# Improving Dietary Health Through Behavioral Economics

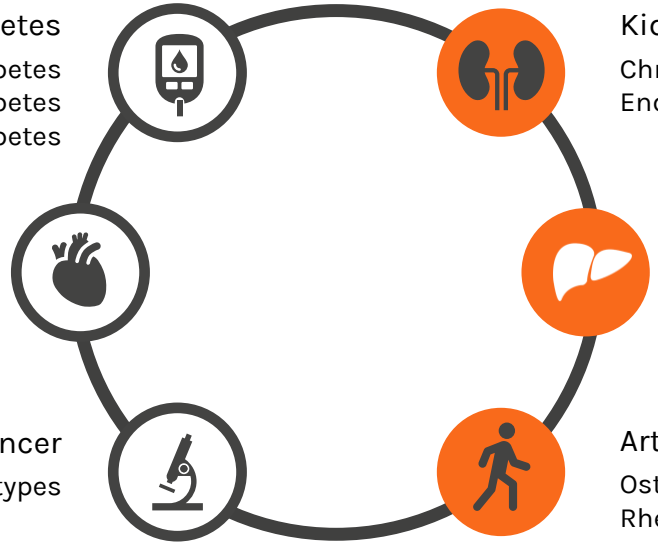
## High-level thoughts to inform “Food is Medicine” interventions

**Kevin Volpp, MD, PhD**
Mark V. Pauly Presidential Distinguished Professor

Center for Health Incentives & Behavioral Economics
Wharton University of Pennsylvania
Penn Medicine
@Kevin_Volpp

# Food is central to health outcomes

1 in 2 American adults have diabetes or prediabetes, and those living in poverty, rural areas, and historically vulnerable groups are more affected



**Diabetes**
Type 2 diabetes
Type 1 diabetes
Gestational diabetes

**Kidney Disease**
Chronic Kidney Disease
End-Stage Kidney Failure

**Cardiovascular Disease**
Atherosclerosis, Coronary Heart Disease, Peripheral Artery Disease, Congestive Heart Failure, Stroke, Heart Attack

**Liver Disease**
Nonalcoholic fatty liver disease
Alcoholic liver disease

**Cancer**
Various types

**Arthritis**
Osteoarthritis
Rheumatoid arthritis

Aspen Institute. Food is Medicine Research Action Plan. 2022

# But, Americans don’t have very healthy diets

- Less than 1 in 10 Americans meet requirements for fruits and vegetables
- More than 9 in 10 Americans have excess sodium intake
- 2% of Americans meet whole grains targets
- Healthy Eating Index – US population scores 59 out of 100

US Department of Agriculture, HHS, Dietary Guidelines for Americans, 2020-2025: 2020; 9th Edition; Poor nutrition CDC Published May 19, 2023.

# Behavior as the final common pathway. . .

Annals of Internal Medicine®



IDEAS AND OPINIONS | 3 OCTOBER 2017

## Reimagining Halfway Technologies With Behavioral Science

*David A. Asch, MD, MBA; Kevin G. Volpp, MD, PhD*

Article, Author, and Disclosure Information



In 1971 (1), Lewis Thomas outlined 3 levels of health care technology. The first he called "nontechnology": care that attends to ill patients but does little to alter the course of disease. Second were "halfway technologies": those that do not eliminate diseases but at least postpone their effects. In this large group he put everything from solid organ transplantation to cardiac care units—what today we might call chronic disease management. Third was technology so transformative we often take it for granted, such as childhood vaccines to prevent diphtheria and antimicrobials to treat syphilis. He urged further investment in the basic sciences that support this third level of technology, arguing that the first 2 contributed greatly to the $60 billion spent at the time on U.S. health care and the third was "the only way to get the full mileage that biology owes to the science of medicine, even though it seems ...

