Utilizing text message technology in a pragmatic clinical trial: The experience of the Nudge Study

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Objective: To conduct a pragmatic patient-level randomized intervention across 3 HCS to improve adherence to chronic CV medications through the use of text message technology.

• Primary outcome: Medication adherence defined by the proportion of days covered (PDC) using pharmacy refill data.

• Secondary outcomes:
  • Intermediate clinical measures (e.g., BP control)
  • CV clinical events (e.g., hospitalizations)
  • Healthcare utilization
  • Costs
INTERVENTION ARMS

- Usual Care
- Generic Texts
  - You are due for a refill on your meds
- Optimized Texts
  - [Name]
    - Congrats! You've filled meds on time at least 60% of the time. Make it 100%!
- Optimized Texts + AI Chat Bot
  - [Name]
    - What problems do you have getting refills?
      - Text
        - 1=transport
        - 2=cost
        - 3=time
This is a message from the Nudge Study at the VA.

Hi Steve, You are due to refill your metformin.

Para mensajes en Español por favor responda Español.

If you have already filled your prescription let us know by replying DONE.

Recurring Msgs. Reply STOP to quit, HELP for info. Msg&DataRatesMayApp

View all 2:00 PM
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SAMPLE MESSAGES SENT: INTRODUCTION MESSAGE

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STEPS TO DELIVERING THE INTERVENTION
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Electronic Medical Records
to identify patients

1. Clinic, co-morbidity, medication prescribed
2. Opt-out forms sent
3. Determine if cell versus landline number
STEPS TO DELIVERING THE INTERVENTION

1. Electronic Medical Records to identify patients
   - Clinic, co-morbidity, medication prescribed
   - Opt-out forms sent
   - Determine if cell versus landline number

2. Monitor for 7 day gaps
   - Daily data pull: medication name, fill date, days supply, cancel date
   - Other clinical information: inpatient or mortality
   - Merge with patient text message reply data (DONE or STOP)
   - Calculate if there is gap in refills
STEPS TO DELIVERING THE INTERVENTION II
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Online platform to send text messages & chat bot

1. Spreadsheet created of new patients with gap and old patients who have not refilled and status
2. Patient name and number uploaded into Mobile Messenger
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Text message to patients

1. Respond to patient text messages
PATIENT RESPONSE TO TEXTS
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**Study Findings**

**Milestones**

<table>
<thead>
<tr>
<th>Arm 1 - Usual Care</th>
<th>Arm 2 - Generic</th>
<th>Arm 3 - Optimized</th>
<th>Arm 4 - Optimized + Chatbot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled</td>
<td>670</td>
<td>673</td>
<td>673</td>
</tr>
<tr>
<td>Done</td>
<td>0</td>
<td>196</td>
<td>126</td>
</tr>
<tr>
<td>Stop</td>
<td>0</td>
<td>31</td>
<td>38</td>
</tr>
</tbody>
</table>

**Total Enrolled, Done, and Stop**

- Arm 1 - Usual Care: 670 Enrolled, 0 Done, 0 Stop
- Arm 2 - Generic: 673 Enrolled, 196 Done, 31 Stop
- Arm 3 - Optimized: 673 Enrolled, 126 Done, 38 Stop
- Arm 4 - Optimized + Chatbot: 674 Enrolled, 145 Done, 38 Stop
CHANGES DUE TO STAKEHOLDER PANEL

This is a message from the Nudge Study at Denver Health.

You are due to refill your Metformin.

If you have already filled your prescription let
CHANGES DUE TO STAKEHOLDER PANEL

Suggested an introductory message

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Include drug name in generic messages
CHANGES DUE TO STAKEHOLDER PANEL

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Other suggestions from the Stakeholder Panel
- Keep messages upbeat
- Avoid emojis or jokes
- Liked text messages more than IVR
- Did not feel comfortable collecting data from those who press STOP is intrusive
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  • Terms such as “hyperlipidemia” are uncommon, this level of information caused confusion with some patients.
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  • Weekly meetings to review patient needs and allow us to optimize approach as needed.
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- Identify common questions and create standard responses
  - *What is the Nudge Study?*
  - *What medication do you mean?*
  - *What is the pharmacy number?*
  - *Can you just refill it for me?*
• Patients eligible for the Nudge Study are considered high risk for contracting COVID-19
• Messages developed to raise awareness and discourage patients from going to pharmacy in-person and provide additional information on COVID-19
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• Messages developed to raise awareness and discourage patients from going to pharmacy in-person and provide additional information on COVID-19

Introduction to all text messages

You are considered at high risk for getting the Coronavirus (COVID-19). We suggest you have a family member or friend pick up your medications for you.

If you do not have a family member or friend who can do this, please use the mail order service available to you please call 303-389-1390 for more information.
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**Introduction to all text messages**

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**After every text response**

- CO-HELP is Colorado’s call line for the novel coronavirus (COVID-19). People with general questions about COVID-19 can call at 1-877-462-2911. If you have concerns about your own health please call your doctor. If you are having a life threatening emergency call 911.
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• Advantages
  • Able to reach a large number of patients at a low cost, including difficult-to-reach vulnerable populations
  • Allow us to quickly adapt our messages in response to patient needs and external events (e.g. COVID-19)
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• Disadvantages
  • Unable to confirm patient receipt and/or patient comprehension
  • Patients may switch numbers or loose service, particularly at the end of the month
LESSONS LEARNED

• Text message campaigns are easy–to-implément and inexpensive to send
• Mobile technologies are adaptable; able to optimize messages as needed in response to patient interactions and needs
• It is possible to utilize mobile health technologies in rapidly changing situations (e.g. COVID-19) as well as sending sustained messages
• Text messages are ubiquitous; patients require no training to receive the messages