Text Reminders to Increase Vaccine Uptake Research Update

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June 15, 2023

Joint work with Mitesh S. Patel, Linnea Gandhi, Heather N. Graci, Dena M. Gromet, Hung Ho, Joseph S. Kay, Timothy W. Lee, Sean F. Ellis, Alex S. Luscher, Rayyan S. Mobarak, Madeline K. Paxson, Ramon A. Silvera Zumaran, Rob Kuan, Modupe N. Akinola, John Beshears, Jon E. Bogard, Ilana Brody, Alison M. Buttenheim, Christopher F. Chabris, Edward Chang, Gretchen B. Chapman, James J. Choi, Hengchen Dai, Jennifer Dannals, Craig R. Fox, Noah Goldstein, Amir Goren, Hal Hershfield, Matt D. Hilchey, Alex Hirsch, Jillian Hmurovic, Samantha Horn, Leslie K. John, Dean S. Karlan, Melanie Kim, Ariella Kristal, Rahul Ladhania, David I. Laibson, Catherine Lamberton, Jens Ludwig, Brigitte C. Madrian, Michelle N. Meyer, Maria Modanu, Sendhil Mullainathan, Jimin Nam, Allison Oakes, Todd Rogers, Renante Rondina, Silvia Saccardo, Maurice Schweitzer, Maheen Shermohammed, Dilip Soman, Jehan Sparks, Jann Spiess, Joachim Talloen, Lyle Ungar, Caleb Warren, Megan Weber, Ashley Whillans, Kuldeep Yadav, Julian Zlatev, Ron Berman, Chalanda N. Evans, Christopher K. Snider, Eli Tsukayama, Christophe Van den Bulte, Kevin G. Volpp, Neil A. Lewis Jr., John A. List, Maryann V. Beauvais, Jonathon K. Bellows, Cheryl A. Marandola and Angela L. Duckworth

BEHAVIOR CHANGE FOR GOOD

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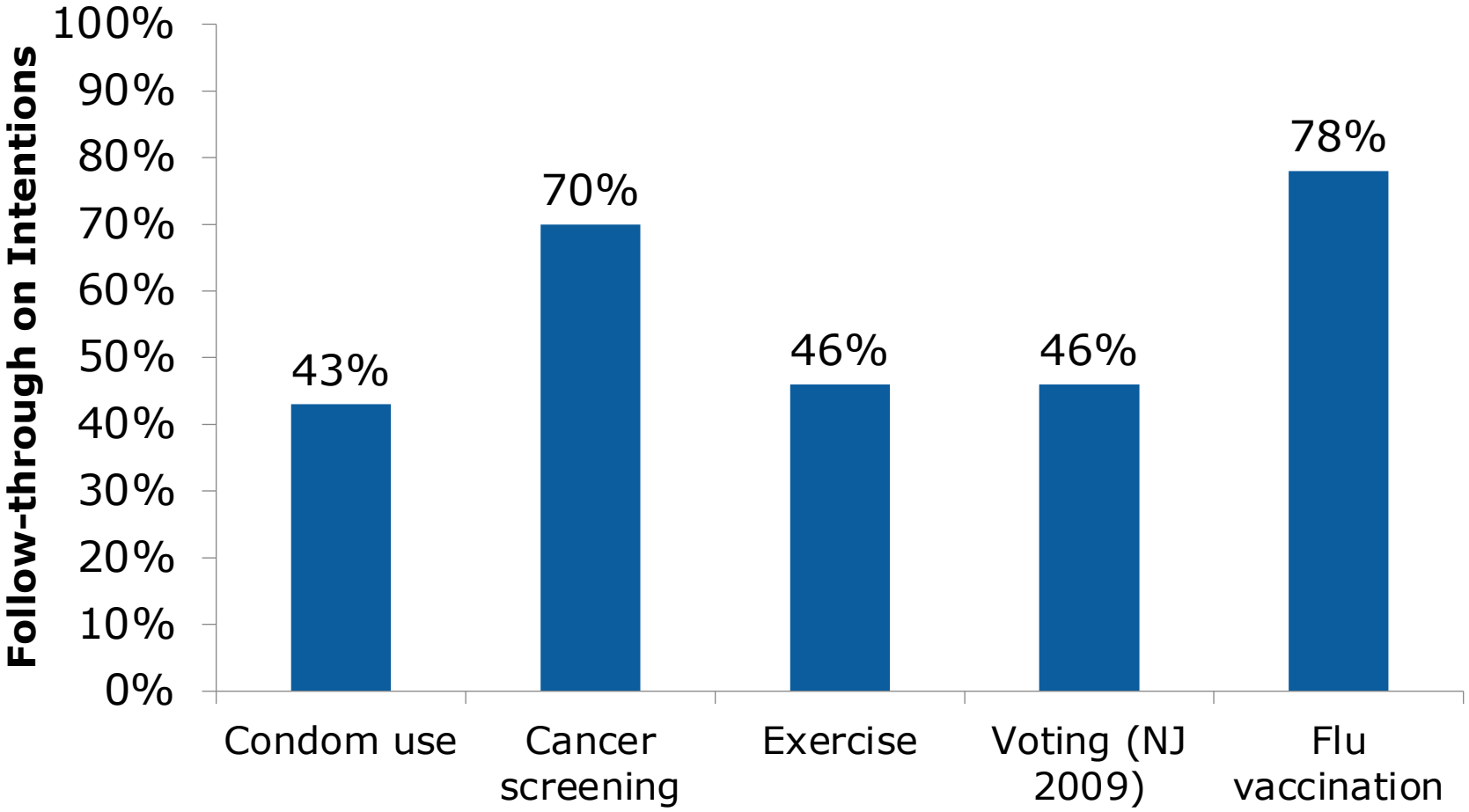
Intention doesn’t always equal action

(DiBonaventura and Chapman, 2005; Rogers and Aida, 2014; Sheeran 2002)

