

## Methods: Mind the Gap

Webinar Series

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# Supercharging Implementation Science With Insights From Behavioral Economics



Presented by:

Rinad S. Beidas, Ph.D.  
Northwestern University  
Feinberg School of Medicine

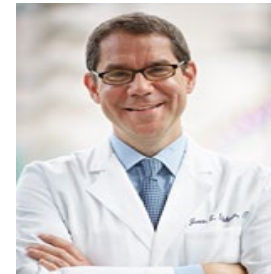


National Institutes of Health  
*Office of Disease Prevention*

# Supercharging implementation science with insights from behavioral economics

Rinad S. Beidas, PhD  
Ralph Seal Paffenbarger Professor  
Chair, Department of Medical Social Sciences

Thank you to the incredible team committed to bring together implementation science and behavioral economics



P50 MH 113840; P50 CA244690;  
R01 MH123491

# Agenda

Implementation  
science



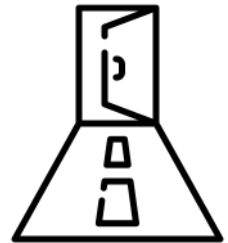
Exemplars



Behavioral  
economics



Implications and  
future  
directions

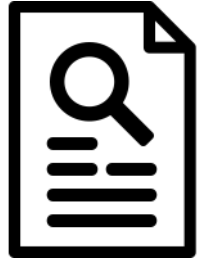


# Agenda

Implementation  
science



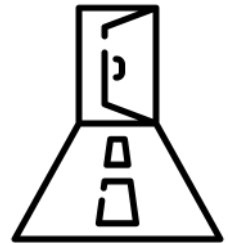
Exemplars



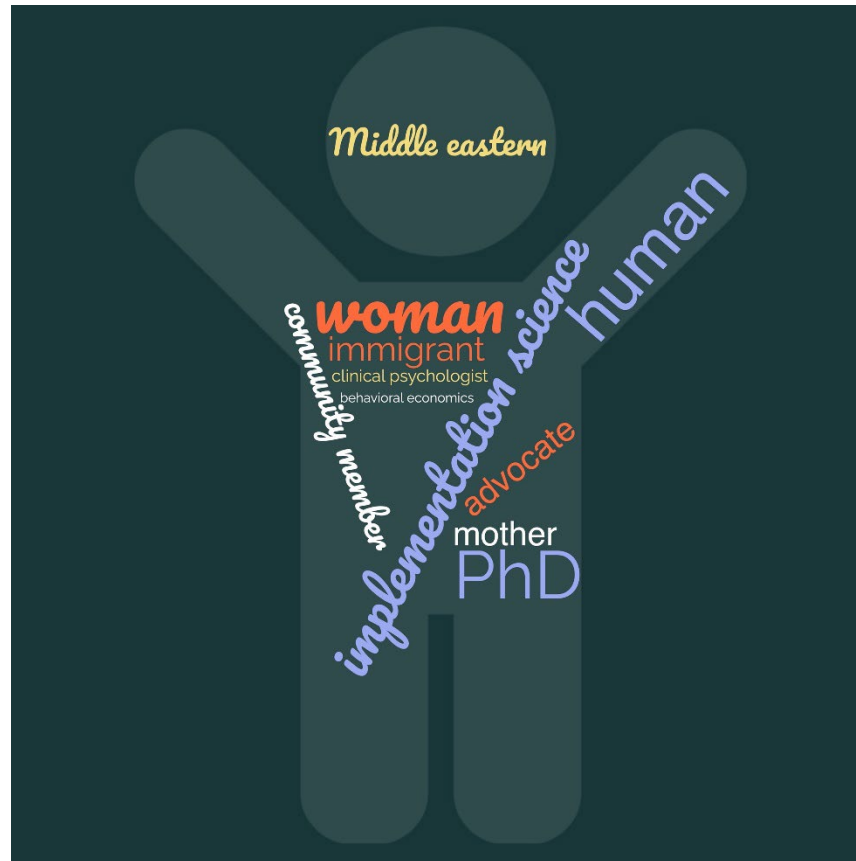
Behavioral  
economics



Implications and  
future  
directions



# My identities and lived experiences shape my perspective



# Closing the gap between discovery and implementation may very well be one of the meaningful challenges of our time

EDITORIAL

## A new lane for science

A recent *Science* article highlighted the confusion of public health officials who appoint scientists—including those who do not stay in their field—rather than the experts who have received their training and experience in their respective fields. Unfortunately, the evidence is clear: clinical interventions benefit their health. To address this failure, we need to add another layer to implementation science beyond medication development and study to evaluate their use by clinical health care providers in communities and practice settings. Public health failures have been avoided, as evidenced by the importance of implementation science.

**“COVID-19 has shown the world that ‘knowing what to do’ does not ensure ‘doing what we know.’”**

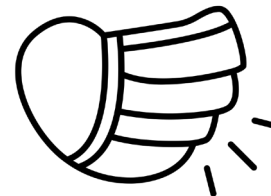
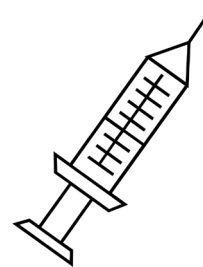
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DOI: 10.1377/hlthaff.2020.02054  
HEALTH AFFAIRS 40,  
NO. 1 (2021): 42-52  
©2021 Project HOPE—  
The People-to-People Health  
Foundation, Inc.

COVID-19

By A. David Paltiel, Jason L. Schwartz, Amy Zheng, and Rochelle P. Walensky

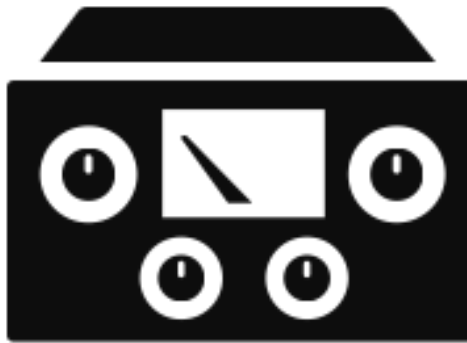
## Clinical Outcomes Of A COVID-19 Vaccine: Implementation Over Efficacy



Source. Paltiel et al., 2020, *Health Affairs*; Proctor & Geng, 2021, *Science*.

# My definition of implementation science

Implementation science is about making sure that all people are getting the things that work in the community and moving the needle equitably in health





# NCI definition of implementation science

The study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve population health



Source. <https://cancercontrol.cancer.gov/is/about>; UW Imp Sci Resource Hub, 2022

# Implementation science has its own assumptions and foci

The work must be done in partnership with our communities

Our outcomes are different from traditional studies. We focus on clinician behavior within organizational constraints

Context is not seen as a nuisance

There is an evidence-based “thing” to be implemented

We have specific frameworks, methods, and strategies

Source. Williams & Beidas, 2018, *J Child Psychol Psychiatry*

Said simply: Think about the thing, and the things we do to help people do the thing.

