Re-AIMing for the Target:  
A Case Study in Diabetes HIT

Dean Schillinger, MD  
Professor of Medicine  
UCSF Center for Vulnerable Populations  
San Francisco General Hospital  
CA Diabetes Prevention and Control
Vulnerabilities Cluster within Individuals and Neighborhoods

Rate of Adult Uncontrolled Diabetes
Diabetes Short-term & Long-term Complications Hospitalizations.
Hospitalizations Pooled 1999-2001 Discharge Data.
Age Adjusted Data per 100,000.

- Populations not Statistically Significant
- 1 - 150
- 151 - 299
- 300 - 499
- 500 - 799
- 800 - 1179

Source: San Francisco Department of Public Health. 2004 Community Health Assessment.
City and County of San Francisco Department of Public Health Environmental Health Section
RE-AIM TO HELP PLAN, EVALUATE, AND REPORT STUDIES

$R$ → Increase $\text{Reach}$

$E$ → Increase $\text{Effectiveness}$

$A$ → Increase $\text{Adoption}$

$I$ → Increase $\text{Implementation}$

$M$ → Increase $\text{Maintenance}$

“The law of halves” ... a story
## ULTIMATE IMPACT OF MAGIC DIET PILL

<table>
<thead>
<tr>
<th>Dissemination Step</th>
<th>Concept</th>
<th>% Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% of Clinics Use</td>
<td>Adoption</td>
<td>50%</td>
</tr>
<tr>
<td>50% of Clinicians Prescribe</td>
<td>Adoption</td>
<td>25%</td>
</tr>
<tr>
<td>50% of Patients Accept Medication</td>
<td>Reach</td>
<td>12.5%</td>
</tr>
<tr>
<td>50% Follow Regimen Correctly</td>
<td>Implementation</td>
<td>6.2%</td>
</tr>
<tr>
<td>50% of Those Taking Correctly Benefit</td>
<td>Effectiveness</td>
<td>3.2%</td>
</tr>
<tr>
<td>50% Continue to Benefit After 6 Months</td>
<td>Maintenance</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
PURPOSES OF RE-AIM

• To broaden the criteria used to evaluate programs to include external validity

• To evaluate issues relevant to program adoption, implementation, and sustainability

• To help close the gap between research studies and practice by
  ▪ Informing design of interventions
  ▪ Providing guides for adoptees
  ▪ Suggesting standard reporting criteria
### RE-AIM Dimensions and Definitions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REACH</strong></td>
<td>1. Participation rate among eligible individuals</td>
</tr>
<tr>
<td></td>
<td>2. Representativeness of participants</td>
</tr>
<tr>
<td><strong>EFFICACY / EFFECTIVENESS</strong></td>
<td>1. Effects on primary outcome of interest</td>
</tr>
<tr>
<td></td>
<td>2. Impact on quality of life and negative outcomes</td>
</tr>
</tbody>
</table>

www.re-aim.org
## RE-AIM DIMENSIONS AND DEFINITIONS (cont.)

<table>
<thead>
<tr>
<th>Setting Level</th>
<th>DI MENSION</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting Level</td>
<td>ADOPTION</td>
<td>1. Participation rate among possible settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Representativeness of settings participating</td>
</tr>
<tr>
<td></td>
<td>IMPLEMENTATION</td>
<td>1. Extent to which intervention delivered as intended</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Time and costs of intervention</td>
</tr>
<tr>
<td>Both</td>
<td>MAINTENANCE</td>
<td>1. (Individual) Long-term effects of intervention (≥ 6 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. (Individual) Impact of attrition on outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. (Setting) Extent of continuation or modification of treatment</td>
</tr>
</tbody>
</table>

www.re-aim.org
WHICH PROGRAM IS BETTER?

See www.re-aim.org for displays and evaluation questions

Glasgow et al.  AJPM30(1):67-73
RE-AIM PRIORITIES:

• Health disparities – e.g., who participates and who benefits
• Costs and cost-effectiveness
• Effects of different interventionists
• Combining different factors to produce composite outcomes

Self-Management Support and Communication

Research questions
1. Are vulnerable diabetes patients interested in self-management support?
2. Do they perceive a benefit to improved communication?

40% perceived a benefit from better provider communication, higher for racial/ethnic minority and limited health literacy (70%)

Conclusion: Vulnerable diabetes patients desire self-management support and perceive a benefit to improved communication.

