</tr>
</tbody>
</table>

Moore, G. *Dealing with Darwin*, 2005

To improve quality, innovations are critically dependent on diffusion

- Diffusion is the process by which an *innovation* is *communicated* through certain *channels* over *time* among members of a *social system*
Linear (‘‘Rational’’) Model of Diffusion

Innovator → Receiver

Linear (‘‘Rational’’) Model of Diffusion

Innovator → Receiver
Social Model of Diffusion

Innovator

Receiver

Social Model of Diffusion

Innovator

Receiver
Social Model of Diffusion

Innovator → Early Adopter

Social Model of Diffusion

Early Adopter → Opinion Leader
Social Model of Diffusion

Take Up of Successful Innovations

% Time
Characteristics of an innovation that enhance diffusion

- Simplicity
- Relative advantage
- Trialability
- Capacity for reinvention
- Compatibility
- Observability

Berwick D, JAMA, 2003

Context Factors

- Systems/Policy Environment
- Institution/Organization
- Group/Team
- Individual

SHARP END OF CARE
Implications for Evaluators

- High risk of failure or “partial success”
- Frame the target and purpose of the evaluation
  - Innovations are nearly always modified in practice
  - Context factors can trump take up
- Timing of measurements is critical
  - Median “time to take up” is difficult to predict
  - Take up is almost never 100%
- Analysis and interpretation are challenging
  - Partial take up is difficult to interpret
  - Comparison groups are critical

Key Framing Questions for Real-time Evaluation

- What is the evaluation intended to do?
  - Is the main focus learning or accountability?
- Who will use the evaluation results and for what purpose?
- What decisions will rely on this evaluation?
Specifying the Intervention

• Specify a Logic Model
  – Components of the innovation/intervention “package”
  – Rationale for inclusion of each component of the innovation/intervention
  – Implementation plan
  – Expected outcomes

Data Collection

• Avoid collecting data for underpowered comparisons
• Use key informant interviews
  – Assess fidelity
  – Document unexpected changes to the innovation/intervention package
• Attempt to obtain all relevant perspectives
  – Involve leaders in study design
Control Charts: Use with Caution

• Fun Facts
  – Shewhart believed that choice of control limits was a convenient heuristic that lacked an empirical basis
  – Deming said that control charts are not useful for hypothesis testing

Example 1
Geisinger ProvenCare

• Single payment for all CABG service and post-op complications (warranty)
  – Pay-for-performance on 40 care elements
• Evaluation
  – 137 patients pre-intervention vs. 117 patients post
  – Charges for CABG patients fell 5%, 16% reduction in total LOS (not post-op LOS)
  – 30-day readmissions fell from 7.1% to 6%
  – Adherence to care elements increased from 59% to 100%
  – No change in 19 health outcomes
Example 2
PROMETHEUS Bundled Payment Demonstration

• Bundle payment based on pre-defined clinical episode
  – “evidence-informed case rates”
• 21 bundles
  – chronic and acute conditions, procedures
• Attempts to separate “probability risk” (random events) from “technical risk” (potentially avoidable complications)
  – Insure probability risk but not technical risk

PROMETHEUS designed to address anticipated feasibility issues

• Defining the services included in a bundle
• Defining the payment method
  – Formulas for sharing financial risk while redesigning care
• Implementing quality measurement
• Determining physician and hospital accountability
• Engaging physicians
• Implementing care redesign

Hussey P et al, Health Affairs, 2011
PROMETHEUS Pilot Site Experience (2008-2011)

- 5 pilot sites
  - 2 dropped out before starting
    - Financial cutbacks
    - Limited opportunity for improvement (AMI care)
  - 2 chose chronic medical condition focus, 1 chose procedure focus
  - None were able to implement contracts over 2 years

Hussey P et al, Health Affairs, 2011

PROMETHEUS Challenges

- Fee-for-service claims data and PROMETHEUS software identified erroneous “episodes, typical care, and potentially avoidable complications”
- Language barriers
  - Unfamiliar terminology, population vs. patient frame
- Skepticism about achievable goals
  - 50% reduction in potentially avoidable complications
- Inability to agree on payment incentive structure
- Where is the investment for care redesign?

Hussey P et al, Health Affairs, 2011
Example 3

• Combines global payment and pay-for-performance
  – 5-year contract
  – Includes downside risk
  – PCP designation mandatory (referral authorization)
  – FFS claims with year-end reconciliation
• P4P up to 10% of budget (pre-set thresholds)
• Insurer assists with regular reports on spend, utilization, quality

AQC Study Population.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All Intervention Groups (N=380,142)</th>
<th>Control Group (N=1,351,440)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td>34.4±18.6</td>
<td>35.3±18.5</td>
</tr>
<tr>
<td>Female sex (%)</td>
<td>52.6</td>
<td>51.2</td>
</tr>
<tr>
<td>Health risk score‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.08</td>
<td>1.16</td>
</tr>
<tr>
<td>Interquartile range</td>
<td>0.12–1.29</td>
<td>0.13–1.39</td>
</tr>
</tbody>
</table>

### Change in Average Health Care Spending per Member per Quarter in the Intervention and Control Groups

<table>
<thead>
<tr>
<th>Spending Category</th>
<th>Intervention (change)</th>
<th>Control (change)</th>
<th>Difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total quarterly</td>
<td>53</td>
<td>69</td>
<td>-15.51</td>
<td>0.009</td>
</tr>
<tr>
<td>E and M</td>
<td>25</td>
<td>27</td>
<td>-2.22</td>
<td>0.002</td>
</tr>
<tr>
<td>Procedures</td>
<td>10</td>
<td>16</td>
<td>-5.96</td>
<td>0.001</td>
</tr>
<tr>
<td>Imaging</td>
<td>8</td>
<td>11</td>
<td>-3.47</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Test</td>
<td>7</td>
<td>11</td>
<td>-3.72</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Outpatient facility</td>
<td>16</td>
<td>30</td>
<td>-14.50</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Non-significant spending changes: Inpatient, outpatient professional services, ancillary services.


### Difference-in-Differences Estimates of the Effect of the Alternative Quality Contract (AQC) on Average Health Care Spending

![Graph showing the difference-in-differences estimates](image)

AQC Key Insights

- AQC contract associated with modestly lower spending in year 1
- Savings primarily among high-risk enrollees
  - Not a Medicare population
- Savings generated by steering patients to organizations with lower fees
  - Not reductions in utilization
- Quality improved on included measures


Summary of Approach to Evaluation

- Independent, but closely engaged implementer and evaluator teams
- Careful specification and agreement on logic models beforehand
  - Pilot phase if feasible to establish intervention and instruments
- Rely heavily on guided interviews with multiple key informants
- “Light-touch” data collection (“PDSA-like”)
Publishing, not Perishing

- Describe context
- Identify the novel question
- Emphasize comparison groups
- Don’t oversell modest results
- Make failure interesting