Mobile Health in Two Populations: Addressing Chronic Disease Management Through Text Messaging

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Value of text messaging in homeless populations

- Access to technology in homeless populations (2012)

Survey

- Veterans who are homeless (2013)

Pilot

- Pilot texting study 2014
  - Small RCT Boston’s homeless 2017

Application example in Veterans

- Hep C treatment breakthrough

- 100,000 veterans treated

- Connect with harder to reach veterans who have HCV
Value of text messaging in homeless

Lit Review
• Access to technology in homeless populations (2012)

Survey
• Veterans who are homeless (2013)

Pilot
• Pilot texting study 2014
• Small RCT Boston’s homeless 2017
Appointment reminders by text message in a safety net health care system: a pragmatic investigation - Fischer et al. 2017 eGEMS

- Kept appointments — HIGHER RATES
- Cancelled appts. — LOWER RATES
- No shows — LOWER RATES

- Other studies: immunization rates, pre-natal care, well-baby care.
Homelessness in the US

• 2016 point-in-time count:

549,928 people

2016 Annual Homeless Assessment Report (AHAR)
Access and use of IT in homeless populations
Technology access among homeless persons – systematic literature review

- Mobile phone ownership: 44% to 62%;
- Computer ownership: 24% to 40%;
- Computer access and use: 47% to 55%;
- Internet use: 19% to 84%.

McInnes et al. 2013, AJPH
Access to and use of Technology: Veterans Experiencing Homelessness (n=106)

- Have any mobile phone: 89%
- Have email address: 81%
- Use Internet: 76%
- Use text messaging: 71%
- Have smartphone: 35%

McInnes et al 2014 Telemedicine and eHealth
Figure. Utilization Changes after Texting Intervention

- Patient Cancellations: 47 (PRE), 29 (POST)
- No-shows: 24 (PRE), 19 (POST)
- ER visits: 10 (PRE), 4 (POST)
- Hospitalization: 1 (PRE), 0 (POST)

McInnes et al 2014 Am J Public Health
Veteran views on text messages

Well you have something solid in front of you. You don’t have to write it down. You can save it and it’s there. I mean you have all your information right there.

[I wouldn’t want cell phone reminders]...not with what it costs me.

McInnes et al. 2015 PeerJ
Ongoing project with Boston Health Care for the Homeless Program
“hot-spotter”

• High utilizing population
• Texts for:
  – visit reminders
  – medication-taking
  – mood monitoring
• Patient advisory panel
• Up to 60 patients
• Randomized trial

$3.5 million

Photograph by Phillip Toledano, 2011
Health and Public Health Impact

- Disease management
- Quality of life
- Reduce costs
- Scalable
- “Spillover” benefits
  - Technology
  - Housing
  - Employment
Application example in Veterans

- Hep C treatment breakthrough
- 100,000 veterans treated
- Connect with harder to reach veterans who have HCV
Veterans & Hepatitis C

QUIZ: Who are these two women?
I AM READY TO BE HEPATITIS CURED

In clinical studies, 96-99% of patients who had no prior...
Florence Nightingale ("Flo")  Annie K Fox ("Annie")
Annie Text Messaging System
Hepatitis C Protocol

• Designed to support patients through the Hep-C treatment process
  – Medication-taking
  – Appointment-keeping
  – Labs completed
Annie Hep C Protocol:

- Daily medication reminder
- Reminders for lab work
- Hep C appointment reminders
- Motivational/educational texts

Hi, it’s Annie here. Please don’t forget to take your HepC medication today. Kindly, let us know if you have by replying “Med Yes” or “Med No”.

If no veteran response in 45 minutes

Hi, it’s Annie again. I haven’t heard from you. Did you remember to take your HepC medication today? Please reply Med Yes or Med No, like this: Med Yes.

Med No

Ok, thanks for letting us know. Please remember it is important to take your HepC meds every day. If you have any questions, please call 206-2xx-4xxx.
Evaluation design - Hybrid

• 4 sites receiving Augmented Implementation
• 3 sites receiving Usual Implementation
• 2 control sites (without Annie)

• Quantitative (from 8 week intervention period)
  – Surveys
  – Medical records
  – Annie database logs

• Qualitative (at end of intervention period)
  – Semi-structured interviews with Veterans & Clinicians
Augmented vs. Usual Implementation

• 4 VA facilities receiving multi-component augmented implementation strategy
  – Group web-based training
  – Helpline
  – Toolkit
  – Assistance tailoring hep C text message protocol
  – Facilitation – by phone and onsite