Fig. 1

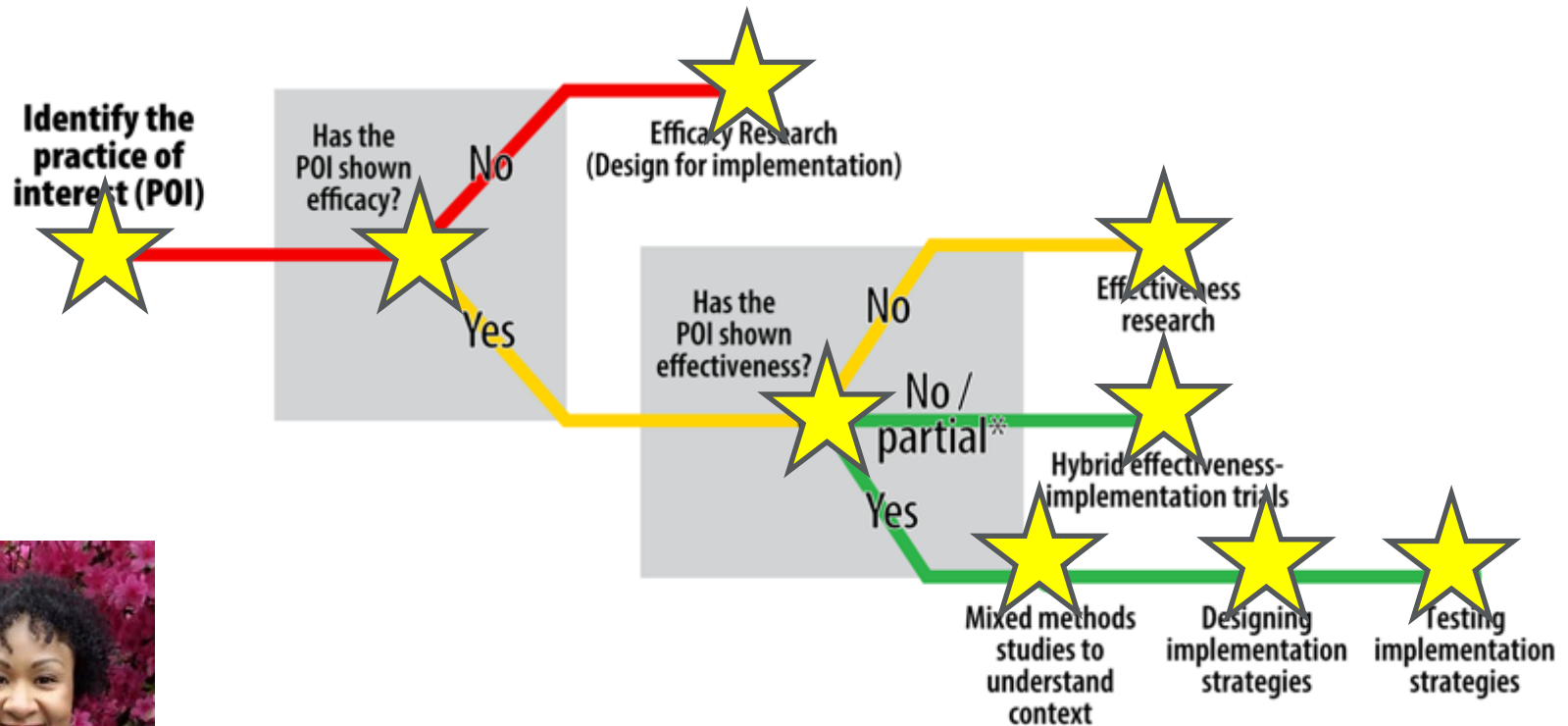
**When defining implementation science, some very non-scientific language can be helpful...**

- The intervention/practice/innovation is **THE THING**
- *Effectiveness* research looks at whether **THE THING** works
- *Implementation* research looks at how best to help people/places **DO THE THING**
- Implementation strategies are the stuff we do to try to help people/places **DO THE THING**
- Main implementation outcomes are **HOW MUCH** and **HOW WELL** they **DO THE THING**

The slide used for the past 2 years

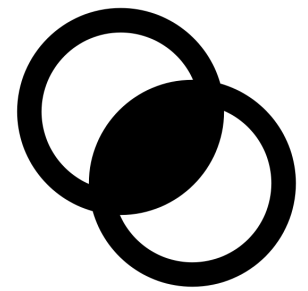
Source. Curran, 2020, *Imp Sci Comm*

# The implementation science subway is a heuristic tool to identify where you are with your work



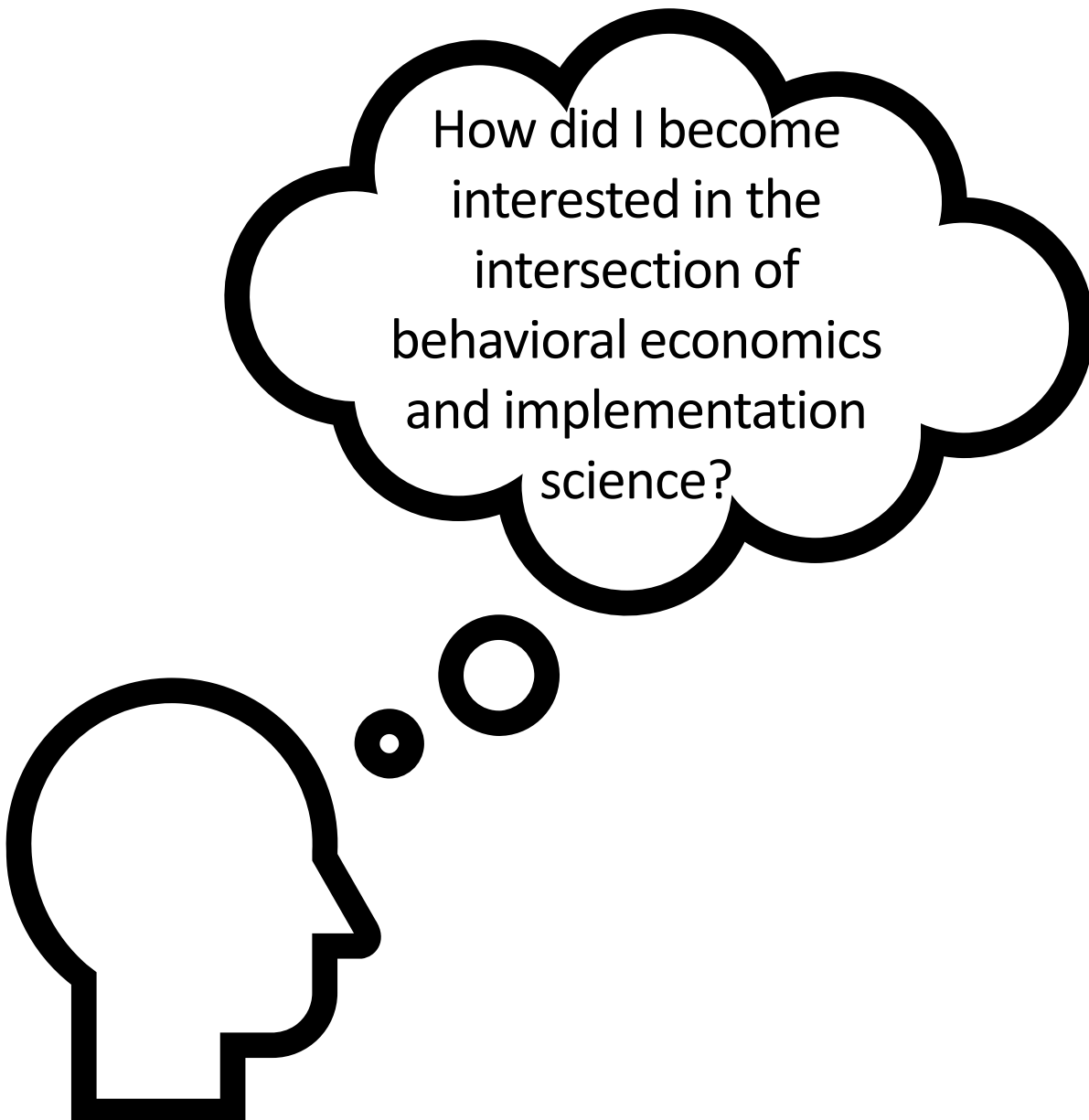
**Source.** Lane-Fall, Curran, & Beidas (2019). *BMC Medical Research Methodology*.