Intention doesn't always equal action



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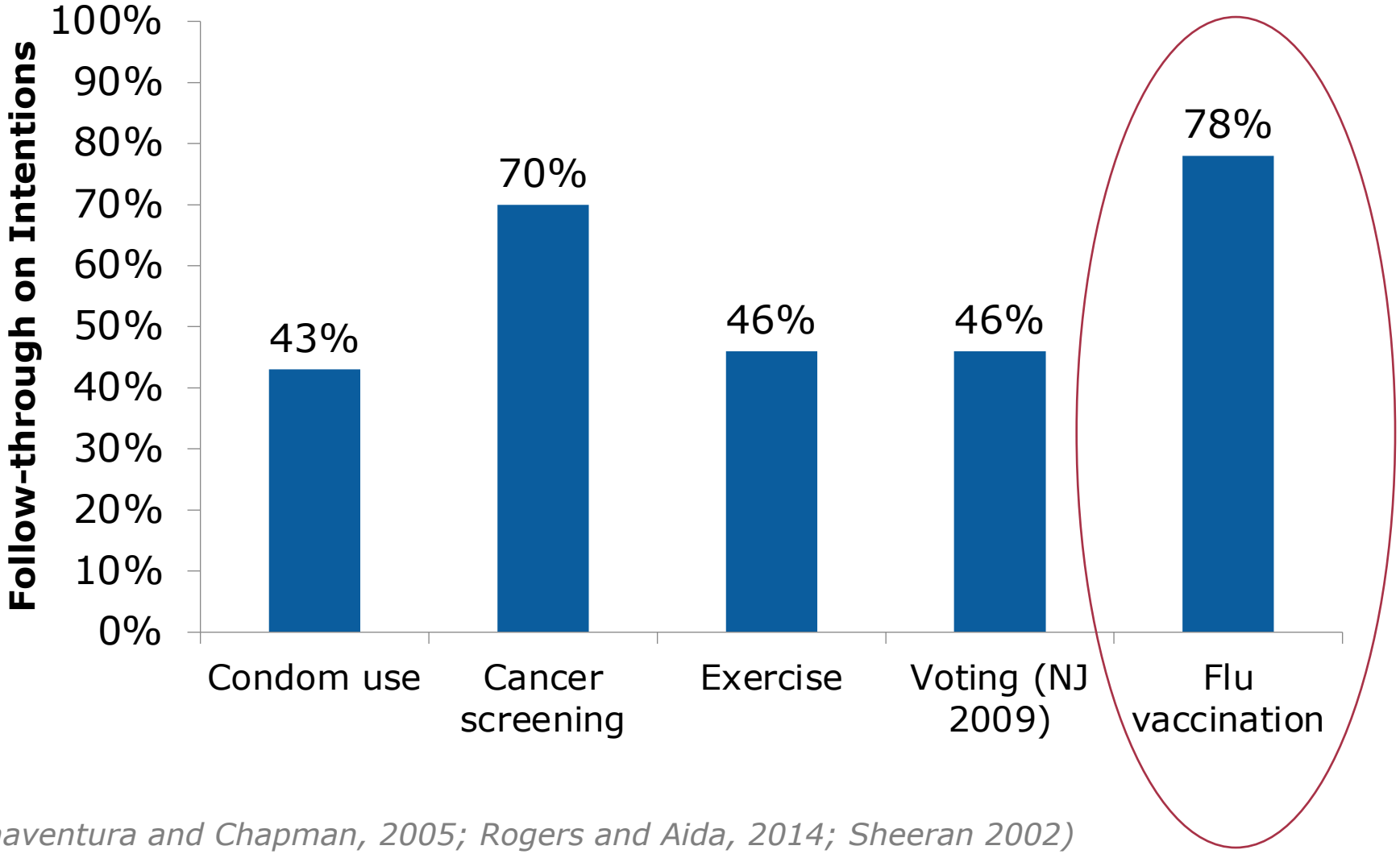
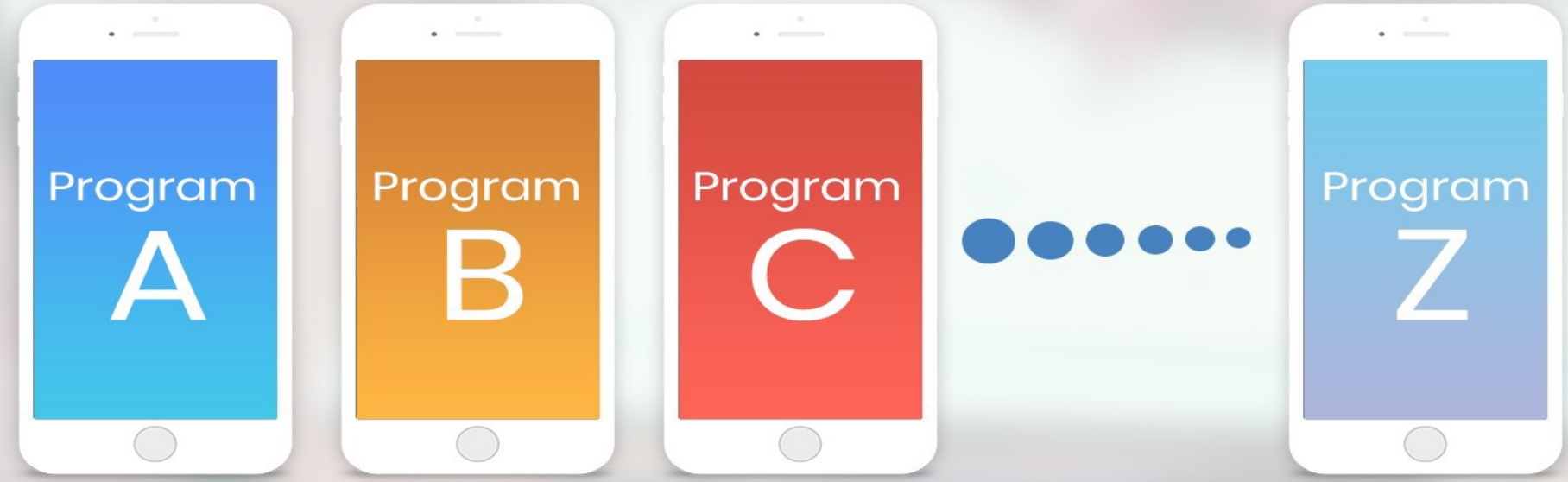


(DiBonaventura and Chapman, 2005; Rogers and Aida, 2014; Sheeran 2002)

3 Megastudies to Test What Messages Promote Vaccination



A Megastudy with Penn Medicine & Geisinger (Including 47,306 patients with healthy check ups)

Milkman et al. (2021). A Megastudy of Text-based Nudges Encouraging Patients to Get Vaccinated at an Upcoming Doctor's Appointment. *Proceedings of the National Academy of Sciences*.

A Megastudy with Penn Medicine & Geisinger (Including 47,306 patients with healthy check ups)

Experimental Design
We tested 19 different text-messaging strategies

A Sample of What We Tested
- *"Dedicate your shot to a loved one"*
- *"Here's a joke about the flu"*
- *"Get a shot to protect other people"*
- *"A shot has been reserved for you"*

Milkman et al. (2021). A Megastudy of Text-based Nudges Encouraging Patients to Get Vaccinated at an Upcoming Doctor's Appointment. *Proceedings of the National Academy of Sciences*.