# Rationality inadequately describes behavior change

Information

Behavior

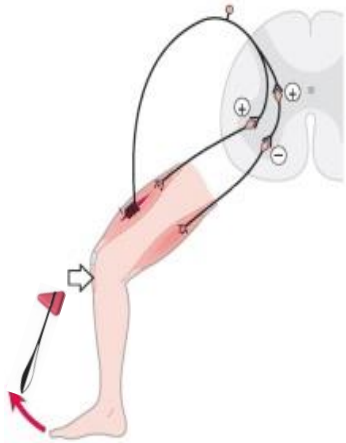
## Old approach:

- Educate people – information provision is all we need to do
- Adjust price – magnitude of incentive is all that matters
- Ignore simplicity - Layer on increasingly complex interventions

# The mind is a high-resistance pathway

Information

Behavior

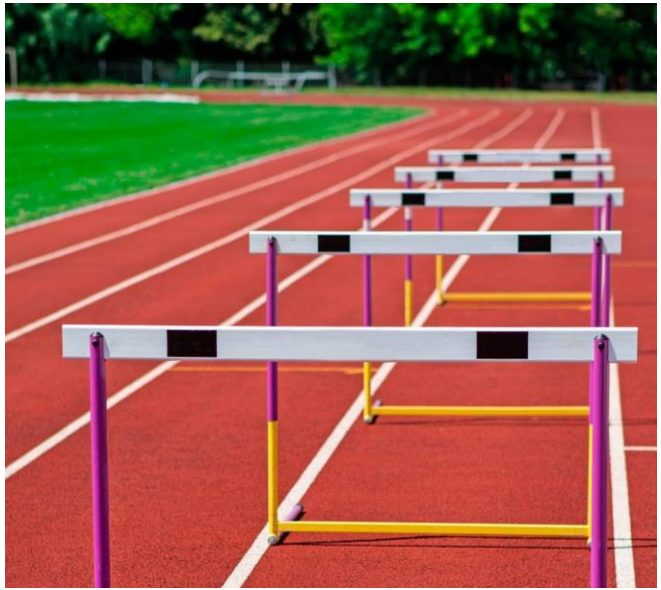


Better approach:

Use behavioral ‘reflexes’ to bypass cognition:

- Information ⇒ Choice architecture (defaults)
- Incentives ⇒ Behavioral incentives (financial/social)
- Complexity ⇒ Simplicity (limited bandwidth)