## The main take-away from today's talk



Created by Angelo Troiano  
from Noun Project

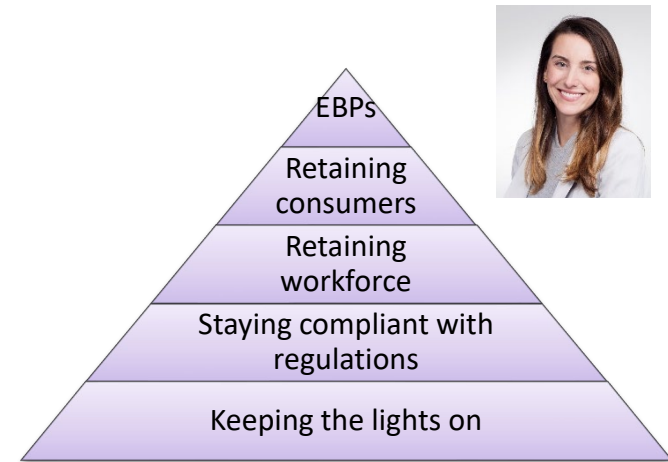
The nexus of behavioral economics and implementation science has the potential to transform the seemingly intractable challenge of moving the needle in health care equitably.



How did I become  
interested in the  
intersection of  
behavioral economics  
and implementation  
science?

# Key Insight #1: An existential crisis

I spent 5 years studying therapist behavior change as part of a naturalistic observational study, and I started to wonder if there were ways to make it easier for clinicians to deliver evidence-based care.



## RESEARCH

Open Access

A repeated cross-sectional study of clinicians' use of psychotherapy techniques during 5 years of a system-wide effort to implement evidence-based practices in Philadelphia



Rinad S. Beidas<sup>1,2,3\*</sup>, Nathaniel J. Williams<sup>4</sup>, Emily M. Becker-Haimes<sup>1,15</sup>, Gregory A. Aarons<sup>5</sup>, Frances K. Barg<sup>6</sup>, Arthur C. Evans<sup>7</sup>, Kamilah Jackson<sup>8</sup>, David Jones<sup>9</sup>, Trevor Hadley<sup>1</sup>, Kimberly Hoagwood<sup>10</sup>, Steven C. Marcus<sup>11</sup>, Geoffrey Neimark<sup>8</sup>, Ronnie M. Rubin<sup>8,16</sup>, Sonja K. Schoenwald<sup>12</sup>, Danielle R. Adams<sup>13</sup>, Lucia M. Walsh<sup>14</sup>, Kelly Zentgraf<sup>1</sup> and David S. Mandell<sup>1,3</sup>

**I STAFF REPORTS | HEALTH**

# Study: Slow change in children's therapy

The best mental health treatments for youth weren't always used in Phila. despite training efforts.

By Aneri Pattani  
STAFF WRITER

Not all therapy is created equal.

Years of scientific research have shown that some types of mental health treatment, like cognitive behavioral therapy, are more effective than others. But not all providers offer those treatments, and a new study shows just how challenging it can be to get them to switch.



Joan Erney of Community Behavioral Health

the most effective, scientifically proven treatments increased only 6 percent, the study found.

"The increase has not been as robust as we'd like," said Joan Erney, chief executive officer of Community Behavioral Health (CBH), which provides mental health and substance use services for Medicaid recipients in Philadelphia.

The study was a collaboration between the University of Pennsylvania and the Philadelphia Department of Behavioral Health and Intellectual Disability Services (DBHIDS).

Previous research shows that children

coauthor of the study and an associate professor of psychiatry, medical ethics, and health policy at Penn's Perelman School of Medicine.

"Our vision is that kids receive the highest-quality mental health services and that they be time-limited, so kids can go on to do the things kids do," she said.

But in many areas of health care, translating best practices from research to the community can take upward of a decade, Beidas said.

In mental health care, it has to do in part with the education sys-



Study coauthor Rinad Beidas: Many therapists today need training in new treatment approaches. University of Pennsylvania

It can also get expensive for employers to train every clinician, especially in the public sector, where there is high turnover, Beidas said.

In 2007, DBHIDS decided to address these barriers by begin-

sumers, that might still indicate some improvement, Beidas said, but it needs to be studied further.

"We don't know what 6 percent means for clinical outcomes," Beidas said. "Does that make a difference?"

One promising finding, Beidas said, was that the improvement was systemwide, even though only half the clinicians in the study participated in training initiatives. That might indicate that supervisors attended and passed along what they learned to others or that clinicians shared the information with their peers.

The researchers also found that each additional training a clinician attended predicted a 3 percent increase in the use of evidence-based practices. That provides support for the city to continue providing training, Beidas said.

The study also revealed the



## Key insight #2: Could behavioral economics offer a solution?

I partnered with Penn colleagues who were experts in behavioral econ through 2 P50s (mental health, cancer) and became the second director of the Nudge Unit.

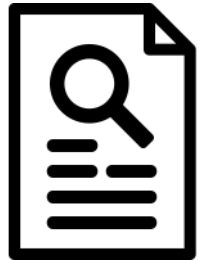


# Agenda

Implementation  
science



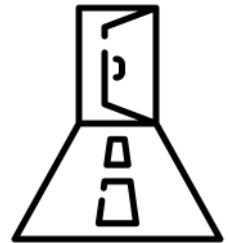
Exemplars



Behavioral  
economics



Implications and  
future  
directions



NB. Clearing up a common misconception  
(that I had initially)

Behavioral economics  financial incentives



# Odenplan subway in Stockholm



# Schiphol airport in Amsterdam



# London



# Netflix

GREG CHASE Dr. Belknap  
CARMEN SERANO Carmen  
EVAN BOBRICK Chad  
ROBERTA MARQUEZ Chad's Girlfriend  
CHRISTOPHER DEMPSEY E.M.T.

35  
**Breaking**  
56  
**Bad**

**Season 1, Ep. 2 - The Cat's in the Hat**  
2008 18 48 minutes

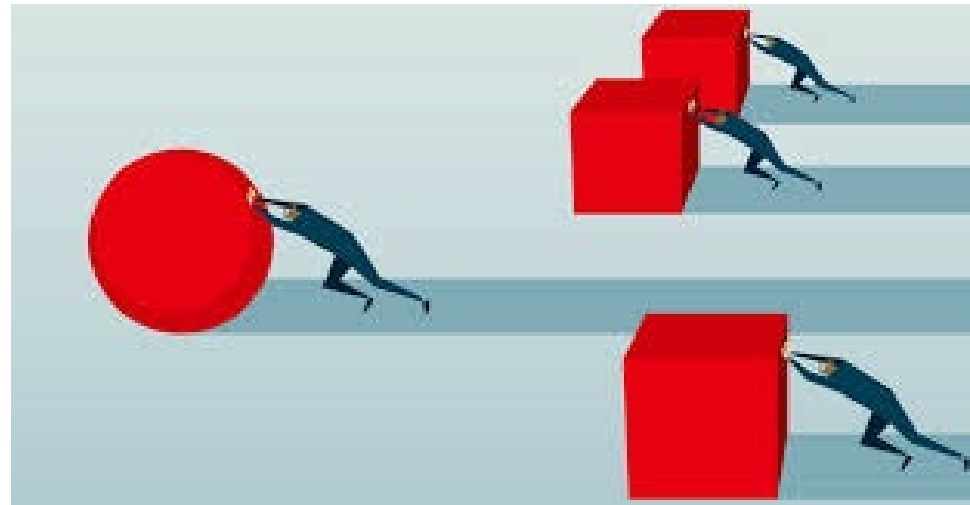
Their first aborted drug deal forces Walt and Jesse to dispose of a pair of corpses. Meanwhile, Skyler suspects that her husband is up to no good.