Did we increase vaccination rates?

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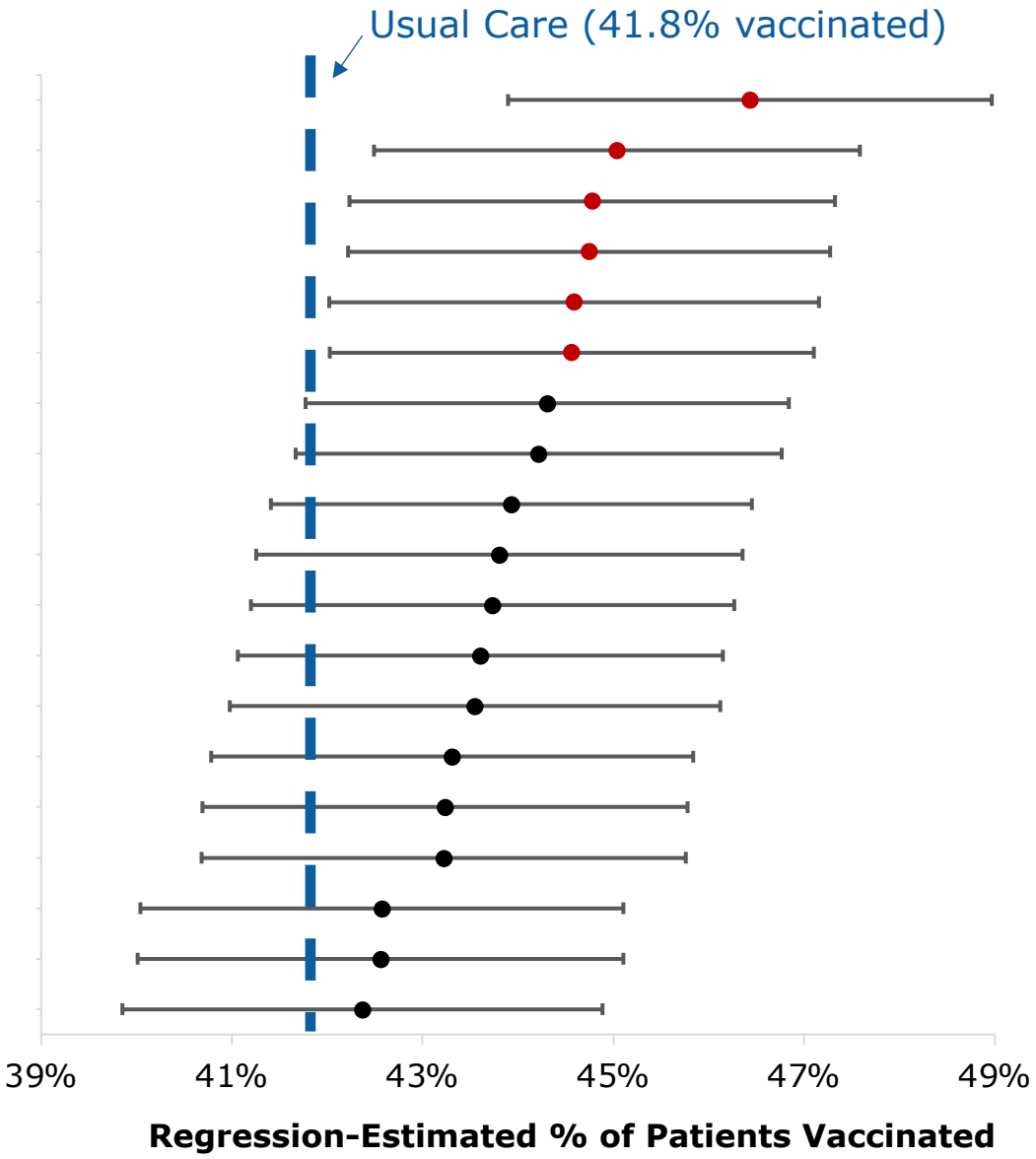


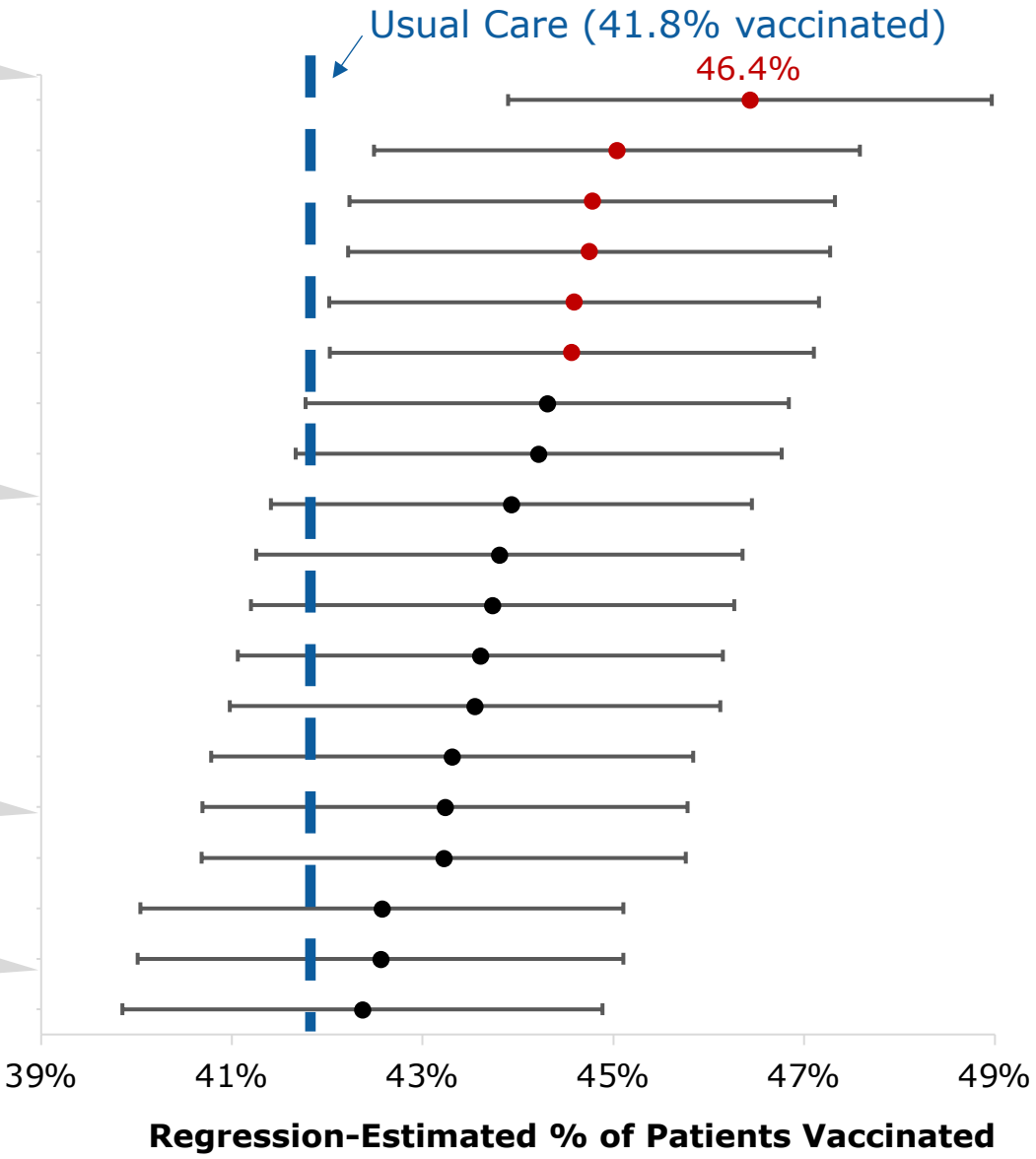
Did we increase vaccination rates?