# Using behavioral science to increase healthy eating

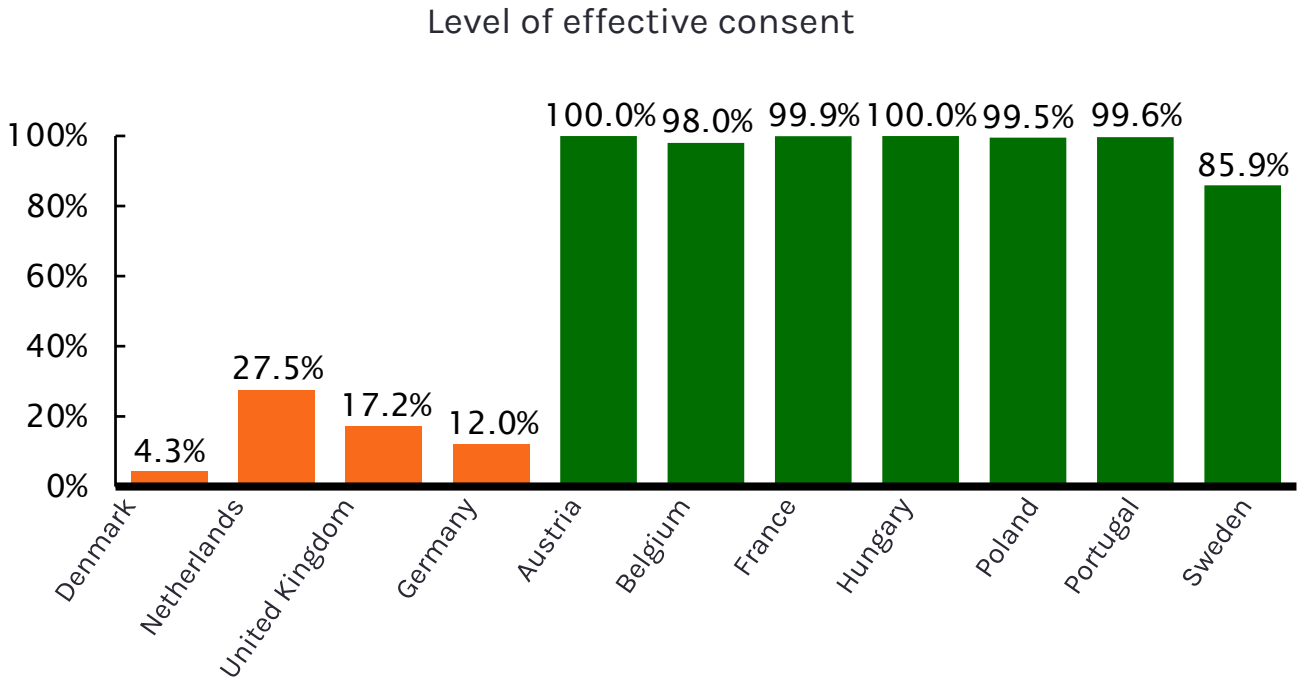


**Change Defaults**

Financial and Social Incentives

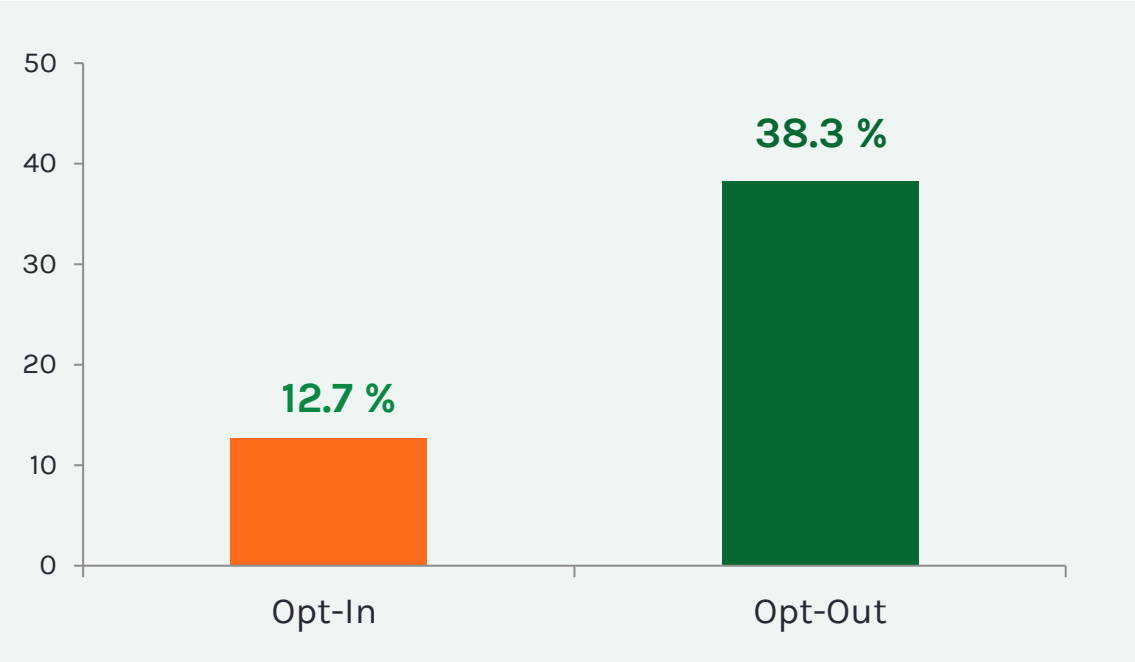
AHA Food is Medicine Initiative

# Default bias → ‘Opt out’ policies result in much higher rates for organ donation (and retirement savings)




Johnson and Goldstein, Science, 2003

# Applying this to Program Enrollment. . .Opt-out enrollment tripled rate of participation in diabetes management program