Next episode playing in **6 seconds**

[Back to Browse](#) [More Episodes](#)



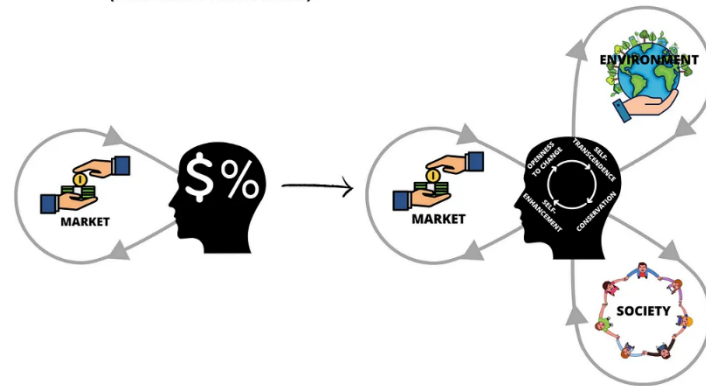
# Can we use behavioral economics and choice architecture to make it easier for clinicians and organizations in healthcare settings?







From **RATIONAL ECONOMIC MAN** (A.K.A. HOMO ECONOMICUS) to **SOCIAL, ADAPTABLE HUMAN**



**Source.** Thank you to Kevin Volpp and David Asch for this slide which I have adapted; Gordon, 2021

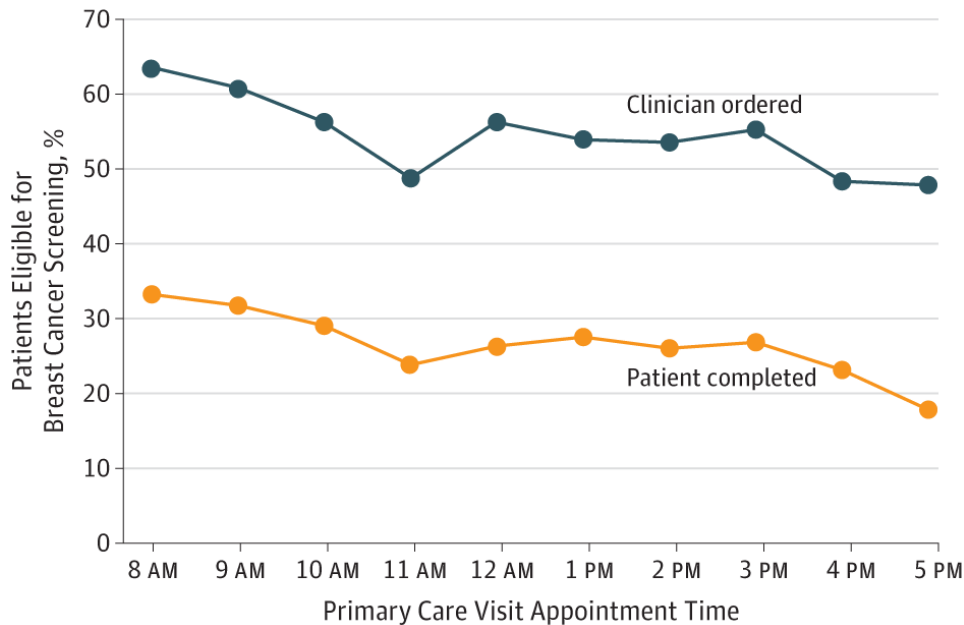
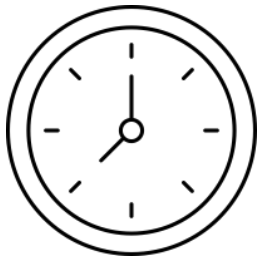
So what?



We should design our science less for the ideals of human behavior and more for the realities of human behavior

Consistent with **bounded rationality** and **dual process theory**, humans have incomplete information, work with enormous constraints on time and resources, and employ heuristics, or mental shortcuts, to make decisions. These patterns can be harnessed to design more effective implementation strategies (or super-charged!)

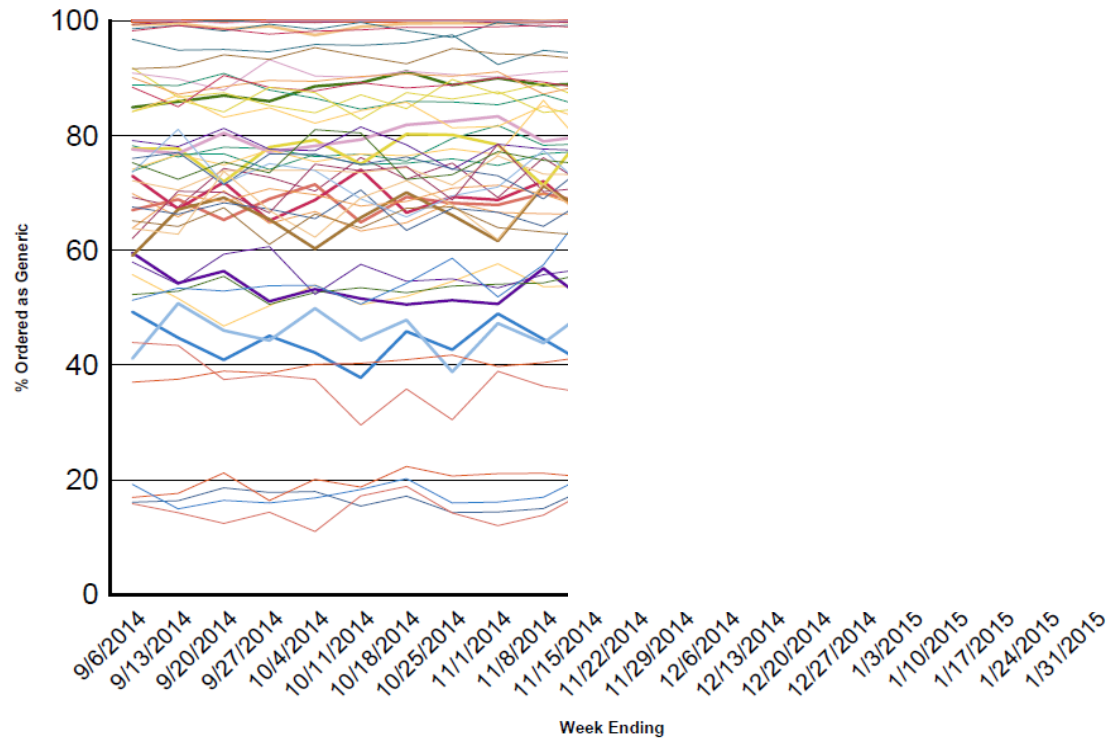
# Evidence that clinicians are humans – we must design our implementation strategies with how clinicians actually behave, rather than how we hope they will behave