A flu vaccine has been reserved for you.

Dedicate your flu shot to a loved one.

Protect others by getting a flu shot.

Share a joke about the flu.



whiskers depict +/-95% CIs

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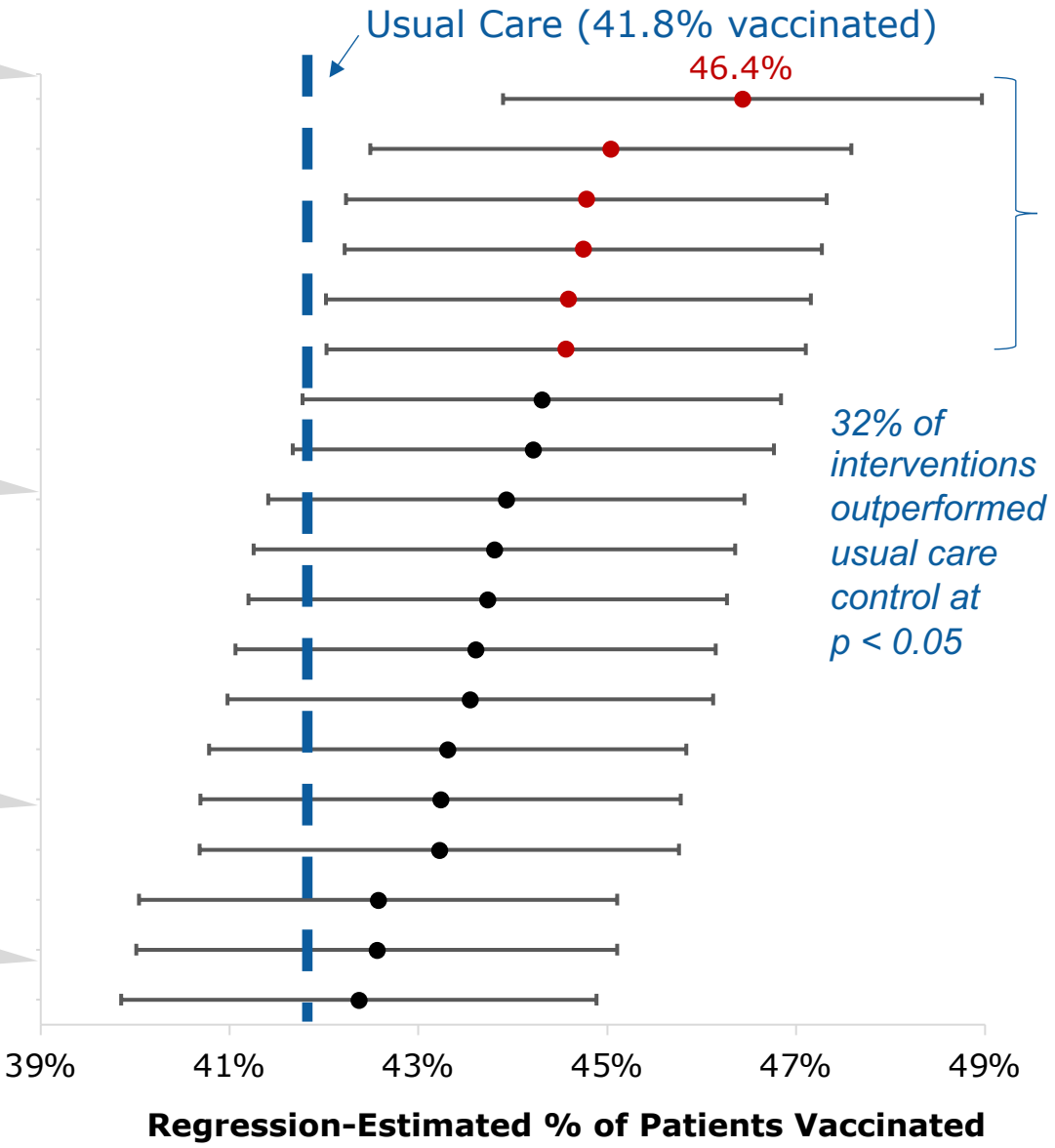

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Top Performing Intervention: Vaccine Reserved For You

72 Hours Before Appointment

John, this is a message from Penn Medicine about your upcoming appointment. Text & data rates apply. Reply stop to opt out at any time.

You have an appt w/ Dr. Smith on 10/01 @ 11:00am & it's flu season. A flu vaccine is available for you. Protect yourself & your family's health!

Look out for a vaccine reminder message before your appt. You can opt out of a reminder by texting back OPT OUT.

24 Hours Before Appointment

PENNMED: John, this is a reminder that a flu vaccine has been reserved for your appt with Dr. Smith.

Please ask your doctor for the shot to make sure you receive it.

(PIs: Jon Bogard, Craig Fox, Matt Hilchey, Dilip Soman, Jehan Sparks, Megan Weber, Renante Rondina, Melanie Kim)

Takeaways

- Text reminders increased flu vaccinations by **5**% on average

Milkman et al. (2021). *Proceedings of the National Academy of Sciences*.

Takeaways

- Text reminders increased flu vaccinations by **5**% on average
- The top-performing reminder increasing vaccinations by **11**%

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Takeaways

- Text reminders increased flu vaccinations by **5**% on average
- The top-performing reminder increasing vaccinations by **11**%
- Two factors drove reminder success:
  1. Conveying the vaccine was "**reserved for you**"
  2. Messages were congruent with the sort of communications patients expected to receive from their healthcare provider (i.e., not surprising, casual, or interactive)

Milkman et al. (2021). *Proceedings of the National Academy of Sciences*.