Hemoglobin A1c improved to a similar degree in both groups

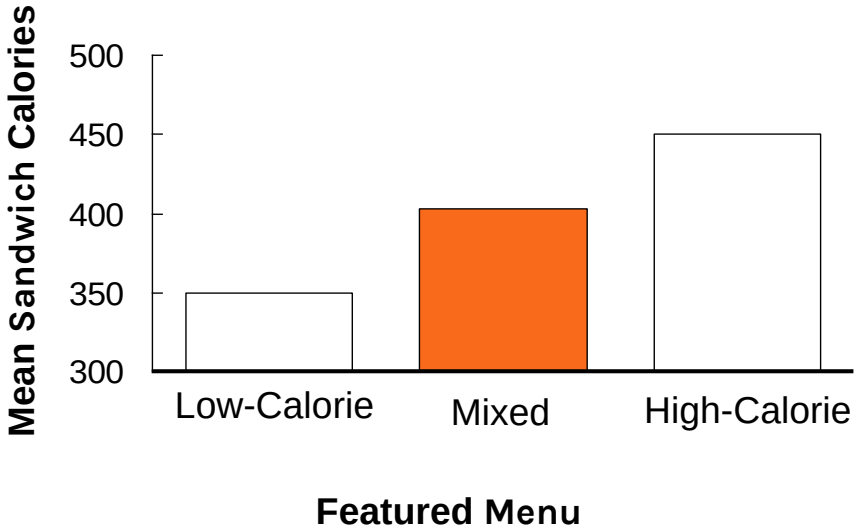
Aysola J, Tahirovic E, Troxel AB, Asch DA, Gangemi K, Hodlofski AT, Zhu J, Volpp K. Am J Health Promotion 2016

