Medication Adherence:
Proportion of Days Covered at Point-of-Care and Automated Reminders

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Nothing to disclose.

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Nudge Study

• Based at the University of Colorado Anschutz Medical Campus
• Partnership between:
  • University of Colorado
  • Denver Health Medical Center
  • Rocky Mountain Regional VA
  • UCHealth.
• Funded by the the National Institutes of Health (NIH) Health Care Systems Research Collaboratory.
Personalized Patient Data and Behavioral Nudges to Improve Adherence to Chronic Cardiovascular Medications

• Problem of Non-adherence
• What is a nudge?
• Nudge study design
• Pilot findings
• Next Steps
Medication Non-Adherence

- Up to 50% of patients do not take CV medications as prescribed
- Results in increased mortality, adverse events, healthcare costs
- Previous attempts to improve adherence are resource intensive, costly, time consuming and have inconsistent benefit
- Cell phones are ubiquitous, we can adapt the idea of a “Nudge” to the phone easily
  - Goal is to improve adherence with Nudge messages over the phone in a way that can specifically respond to patient needs
What is a nudge?

• Use principles from behavioral economics and cognitive psychology
  • Behavior commitments
  • Communicating social norms
  • Narrative stories

• A strategic reminder that can help people adopt healthy behaviors
  • Nobel prize winning economists have shown this can work to improve nutrition, physical activity and other behaviors
Patient inclusion

- Adult cardiovascular patients diagnosed with ≥ 1 condition of interest, prescribed ≥ 1 medication of interest, with a refill gap of at least 7 days

<table>
<thead>
<tr>
<th>Condition</th>
<th>Classes of medications</th>
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<tbody>
<tr>
<td>Hypertension</td>
<td>Beta-blockers (B-blockers), Calcium Channel Blocker (CCB), Angiotensin converting enzyme inhibitors (ACEi), Angiotensin Receptor Blockers (ARB), Thiazide diuretic</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>HMG CoA reductase inhibitor (Statins)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Alpha-glucosidase inhibitors, Biguanides, DPP-4 inhibitors, Sodium glucose transport inhibitor, Meglitinides, Sulfonylureas, Thiazolidinediones, and statins</td>
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<tr>
<td>Coronary artery disease</td>
<td>PGY-2 inhibitor (Clopidogrel, Ticagrelor, Prasugrel, Ticlopidine), B-blockers, ACEi or ARB and statins</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Direct oral anticoagulants, B-blockers, CCB</td>
</tr>
</tbody>
</table>

- Patients at one of three participating healthcare systems
- English or Spanish-speaking
Patient identification using EHR

• **Patient identification**
  • ICD 9 and 10 codes for diagnoses
  • NCD classes were compiled to identify patients across 3 HCS

• **Pharmacy refill data**
  • Pharmacy refill data from pharmacies within the system (Denver Health and VA)
  • Surescripts / Panel Query – Medication History for Populations
Surescripts

INITIATE HISTORY REQUEST
Patient information is checked for completeness and accuracy.

AGGREGATED DATA
Medication history is compiled and normalized into industry standard file before returning to requestor.

DATA QUALITY CHECKED THROUGHOUT PROCESS

UNIQUE PATIENT MATCH
Advanced algorithms are used to verify patient matches when requesting data from pharmacies and pharmacy benefit managers (PBMs).

MULTI-SOURCE DATA GATHERING
We collaborate with pharmacies and PBMs to improve data content and reduce errors, so the medication information passed along is complete and accurate.
Message development

N of 1 Interviews
• 56 people were interviewed in English or Spanish to obtain message feedback
• **Feedback:** Discouraged the use emojis 😞 or fictitious examples of patients

Stakeholder Panel
• A 12-person, study-specific panel reviewed messages and our proposed study methods
• **Feedback:** Opportunities to improve the interactive voice response (IVR); Accessibility for vulnerable populations; adding a DONE option
Study intervention

Study 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
Message example

Study Introduction

This is a message from the Nudge Project at UCHealth:

You are due to refill your meds.

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

Reply STOP to quit, HELP for info. Msg&DataRatesMayApply

Nudge

Temporary opt-out

Second opt-out opportunity & required messages

ScientificSessions.org
Opt-out design

• An opt-in recruitment process is infeasible due to high enrollment goals
• Opt-out process
  – A physical opt-out packet mailed to patients includes an information sheet, opt-out sheet, self-addressed and stamped envelope
  – An optional opt out survey designed to help us understand why patients do not participate in low-risk, opt-out studies
    • Materials signed by participating physicians at each healthcare system
    • Four-week deadline to return opt-out form
• Secondary opt-out opportunity in each text message
Proportion of Days Covered (PDC)

• **Operationalizing PDC within EHR and pharmacy refill data**
  - Requires the use of pharmacy records from each of the HCS during the 365-day follow-up period

• **Measuring PDC**
  - *Primary PDC measure*
    • PDC1: Analyzing all medications on which a patient gapped at baseline
  - *Secondary PDC measures*
    • PDC2: All medications a patient ever gaps on, calculating PDC from the time of gap
    • PDC3: All medications a patient was prescribed at baseline
  - Medications prescribed after the baseline gap and enrollment will not be included in any of these definitions of PDC, though they will be considered in secondary analyses.
Pilot findings

• Piloted study for feasibility and usability with 400 patients at the Denver VA and Denver Health
  • Opt-out rate of 12.5%
  • 60.7% of patients experienced a medication refill gap of 7 days or more during the month-long study period
  • Secondary opt-out rate (responding with “STOP”) was lower than expected (1.2%)
Results to date

- Opt out packets sent to eligible patients (n=4660)
- Patients followed for medication gaps (n=4024)
- Patients enrolled with a 7 day medication gap & sent nudges (n=1352)
- Opt out packets returned (n=392)
- Address undeliverable (n=244)
- Patients that responded “Stop” (n=32)
- Patients that responded “Done” (n=72)
- Patients that received all 5 messages (n=1248)
Text Message Medication Adherence Reminders Automated and Delivered at Scale Across Two Institutions: Pilot Testing the “Nudge” System

Rapid Fire presentation Monday @ 2:32 pm
Thank you!