A Megastudy with Walmart Pharmacies

(Including 689,693 Walmart Pharmacy patients)

Milkman et al. (2022). A 680,000-Person Megastudy of Nudges to Compel Vaccination in Pharmacies. *Proceedings of the National Academy of Sciences*.

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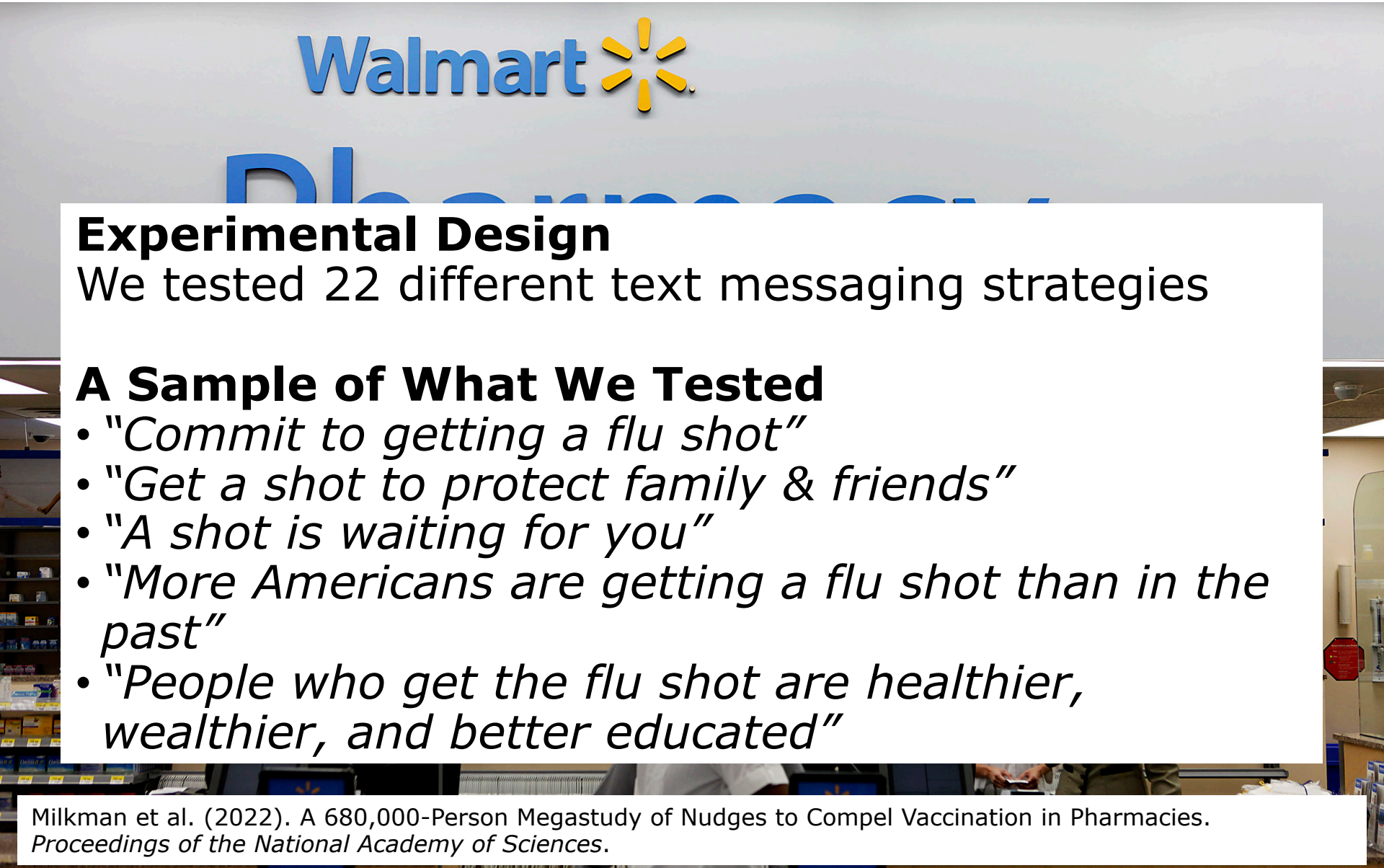

Experimental Design

We tested 22 different text messaging strategies

A Sample of What We Tested

- *"Commit to getting a flu shot"*
- *"Get a shot to protect family & friends"*
- *"A shot is waiting for you"*
- *"More Americans are getting a flu shot than in the past"*
- *"People who get the flu shot are healthier, wealthier, and better educated"*

Milkman et al. (2022). A 680,000-Person Megastudy of Nudges to Compel Vaccination in Pharmacies. *Proceedings of the National Academy of Sciences*.