# Make the healthier choice the easier choice

Low Calorie


Mixed

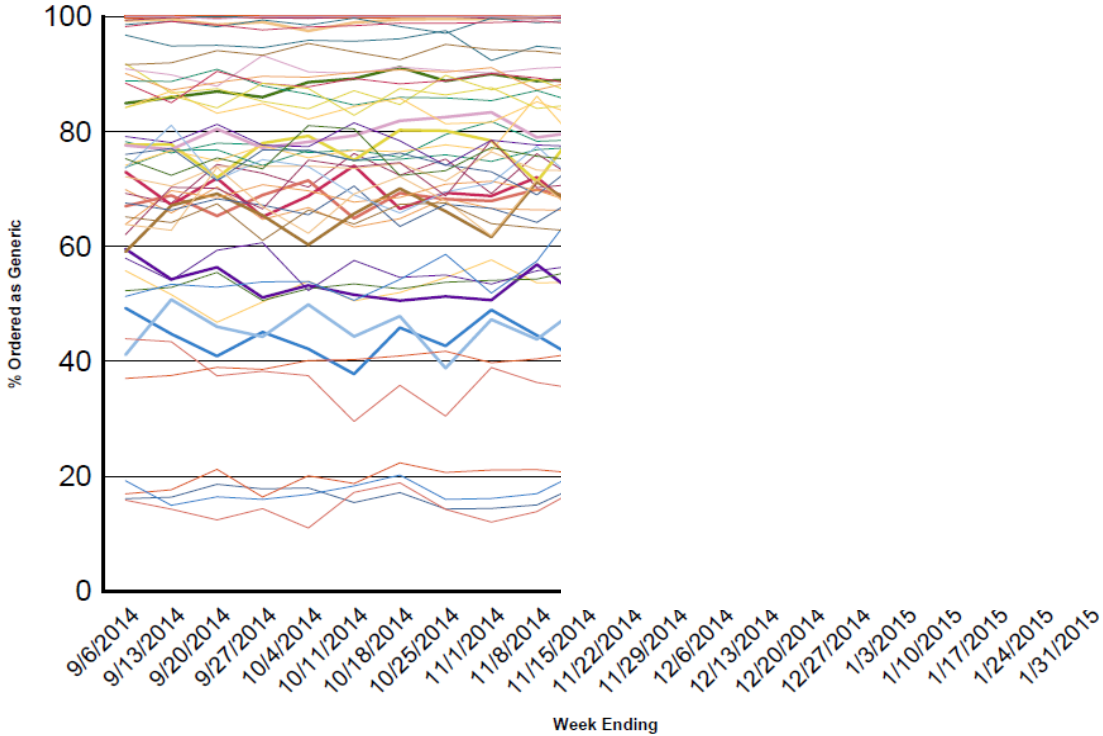

High Calorie


Can influence choice based on layout of food choices

Wisdom, J., Downs, J. & Loewenstein, G. AER Proceedings. 2009.

# Rates of generic prescribing transformed by changes in defaults: Use for Clinician Referral to FIM Programs?

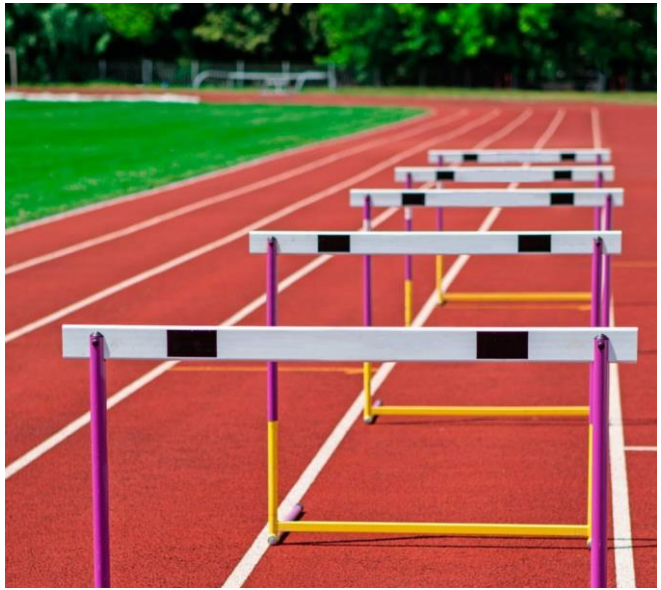



Patel M, Day SC, Halpern SD, Hanson CW, Martinez JR, Honeywell S, Volpp KG. 2016
JAMA Internal Medicine 176(6): 847-8

# Key implications

- Low enrollment rates in programs could be improved by framing enrollment for eligible patients as the default
- Use choice architecture where possible to guide choice of healthy foods
- Making it easier for clinicians to refer patients via shifting default settings would likely increase referral rates significantly