Decision  
fatigue

Falling behind

# Changing the default in prescription settings in the EHR can dramatically reduce heterogeneity of prescribing behavior

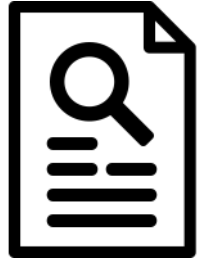


# Agenda

Implementation  
science



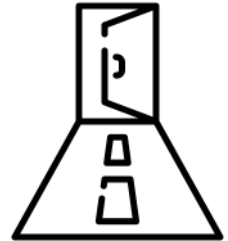
Exemplars



Behavioral  
economics



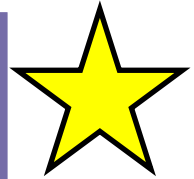
Implications and  
future  
directions



# Exemplars for infusing behavioral economic principles into implementation science work from our team



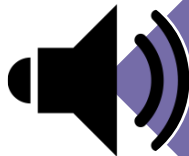
Innovative design and participatory strategies



Clinician nudges



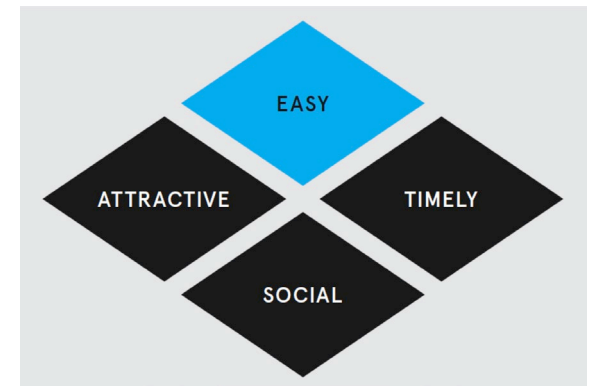
Clinician + patient nudges



Going beyond nudges

# Key principles for strategy design: EAST framework

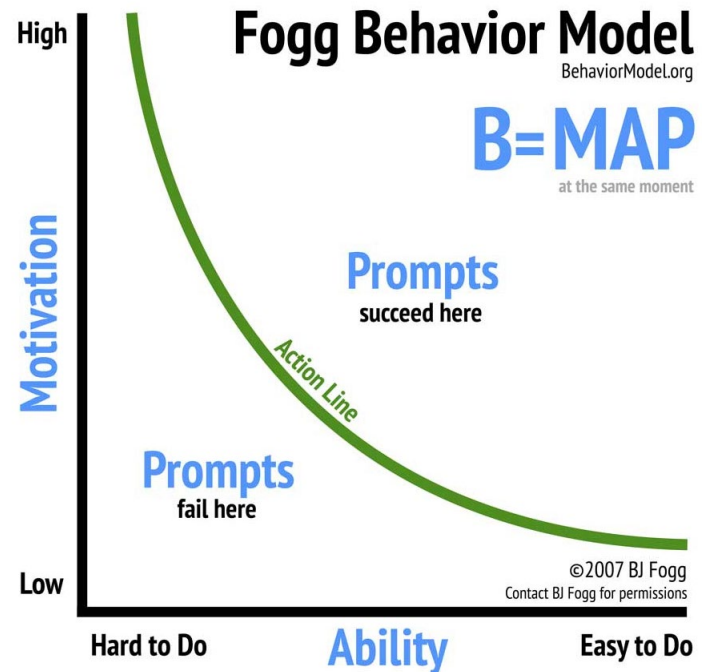
- **Easy:** Reduce intermediate steps and “sludge” (via defaults)
  - Example: Defaulting to generic medication prescriptions saved Penn Medicine \$32 million
- **Attractive:** Make optimal choices stand out with colors, bold text, or personalization
  - Example: Highlighting optimal options in a BPA and reducing the amount of non-essential information
- **Social:** Leverage social networks to create peer pressure/support
  - Example: Emphasizing competition with peers encouraged people to walk more
- **Timely:** Consider when people are most receptive to reminders
  - Example: Sending a nudge to have a serious illness conversation (SIC) just before an appointment can boost SIC completion rates



# Fogg Behavior Model offers insights on when solutions from behavioral economics might be useful

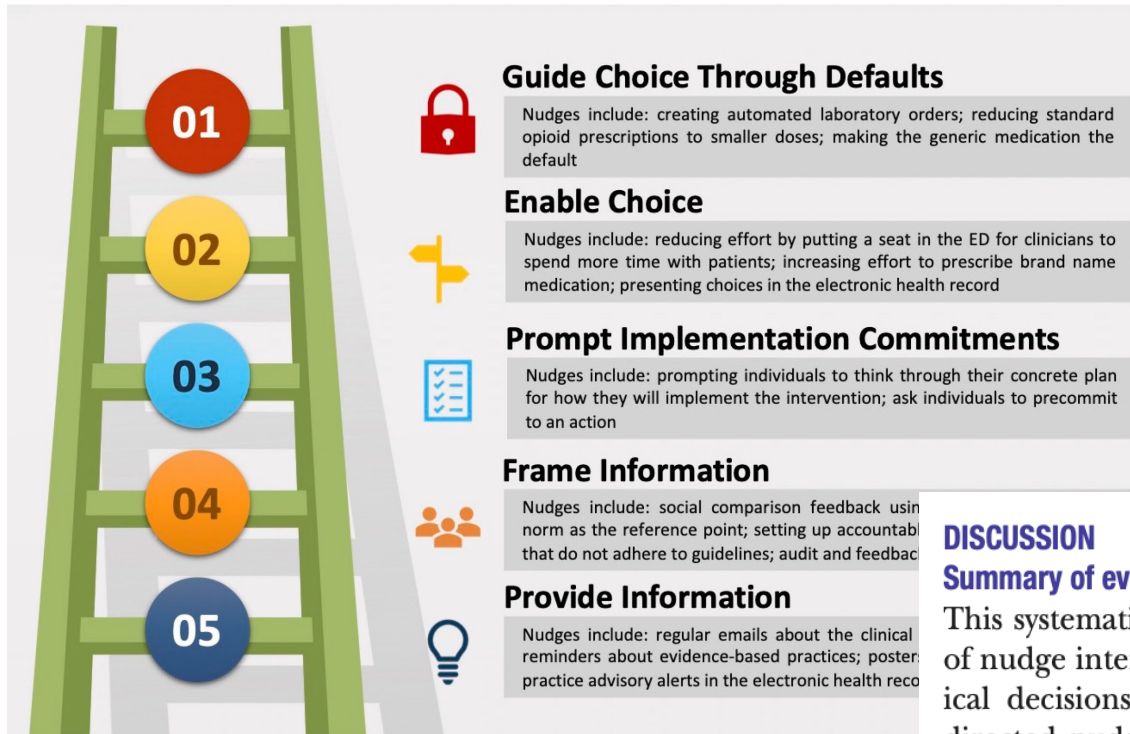
Behavior change requires a combination of the following:

- Motivation: People are interested in making the change.
- Ability: The change is easy to accomplish.
- Prompts: People are reminded of the optimal next step via a prompt/nudge.
- When these conditions are not met, a nudge will not be the solution!