Sarkar et al., *Patient Education and Counseling* 2008
IDEALL Project:

Improving Diabetes Efforts Across Language and Literacy

- Community Health Network of SF/DPH
- AHRQ, CMWF
- TCE, CHCF
Automated Telephone Diabetes Self-Management (ATSM)

- Interactive health technology, touch tone response
- Weekly surveillance & health education (39 weeks=9 mos)
- In patients’ preferred language (English, Spanish or Cantonese)
- Generates weekly reports of out of range responses
- Live phone follow-up through a bilingual nurse -> behavioral action plans
### Key Findings of IDEALL Program

**Estimating Public Health “Reach” of Programs**

#### Composite reach product

<table>
<thead>
<tr>
<th></th>
<th>ATSM</th>
<th>GMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>22.1</td>
<td>4.8</td>
</tr>
<tr>
<td>English</td>
<td>20.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Chinese</td>
<td>22.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Spanish</td>
<td>24.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Adequate Literacy</td>
<td>15.6</td>
<td>7.6</td>
</tr>
<tr>
<td>Limited Literacy</td>
<td>28.0</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Results:
Structure and Process Measures

PACIC

Communication

Self-Efficacy

Self-Management Behavior

*P<.05. Schillinger, in press Diabetes Care
Results: Functional Outcomes

**Bed Days**

- UC: pre = 3.9, post = 3.1
- ATSM: pre = 3.8, post = 1.4
- GMV: pre = 3.6, post = 3.6

**Diabetes Interference**

- UC: pre = 13, post = 17
- ATSM: pre = 14, post = 6
- GMV: pre = 18, post = 17

- Rate ratio 0.5 vs UC, 0.35 vs GMV

**SF12 - Mental Health**

- UC: 58.8
- ATSM: 57.2
- GMV: 61.7

**SF12 - Physical Health**

- UC: 50
- ATSM: 51.3
- GMV: 50.9

*P<.05
Results: Physiologic Outcomes

**SBP**
- UC: 139.6, 136.9, 142.4
- ATSM: 141.5, 137.1, 138.9
- GMV

**DBP**
- UC: 78.1, 75
- ATSM: 78.5, 75.4
- GMV: 78.1, 75.5

**HbA1c**
- UC: 9.8, 9, 9.4
- ATSM: 9.3, 8.7, 9
- GMV

**BMI**
- UC: 31.2, 31.4
- ATSM: 30.3, 30.7
- GMV: 32.1, 32.4
Automated telephony provides safety surveillance function

- 111 participants, 54% inadequate health literacy
- 264 events among 93 participants (86%)
- 111 AE’s and 153 PotAE’s

Sarkar, Schillinger et al. 2008 JGIM
Clinician Survey Findings
N=87/113

- Compared to UC, patients exposed to ATSM were perceived as more likely to be activated to create and achieve goals for chronic care (standardized effect size, ATSM vs. UC, +0.41, p=0.05).
- Over half of physicians reported that ATSM helped overcome 4 of 5 common barriers to diabetes care.
- Physicians rated quality of care as higher among patients exposed to ATSM compared to usual care (OR 3.6, p=0.003), and compared to GMV (OR 2.2, p=0.06).
- The majority felt ATSM should be expanded to more patients with diabetes (88%).

Bhandari, Schillinger SGIM 2008
Health System Findings:
Cost-Effectiveness; Health Plans

• Based on functional improvements, we estimated that the cost per QALY for ATSM was:
  >$65,000 for both set-up and ongoing costs
  >$ 32,000 for ongoing costs only

• Cost effectiveness could be further improved with (a) scaling up or (b) metabolic outcomes improved

• A large majority of CA Medicaid health plans reported an interest in employing ATSM-like technology

HANDLEY, SCHILLINGER, IN PRESS ANN FAM MED 2008
GOLDMAN, SCHILLINGER ET AL. AM J MAN CARE 2007
Key Findings of IDEALL Program

• Reach significant, especially for lower literacy, non-English speaking, Medi-Cal, uninsured.
• Interactive health technology improves patient–centered care, health behaviors, functional status and promotes safety, due to
  • proactive nature
  • heirarchical logic
  • communication tailoring
• For physiologic effects to be achieved, need medication intensification
• Health plans and clinicians favorably inclined
• A challenge for individual clinics to implement
My question is: Are we making an impact?
Current Project

• Partner with a local Medicaid health plan: San Francisco Health Plan
  • SFHP care managers will make ATSM response calls
• Test effectiveness when implemented in ‘real-world’
• Compare ATSM-ONLY with ATSM-PLUS (medication activation)
• ATSM-PLUS involves merging pharmacy claims data with ATSM data to enable care manager counseling
Design and Outcomes