# Using behavioral science to improve health

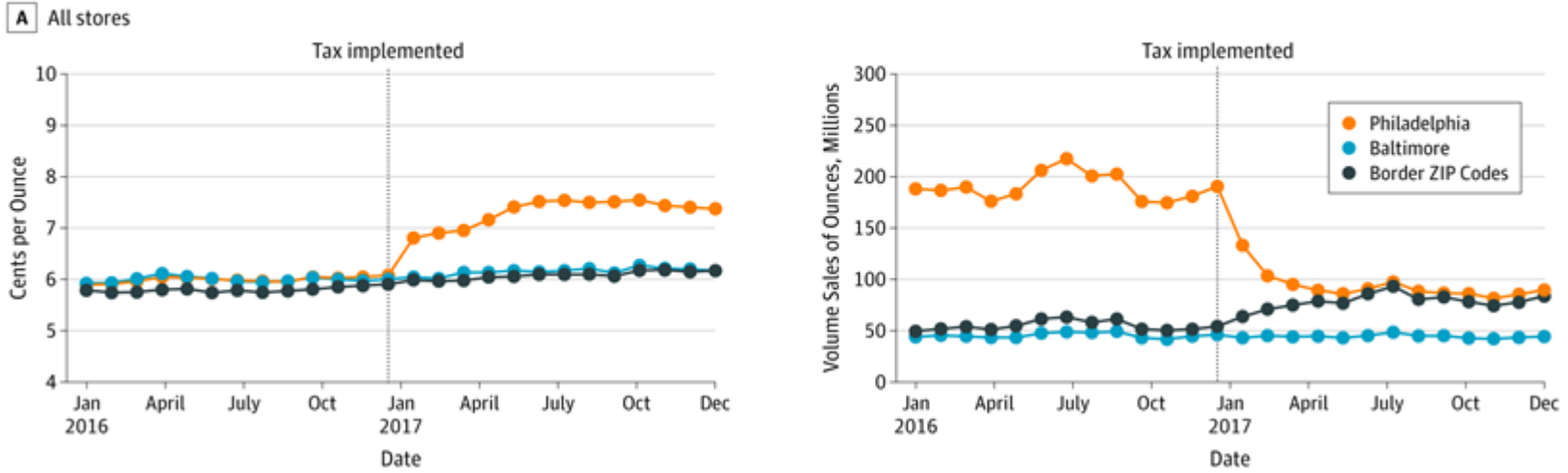


- Change Defaults
- **Financial Incentives**
- AHA Food is Medicine Initiative

# People respond to incentives . . .

# Consumption of sugary beverages varies with price . . .

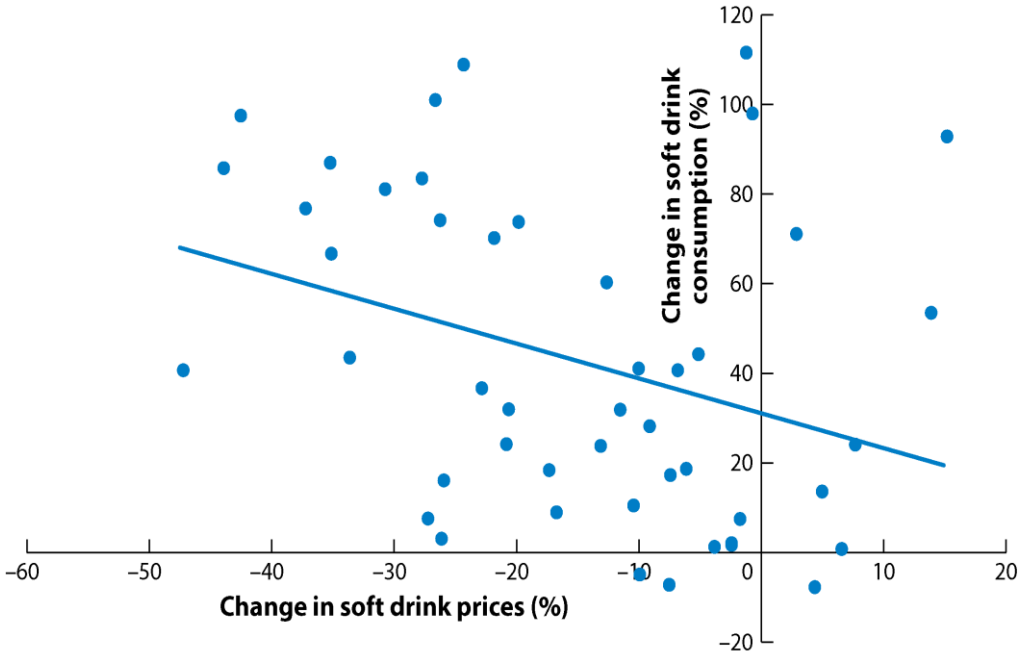
**Figure 1. Changes in Beverage Prices and Volume Sales in Philadelphia, Baltimore, and Bordering Zip Codes Before and After Tax Implementation**




Passage of a 1.5 cent per ounce tax on sugar-sweetened beverages (SSB) in Philadelphia was associated with a 38% net decrease in consumption of SSB

Roberto, Lawman, LeVasseur et al, JAMA 2019

# Consumption of sugary beverages varies with price . . .




Price elasticity of demand about -0.8 based on data from many countries, e.g. 10% increase in price decreases consumption by about 8%