• 3 VA facilities receiving standard Annie implementation
  – Group web-based training
  – Helpline
Toolkit used in the augmented implementation strategy
Facilitation Events

Bi-weekly Dates

<table>
<thead>
<tr>
<th>Bi-weekly Dates</th>
<th>Email</th>
<th>Phone or In-Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-Feb</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>6-Mar</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>20-Mar</td>
<td>1</td>
<td>1</td>
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<tr>
<td>3-Apr</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>17-Apr</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1-May</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>15-May</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>29-May</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>12-Jun</td>
<td>25</td>
<td></td>
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<tr>
<td>26-Jun</td>
<td>28</td>
<td></td>
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<tr>
<td>10-Jul</td>
<td>24</td>
<td></td>
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<tr>
<td>24-Jul</td>
<td>21</td>
<td></td>
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<tr>
<td>7-Aug</td>
<td>14</td>
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<tr>
<td>21-Aug</td>
<td>24</td>
<td></td>
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<tr>
<td>4-Sep</td>
<td>27</td>
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<tr>
<td>18-Sep</td>
<td>21</td>
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<td>10</td>
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Hard work to implement
Invited (N=143)

Not enrolled 69% (N=99)
- Not interested 33%
- Not tech savvy 33%
- Already adherent 17%
- Use other methods 11%
- Missing 5%

Enrolled 31% (N=44)
- Did not reply Start (N=15)
- Replied “Start” (N=29)
1. Is Annie effective at improving disease self-management?
2. Does augmented implementation improve adoption and spread of Annie?
(Q1. Improve self-management?) Self-report adherence – Pre vs Post

- Pre All Meds (n=29):
  - Excellent: 31%
  - Very Good/Good: 55%
  - Fair/Poor: 14%

- Post HCV Meds (Annie n=13):
  - Excellent: 77%
  - Very Good/Good: 23%

- Post HCV Meds (no Annie n=13):
  - Excellent: 38%
  - Very Good/Good: 62%
Adoption higher at augmented sites (vs usual)

- Uptake of Annie was greater at AI sites, among patients invited to use it
  - At AI sites 23% started using Annie
  - At UI sites 18% started using Annie
Summary

• Cell phones prevalent in homeless and other vulnerable populations
• Text messaging can contribute to access to care and health management
• Implementation is hard
  – Patient factors
  – Provider factors
Acknowledgements

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Fischer, eGEMS 2017

**ALL VISITS, PRIMARY AND SPECIALTY CARE (n = 650,872)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Kept/Attended*</th>
<th>Cancelled*</th>
<th>No Show</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>56,630</td>
<td>10,266</td>
<td>10,887</td>
</tr>
<tr>
<td>Percentage</td>
<td>379,092 66.1%</td>
<td>106,586 18.6%</td>
<td>87,411 15.3%</td>
</tr>
</tbody>
</table>
I’m free of hepatitis C
You can be, too
Tens of thousands of Veterans enrolled in VA care have been cured of hepatitis C.

Ask about hepatitis C testing and treatment. Learn more at www.hepatitis.va.gov
### Reasons for declining Annie (n=99 Veterans)

<table>
<thead>
<tr>
<th>Claim high adherence</th>
<th>Annie would duplicate other supports</th>
<th>Don’t text, not tech savvy</th>
<th>Burdensome and little interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>I already take my medication every day and get to my appointments</td>
<td>I have good reminder systems</td>
<td>I barely know how to call people on my phone</td>
<td>Don’t want to have to respond to messages</td>
</tr>
<tr>
<td>I am very regimented person</td>
<td>I have a good memory, I don’t need that</td>
<td>I don’t know how to text</td>
<td>Feels it would be overwhelming</td>
</tr>
<tr>
<td>I do pretty good with taking my meds</td>
<td>I think the pillbox will work better</td>
<td>I have flip phone without text messages</td>
<td>I’m not interested</td>
</tr>
<tr>
<td></td>
<td>I’ll mark the dates on my calendar</td>
<td>I don’t check my text messages</td>
<td>No time for responding to text messages</td>
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<tr>
<td></td>
<td></td>
<td>I have limited texts on my cell plan</td>
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<td></td>
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<td>Don’t have my cell phone at work</td>
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<tr>
<td></td>
<td></td>
<td>Costs money to get texts</td>
<td></td>
</tr>
</tbody>
</table>

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