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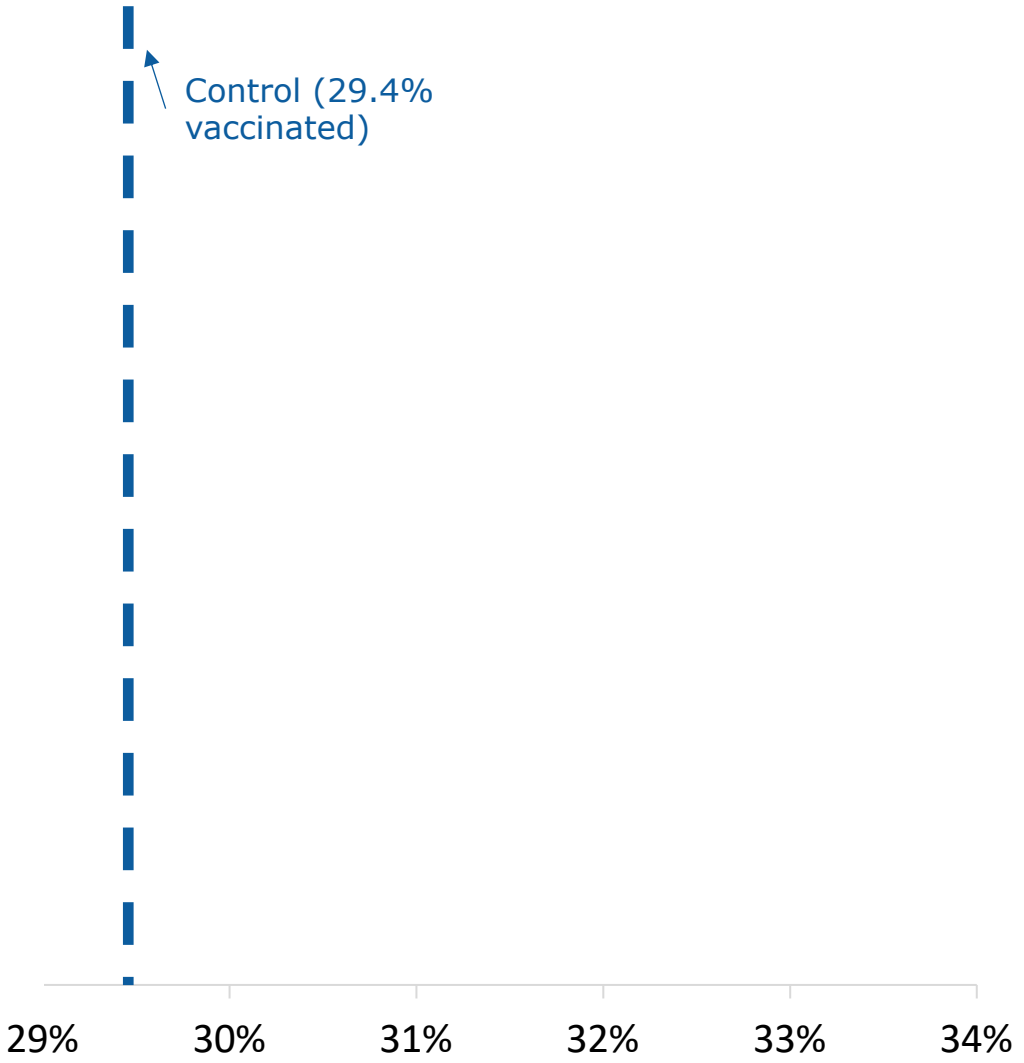


whiskers depict +/-95% CIs

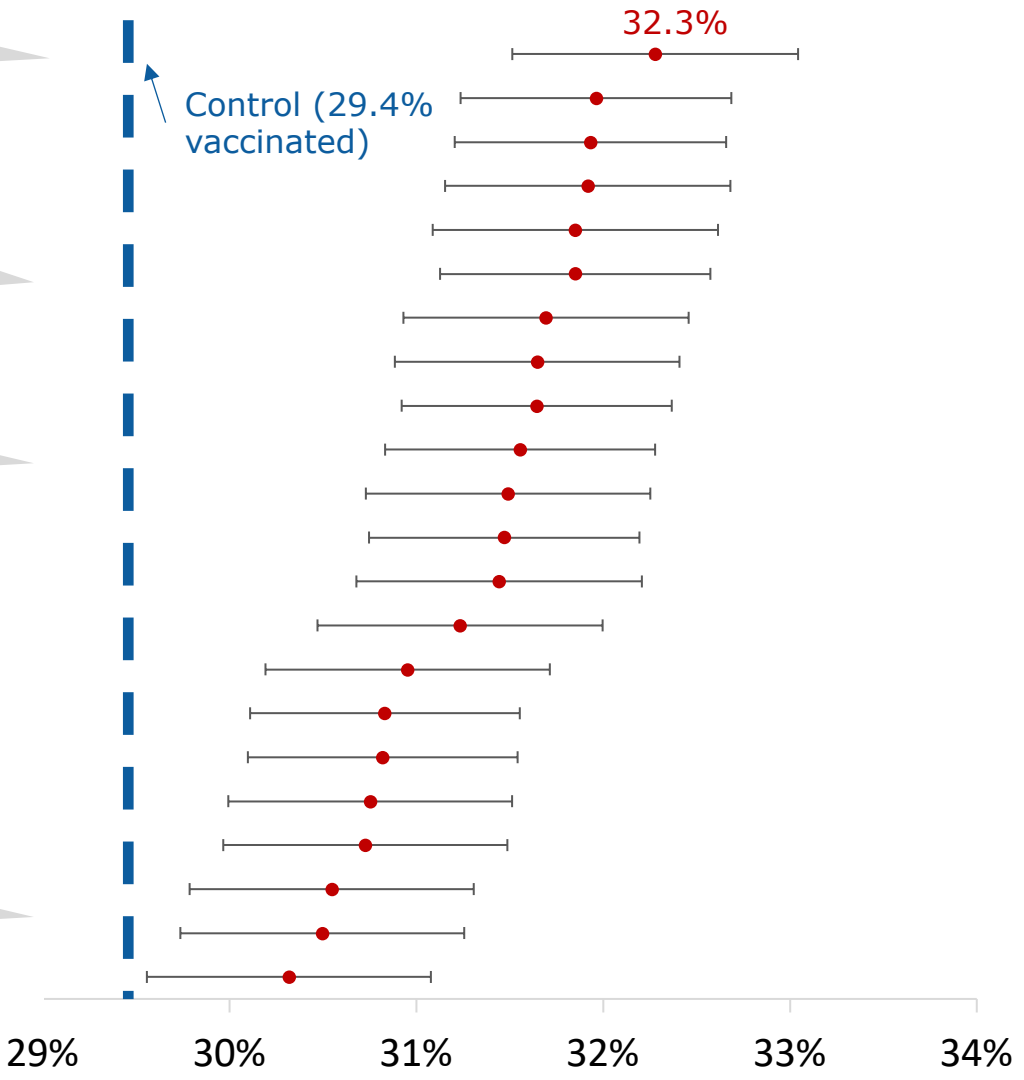
Did we increase vaccination rates?

A flu shot is waiting for you at Walmart.

More Americans are getting flu shots than in the past.

Commit to getting a flu shot.

Do others a favor by getting the flu shot.