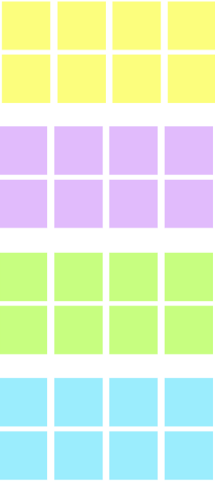
# The Nudge Ladder offers additional implementation strategies for consideration



## DISCUSSION Summary of evidence

This systematic review of 39 studies found that a variety of nudge interventions have been tested to improve clinical decisions. Thirty-three of the 48 (73%) clinician-directed nudges significantly improved clinical practice in the hypothesised direction. **Nudges that changed default options or enabled choice were the most effective and nudges framing information for clinicians were also largely effective.** Conversely, nudges that provided information to the clinician through reminders and prompting implementation commitments did not conclusively lead to significant changes in clinician behaviour.

# Pre-mortem: de-risking when designing strategies using prospective bias

<p><b>NOTES</b></p> <p>Use this space to capture individual ideas, and move them over to the appropriate box when complete. Each team member should have their own color of sticky notes assigned to them.</p> 	<p><b>POTENTIAL CAUSES OF FAILURE</b></p> <p>Brainstorm different factors that might prevent this project from succeeding.</p>	<p><b>MOST IMPORTANT CAUSES TO ADDRESS</b></p> <p>Capture which factors are the riskiest that we can also influence.</p>
	<p><b>BRAINSTORM SOLUTIONS</b></p> <p>Brainstorm solutions that could possibly prevent these risk factors from happening. Capture what you could do now in order to reduce the risk of failure for this project. After you have captured the ideas, vote on those you want to put into place.</p>	<p><b>ACTION PLAN</b></p> <p>Identify which solutions the team would collectively like to move forward with. Create a formalized Pre-mortem plan by assigning tasks and determining deadlines.</p>

Beidas et al. *Implementation Science* (2022) 17:55  
<https://doi.org/10.1186/s13012-022-01226-3>

Implementation Science

DEBATE

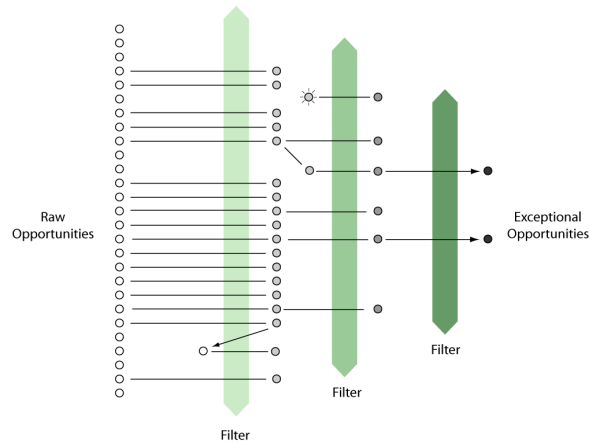
Open Access

## Promises and pitfalls in implementation science from the perspective of US-based researchers: learning from a pre-mortem



Rinad S. Beidas<sup>1\*</sup>, Shannon Dorsey<sup>2</sup>, Cara C. Lewis<sup>2</sup>, Aaron R. Lyon<sup>2</sup>, Byron J. Powell<sup>3</sup>, Jonathan Purtle<sup>4</sup>, Lisa Saldana<sup>5</sup>, Rachel C. Shelton<sup>4</sup>, Shannon Wiltsey Stirman<sup>6</sup> and Meghan B. Lane-Fall<sup>1</sup>

# Innovation tournament: Participatory approaches that leverage the crowd



Home > Challenges

## How can your organization help you use evidence-based practices?

Evidence-based practices refer to treatments that work.

**Timeline**

- Submission, rating and commenting: Feb 5 – March 12
- Challenge committee review: Late March
- Winners and next steps announced: April 1

**Prizes**

- All participants will be entered into a lottery to win \$100
- Winning ideas, as selected by the challenge committee will receive \$100 and the opportunity to partner with Penn researchers to further develop and potentially implement ideas.

Number of Ideas: 66

### Review and Rate Ideas

Enter your full name and email below to get started. This information will not be made visible on the website.



Over the past decade, the city of Philadelphia has supported evidence-based practices, such as cognitive-behavioral therapy, by funding training initiatives and creating infrastructure in the local mental health system.

In 2017, researchers at the University of Pennsylvania surveyed hundreds of therapists in community mental health organizations in Philadelphia to understand their experiences with using evidence-based practices. Their most striking finding? Many clinicians shared that they are "not at all" rewarded or recognized for implementing evidence-based practice.

# Exemplars for infusing behavioral economic principles into implementation science work from our team



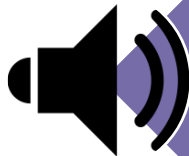
Innovative design and participatory strategies



Clinician nudges



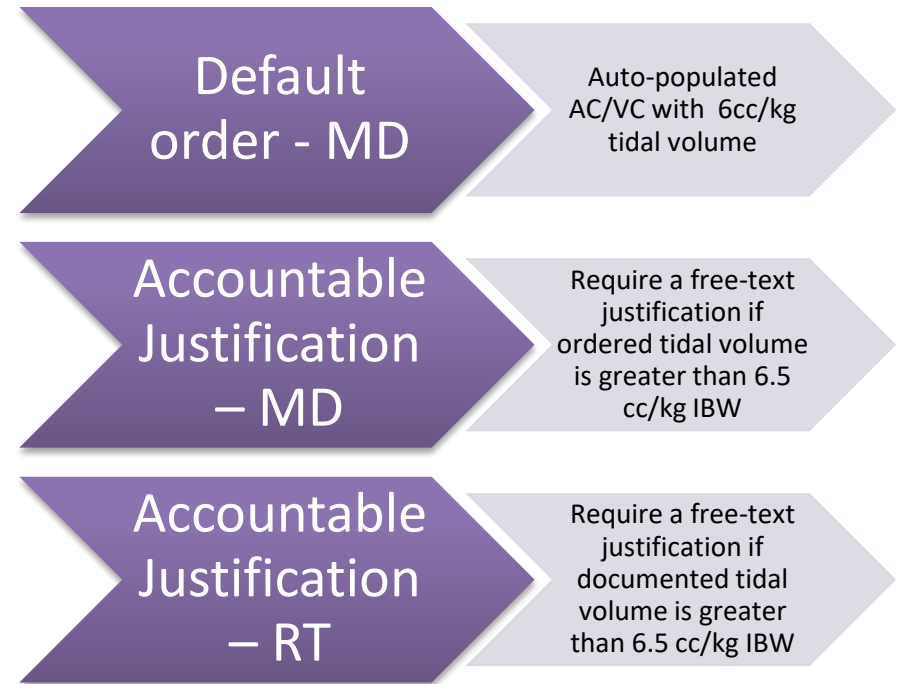
Clinician + patient nudges



Going beyond nudges

# Implementation of behavioral economic approaches to improve evidence uptake for mechanically ventilated patients (R01 HL141608; Kerlin PI)

- Goal: To increase low-tidal volume ventilation for mechanically ventilated patients in the ICU without and without Acute Respiratory Distress Syndrome
- Three behavioral economic implementation strategies using the EHR – 2 targeting MDs, 1 targeting respiratory therapists
- Make it easier or desirable to administer low tidal volumes without restricting choice