Chaloupka FJ, et al. 2019.
*Annu. Rev. Public Health* 40:187–201

Chaloupka, Powell, Warner, Annu Review of Public Health 2019

# Increasing healthy food consumption isn't as simple as using subsidies to lower the price

**50%**

**Subsidy only increased fruit & vegetable purchasing by**

**4.7%**

JAMA Network | Open

**RCT: Effect of Financial Incentives and Default Options on Food Choices of Adults With Low Income in Online Retail Settings**

**POPULATION**

**1297 Men, 1447 Women**

Adults ≥18 y who currently or ever received Supplemental Nutrition Assistance Program (SNAP) benefits

**Mean age, 46.7 y**

**INTERVENTION**

**2744** Participants randomized and analyzed

**649 Control**
No discount given, shopping cart was not prefilled

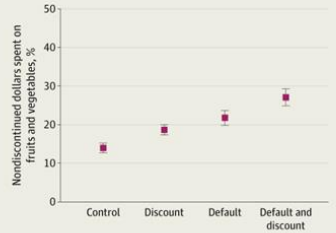
**682 Discount**
A 50% discount given on eligible fruits and vegetables

**727 Default**
Shopping cart prefilled with tailored fruit and vegetable items

**686 Default and discount**
Prefilled shopping cart plus a 50% discount given on eligible fruits and vegetables

**FINDINGS**

Compared with the control group, participants in the discount, default, and combination groups spent significantly greater percentages of nondiscounted dollars on fruits and vegetables




**Percentage more of nondiscounted dollars spent vs control:**

**Discount:** 4.7% (98.3% CI, 1.7%-7.7%)
**Default:** 7.8% (98.3% CI, 4.8%-10.7%)
**Combination:** 13.0% (98.3% CI, 10.0%-16.0%)

**SETTINGS / LOCATIONS**

**Online survey in the US**

**PRIMARY OUTCOME**

Percentage of nondiscounted dollars spent on eligible fruits and vegetables per food basket purchased at an experimental online grocery store with a budget tailored to household size

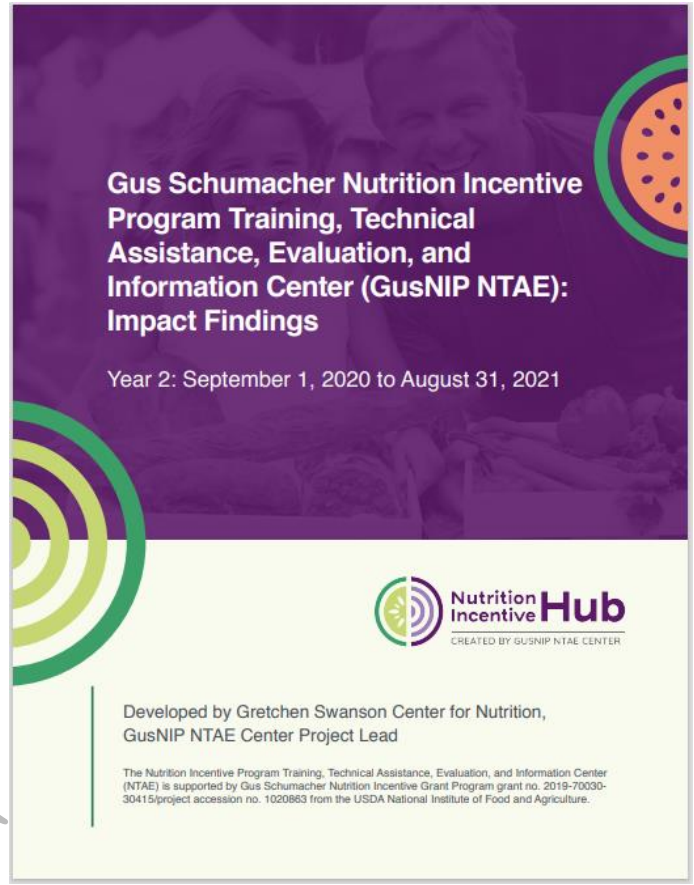
Rummo PE, Roberto CA, Thorpe LE, Troxel AB, Elbel B. Effect of financial incentives and default options on food choices of adults with low income in online retail settings: a randomized clinical trial *JAMA Netw Open*. 2023;6(3):e232371. doi:10.1001/jamanetworkopen.2023.2371