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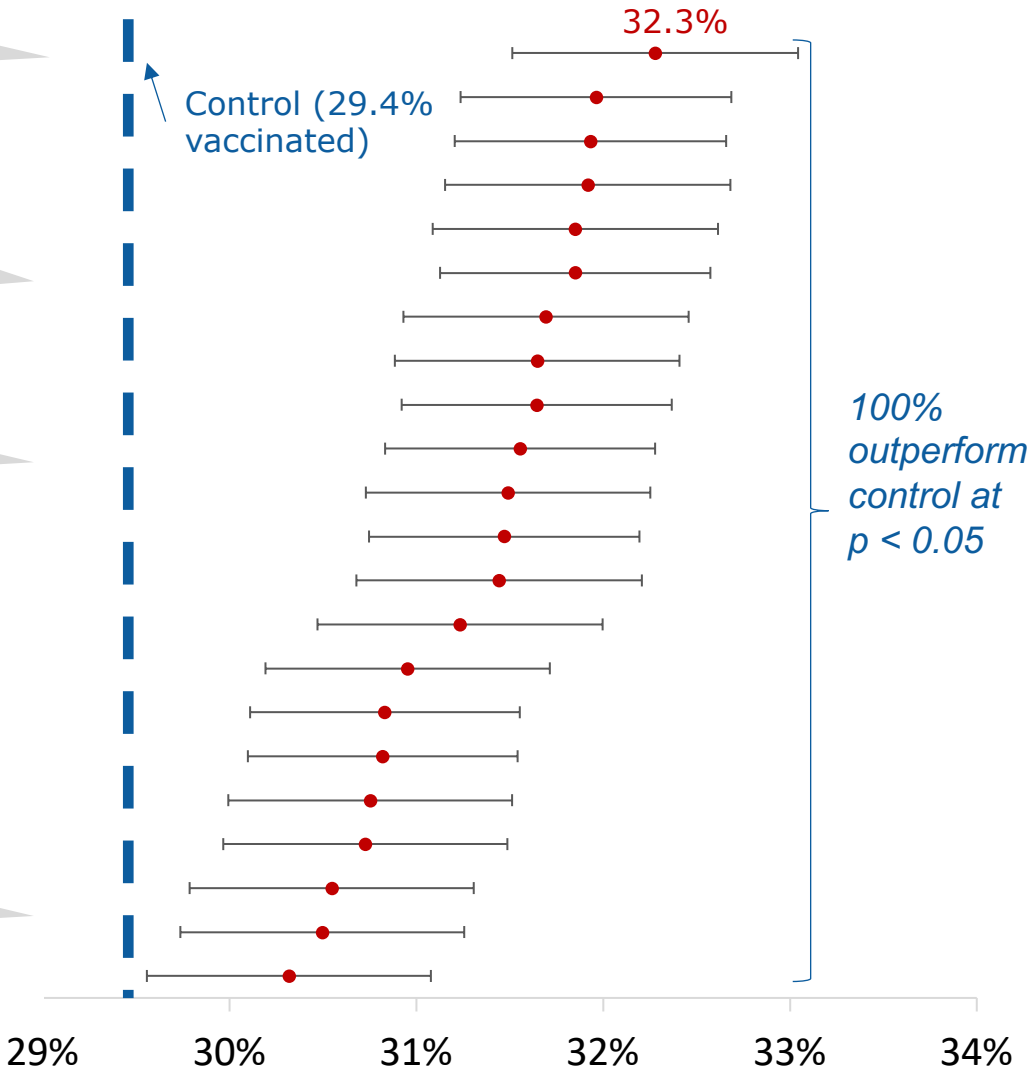

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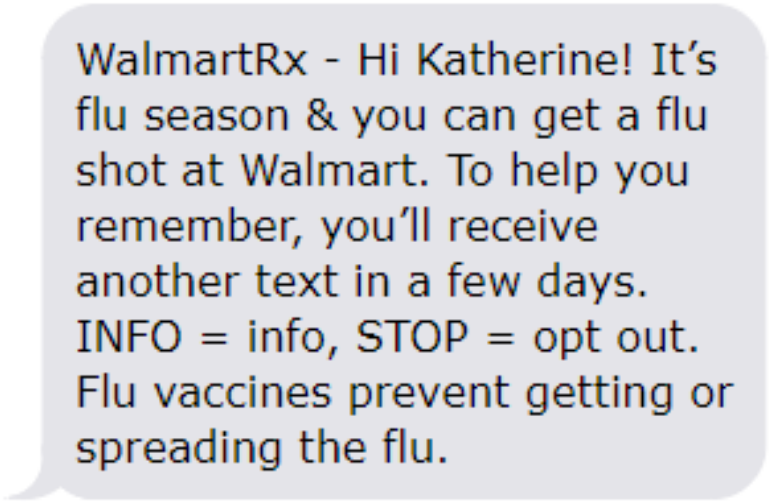
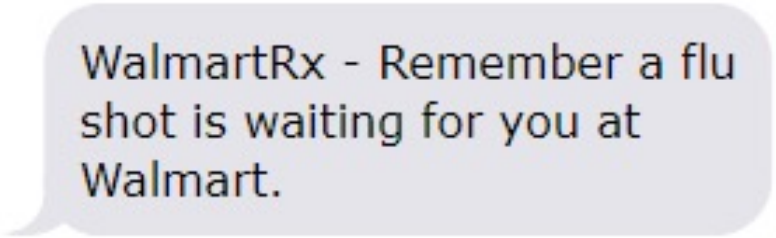
Top Performing Intervention: Flu Shot Waiting For You (2 Texts)

Initial Text



3 Days Later



(PIs: Noah Goldstein, Jon Bogard)

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- The top-performing reminder increasing vaccinations by **10**%

- Two factors drove reminder success:
  1. Conveying the vaccine was "**waiting for you**"
  2. Sending **repeated** reminders

This Also Boosts COVID-19 Vax Take-Up

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Article | Open Access | Published: 02 August 2021

Behavioural nudges increase COVID-19 vaccinations

Hengchen Dai, Silvia Saccardo, Maria A. Han, Lily Roh, Naveen Raja, Sitaram Vangala, Hardikkumar Modi, Shital Pandya, Michael Sloyan & Daniel M. Croymans ✉