# Exemplars for infusing behavioral economic principles into implementation science work from our team



Innovative design and participatory strategies



Clinician nudges



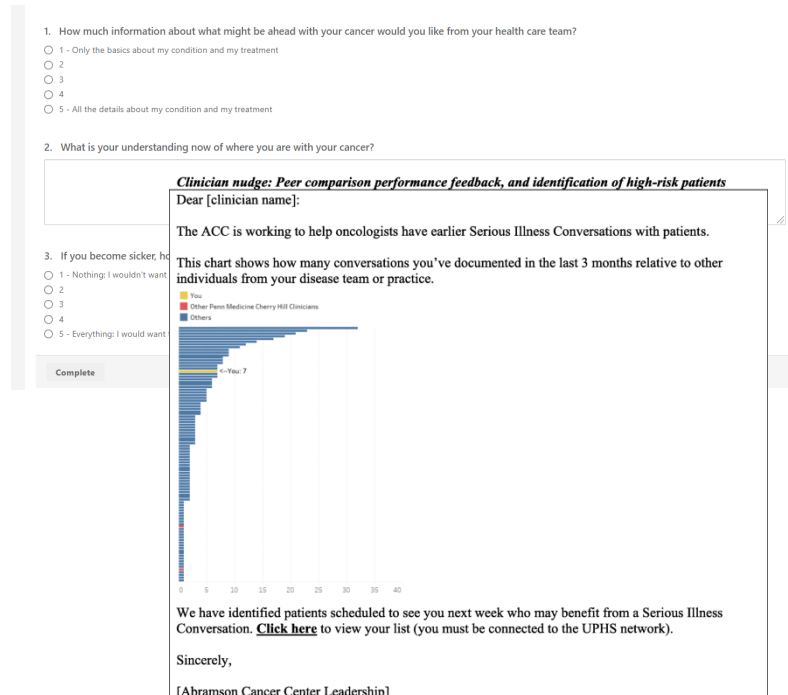
Clinician + patient nudges



Going beyond nudges

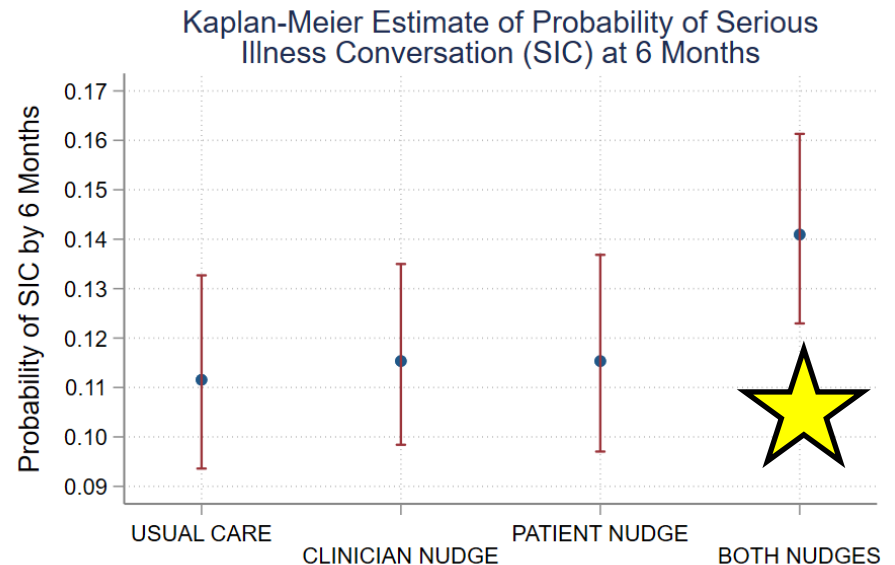
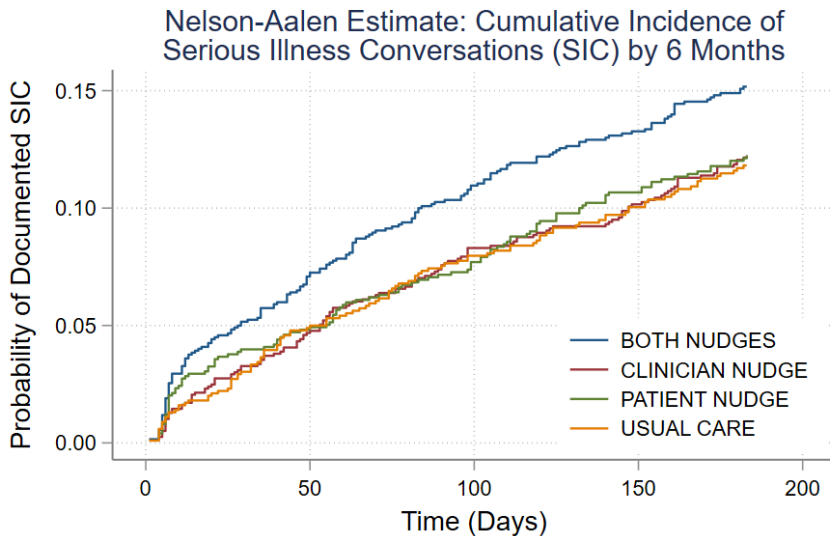
# Penn ISC3 P50: Signature project on serious illness conversations

- Background: Early SICs elicit patients' care preferences and have been shown to improve outcomes and reduce end-of-life healthcare utilization. However, most patients with cancer die without an SIC documented in their medical record.
- Study Design: Conduct a 4-arm pragmatic cluster RCT to test the effectiveness of nudges to clinicians, patients, or both in increasing the frequency/timeliness of SICs
  - Usual care (active control): clinician-directed text messages & emails
  - Clinician nudge: usual communications + peer comparisons on clinician-level SIC rates
  - Patient nudge: text messages normalizing SICs and 3-question priming survey
  - Both nudges: patient + clinician nudge



# Combination nudge is most effective

- 4,400+ patients engaged across 4 study arms
- “Both nudges” arm saw highest SIC rate





# Exemplars for infusing behavioral economic principles into implementation science work from our team



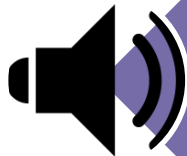
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Clinician + patient nudges



Going beyond nudges



## ASPIRE trial

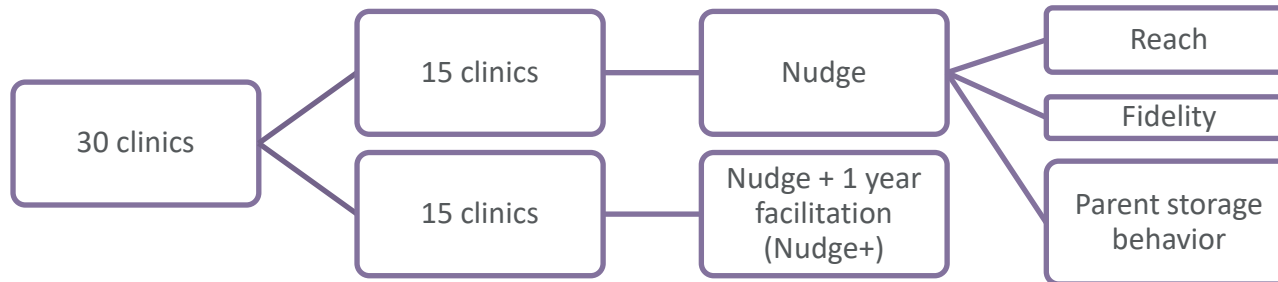
Is the less costly and scalable EHR-based ‘nudge’ powerful enough or is more intensive and expensive facilitation needed to overcome implementation barriers in the case of a sensitive preventive intervention (secure firearm storage program in pediatric primary care)?