• Wait List Design, with randomization among exposed participants. Total N=520
• Outcomes (wait-list vs. ATSM vs. ATSM-Plus):
  - communication
  - behavior
  - functional status
  - metabolic indicators
  - patient safety (prevalence and root causes)
SFHP Care Manager Call to Patient:
• Check understanding and educate regarding diabetes goals
• Elicit barriers to adherence
• Inform about current data & goals
• Assess understanding of discussions with PCP
• Assess willingness to increase or add new medication to meet goals
• Develops action plan using motivational interviewing principles
Help is here.

Diabetes is an important health condition that requires careful monitoring.

We have a program that can help you control your diabetes. You will get information about diabetes and ways to better control it.

A nurse who speaks your language will be available to answer your questions and help you manage your diabetes.

The program is FREE and it can help you feel better!

We will be calling you in a few weeks to tell you more about this program.

If you have questions, you may call us at (415) 615-4522.

We look forward to speaking with you soon!
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La ayuda esta aqui.

La Diabetes es un estado de salud importante que requiere monitoreo cuidadoso.

Tenemos un programa que puede ayudarle a controlar su diabetes.

Usted recibirá información sobre la diabetes y la mejor manera de controlarla.

Una enfermera quien habla su idioma estará disponible para contestar sus preguntas y ayudarle a controlar su diabetes.

¡El programa es GRATIS y puede ayudarle a sentirse mejor!

Estaremos llamándole en unas semanas para decirle más sobre este programa.

Si usted tiene preguntas, puede llamarnos al (415) 615-4522.

Esperamos hablar con usted próximamente!
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Care manager field
Potential Safety Event
Safety event assessment
Preliminary Findings

Cohort 1 (1st 12 weeks)—
• 68 of the 77 completed at least 1 call (88%), 9 did not complete a call (12%).
• Of the 68 who did at least 1 call, the majority (n=59, or 87% of the 68) did 3 or more calls.
• An additional 5 did 2 calls (7%) and 4 (6%) did only one call.
• This would suggest that only 13% had limited engagement with the intervention (only 1-2 calls), while 87% had moderate or significant engagement (3 or more calls).
<table>
<thead>
<tr>
<th>Baseline Prescriptions</th>
<th>Willingness To Intensify</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antihypertensive</strong>, taking</td>
<td>95 (66) → Would intensify 90 (95)</td>
</tr>
<tr>
<td><strong>Antihypertensive</strong>, not taking</td>
<td>48 (34) → Would start 34 (71)</td>
</tr>
<tr>
<td><strong>Insulin</strong>, taking</td>
<td>28 (20) → Would intensify 26 (93)</td>
</tr>
<tr>
<td><strong>Insulin</strong>, not taking</td>
<td>115 (80) → Would start 62 (54)</td>
</tr>
<tr>
<td><strong>Diabetes pills</strong>, taking</td>
<td>125 (87) → Would intensify 118 (94)</td>
</tr>
<tr>
<td><strong>Diabetes pills</strong>, not taking</td>
<td>18 (13) → Would start 13 (72)</td>
</tr>
<tr>
<td><strong>Cholesterol pills</strong>, taking</td>
<td>111 (78) → Would intensify 104 (94)</td>
</tr>
<tr>
<td><strong>Cholesterol</strong>, not taking</td>
<td>32 (22) → Would start 21 (66)</td>
</tr>
</tbody>
</table>
Improvements/Threats

• Improvements to future dissemination:
  • Care manager—health coach
  • Harnessing pharmacy claims data
  • Marketing and outreach
  • Trusted health plan
  • Potentially sustainable
  • Development of detailed training manual/QA processes

• Threats to implementation:
  • Delays in implementation
  • Staff turnover @health plan
  • Maintaining fidelity to intervention processes
    • Care mgr processes; claims data/registry data incomplete
  • Coordinating treatment preferences/medication activation with PCP
Through the RE-AIM Lens: TRANSLATION/EFFECTIVENESS RESEARCH in Health IT/health literacy

We need to develop and appropriately evaluate interventions that can:

- Reach large numbers of people, especially those who can most benefit
- Be widely adopted by different settings
- Be consistently implemented by staff members with moderate levels of training and expertise
- Produce replicable and long-lasting effects (and minimal negative impacts) at reasonable cost