Nature **597**, 404–409 (2021) | Cite this article

27k Accesses | **2** Citations | **604** Altmetric | Metrics

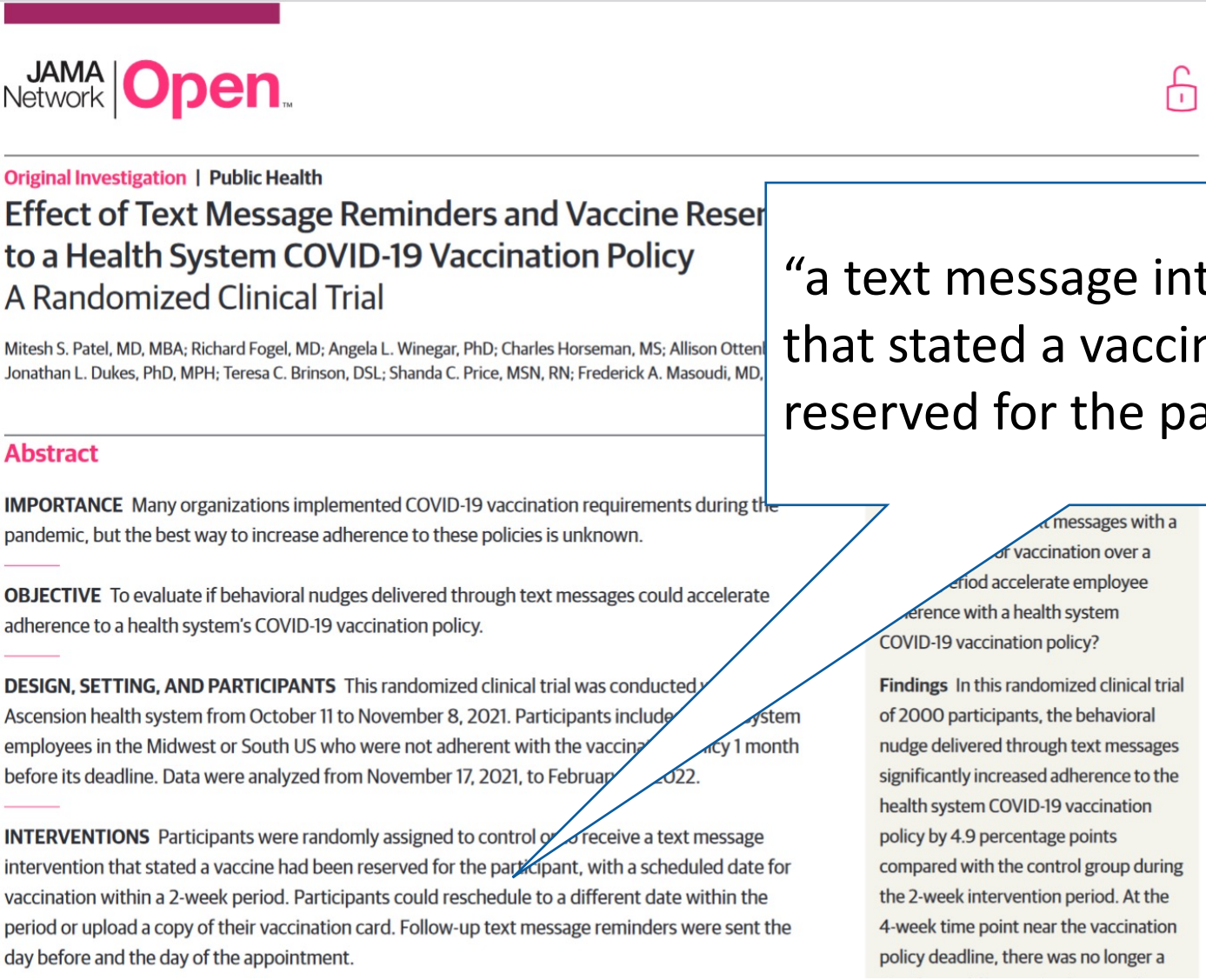
Abstract

Enhancing vaccine uptake is a critical public health challenge[1]. Overcoming vaccine hesitancy[2,3] and failure to follow through on vaccination intentions[3] requires effective communication strategies[3,4]. Here we present two sequential randomized controlled trials to test the effect of behavioural interventions on the uptake of COVID-19 vaccines. We designed text-based reminders that make vaccination salient and easy, and delivered them to participants drawn from a healthcare system one day (first randomized controlled trial) (n = 93,354 participants; clinicaltrials number NCT04800965) and eight days (second randomized controlled trial) (n = 67,092 individuals; clinicaltrials number NCT04801524) after they received a notification of vaccine eligibility. The first reminder boosted appointment and vaccination rates within the healthcare system by 6.07 (84%) and 3.57 (26%) percentage points, respectively; the second reminder increased those outcomes by 1.65 and 1.06 percentage points, respectively. The first reminder had a greater effect when it was designed to make participants feel ownership of the vaccine dose. However, we found no evidence that combining the first reminder with a video-based information intervention designed to address vaccine hesitancy heightened its effect. We performed online studies (n = 3,181 participants) to examine vaccination intentions, which revealed patterns that diverged from those of the first randomized controlled trial; this underscores the importance of pilot-testing interventions in the field. Our findings inform the design of behavioural nudges for promoting health decisions[5], and highlight the value of making vaccination easy and inducing feelings of ownership over vaccines.

The…[text] reminder had a greater effect when it was designed to **make participants feel ownership of the vaccine dose.**

Dai, Saccardo et al. (2021). *Nature*.

This Also Boosts COVID-19 Vax Take-Up



JAMA Network | Open

Original Investigation | Public Health

Effect of Text Message Reminders and Vaccine Reser to a Health System COVID-19 Vaccination Policy

A Randomized Clinical Trial

Mitesh S. Patel, MD, MBA; Richard Fogel, MD; Angela L. Winegar, PhD; Charles Horseman, MS; Allison Otten Jonathan L. Dukes, PhD, MPH; Teresa C. Brinson, DSL; Shanda C. Price, MSN, RN; Frederick A. Masoudi, MD,

Abstract

IMPORTANCE Many organizations implemented COVID-19 vaccination requirements during the pandemic, but the best way to increase adherence to these policies is unknown.

OBJECTIVE To evaluate if behavioral nudges delivered through text messages could accelerate adherence to a health system's COVID-19 vaccination policy.

DESIGN, SETTING, AND PARTICIPANTS This randomized clinical trial was conducted Ascension health system from October 11 to November 8, 2021. Participants include ystem employees in the Midwest or South US who were not adherent with the vaccina cy 1 month before its deadline. Data were analyzed from November 17, 2021, to Februar 022.

INTERVENTIONS Participants were randomly assigned to control o receive a text message intervention that stated a vaccine had been reserved for the participant, with a scheduled date for vaccination within a 2-week period. Participants could reschedule to a different date within the period or upload a copy of their vaccination card. Follow-up text message reminders were sent the day before and the day of the appointment.

t messages with a or vaccination over a eriod accelerate employee erence with a health system COVID-19 vaccination policy?

Findings In this randomized clinical trial of 2000 participants, the behavioral nudge delivered through text messages significantly increased adherence to the health system COVID-19 vaccination policy by 4.9 percentage points compared with the control group during the 2-week intervention period. At the 4-week time point near the vaccination policy deadline, there was no longer a

"a text message intervention that stated a vaccine had been reserved for the participant"

Patel et al. (2022). *JAMA Network Open*.

Thank You

BCFG TEAM SCIENTISTS & STAFF

BCFG FUNDERS

NIH (via the CHIBE & NBER Roybal Centers)

SSRC – The Mercury Project (with funding from

The Rockefeller foundation,

The Robert Wood Johnson Foundation,

Craig Newmark Philanthropies, and

The Alfred P. Sloan Foundation)

The Flu Lab

Penn Center for Precision Medicine

Marc Leder

AKO Foundation

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