# Design

## Hybrid type III effectiveness implementation trial – longitudinal cluster RCT

30 clinics, 204 clinicians, 46, 544 well child visits



Primary mechanism: Clinic-level adaptive reserve

# S.A.F.E Firearm Program and Implementation Strategies

## Parent Handout



## Firearm Cable Lock



## EHR Documentation

### *Henry Ford Health*

Safe firearm storage discussed

1. Yes

0. No

Cable lock offered

1. Yes

0. No

### *Kaiser Permanente Colorado*

Discussed safe firearm storage

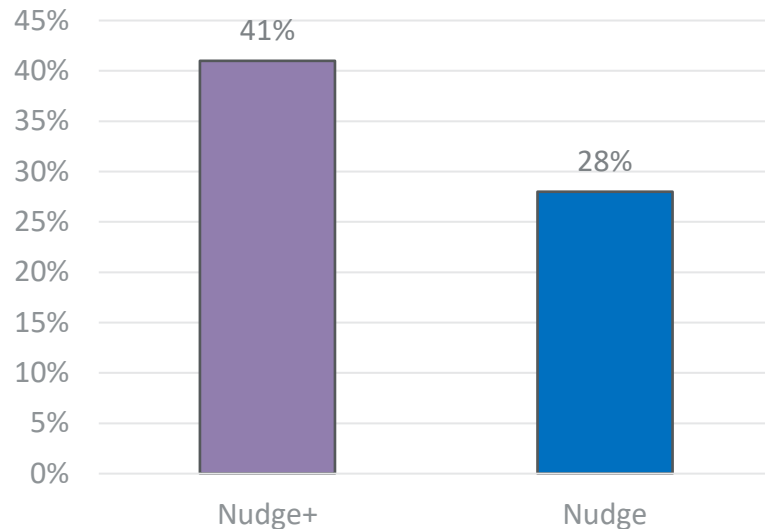
Did not discuss safe firearm storage

Offered cable lock

Did not offer cable lock

# Reach (counseling + locks) by study arm

*Preliminary findings; additional statistical analysis and modeling to be conducted – please do not share on social media*

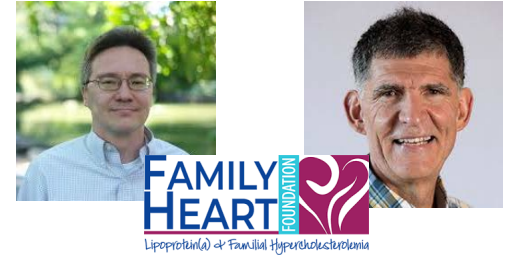


**Preliminary finding:**  
**Patients presenting to clinics receiving facilitation (i.e., Nudge+ clinics) were 2.2 times more likely to receive *S.A.F.E. Firearm* (41% vs. 28%)**



# Other exciting work in this space that our team is involved in

NHLBI funded patient-facing BE implementation strategies vs. navigator to increase cascade screening for familial hypercholesterolemia



NHLBI funded deimplementation strategies on sustainment of deimplementation (education + AF vs. both and BE EHR approach) of pulse ox in children hospitalized with bronchiolitis



New NCI funded Penn Northwestern ISC3 projects on genomics, MRI following mammogram, and patient reported outcomes



Early career investigators supported by Ks making this their area of expertise



# Agenda

Implementation  
science



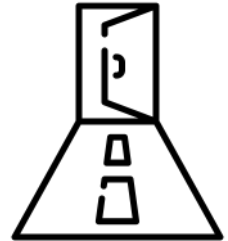
Exemplars



Behavioral  
economics



Implications and  
future  
directions



# Other exciting potential directions

Incorporating BE into our existing taxonomies in IS

Optimizing BE strategies using rapid cycle approaches and thoughtful design

What works for whom?  
Precision nudges

When to use patient-, clinician, and combination?

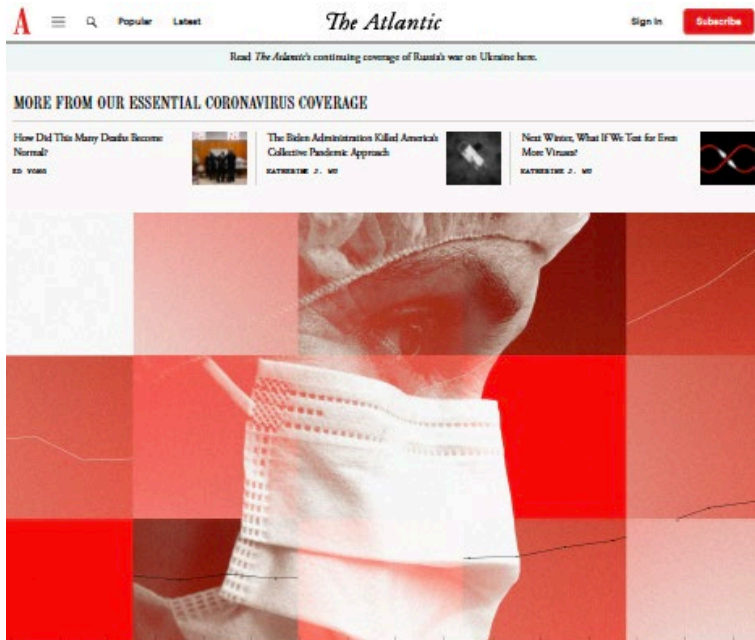
Do BE strategies consistently reduce inequities?

BE strategies as "first line" coupled with other strategies in a stepped fashion (I vs S frame)

PS BE can benefit from an IS perspective also!!!



# Caution: Behavioral economics alone will not be a panacea



## Lessons From Maslow: Prioritizing Funding to Improve the Quality of Community Mental Health and Substance Use Services

Rebecca E. Stewart, Ph.D., David S. Mandell, Sc.D., Rinad S. Beidas, Ph.D.

Evidence-based practices (EBPs) are frequently proposed as an approach to close the quality chasm in behavioral health treatment, and many U.S. municipalities are investing in EBPs as a primary way to improve the quality of care delivered to individuals most in need. In this Open Forum, the authors argue that EBPs often cannot be successfully implemented because basic organizational needs are not met in the current fiscal environment. The authors

summarize research that supports why EBPs, along with other approaches to improve quality, are likely to fail until there is adequate financing. They also propose a policy and research agenda to ameliorate and address the fiscal challenges inherent in community mental health and substance use services.

*Psychiatric Services* 2021; 00:1–4; doi: 10.1176/appi.ps.20200209

### HEALTH WHY HEALTH-CARE WORKERS ARE QUITTING IN DROVES

About one in five health-care workers has left their job since the pandemic started. This is their story—and the story of those left behind.

By Ed Yong



### The i-frame and the s-frame: How focusing on individual-level solutions has led behavioral public policy astray

Published online by Cambridge University Press: 05 September 2022

Nick Chater  and George Loewenstein 

Show author details 

# Challenges to applying these concepts

Many implementation behaviors are more complex than deciding to prescribe an antibiotic or administer a flu shot

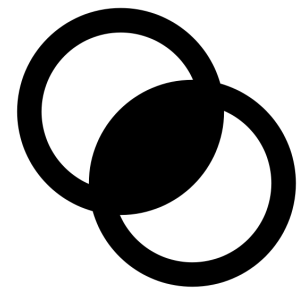
Behaviors require sustained behavior change

Challenges in mechanistic understanding

On average, we see a 10% increase in desired behavior with nudges

This is not a silver bullet. We still need to address multi-level determinants

## The main take-away from today's talk



Created by Angelo Troiano  
from Noun Project

The nexus of behavioral economics and implementation science has the potential to transform the seemingly intractable challenge of moving the needle in health care equitably.

Want more?

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