# Substantial funds left on the table . . .

**65%**

**Total Annual Benefits Utilization**

*Based on total incentives redeemed ($579,995) as a proportion of total incentives issued ($886,975) across 261 firms, hundreds of participants*




Gus Schumacher Nutrition Incentive Program Training, Technical Assistance, Evaluation, and Information Center (GusNIP NTAE): Impact Findings. https://www.nutritionincentivehub.org/media/fjohmr2n/gusnip-ntae-impact-findings-year-2.pdf

# Incentives for Fruit and Vegetable Consumption

THE WALL STREET JOURNAL.

Subscribe Now | Sign In
JOIN NOW

Home World U.S. Politics Economy Business Tech Markets Opinion Arts Life Real Estate
Search

The Fatal Mistake That Doomed Samsung's Galaxy Note 7

AT&T, Time Warner Shares Drop Amid Investor Skepticism

Car Makers Struggle With Dashboard Screens

Venture Capitalists Hunt for Next Big Technology

Retailers Hire for Sign of Market

BUSINESS | JOURNAL REPORTS: LEADERSHIP

**Here's Why You Should Pay Your Children to Eat Their Vegetables**

Study finds short-term cash incentives yield more-healthful eating habits in the long term

Giving children rewards for healthy eating can create good habits that outlast the rewards. *PHOTO: ISTOCKPHOTO/GETTY IMAGES*

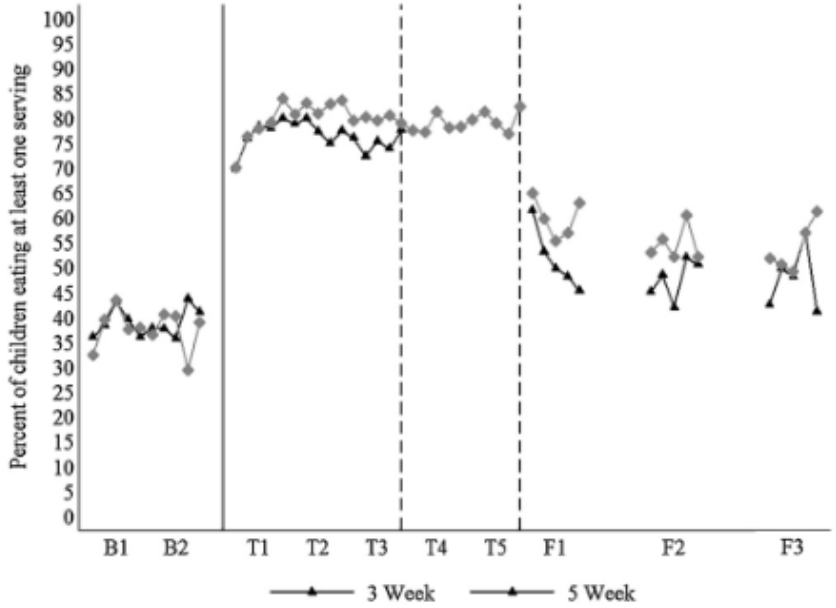
By BECKIE STRUM

60 COMMENTS

- 40 elementary schools in Utah
- Students received $0.25 vouchers each day for 3 or 5 weeks
- Immediate reinforcement and highly salient
- Research assistants observed servings F and V
- Post intervention checks at 1,2,4,8 weeks

Price J, Loewenstein G, Volpp KG. Journal of Health Economics. 2015

# Significant increases in F and V consumption – about half sustained post-intervention



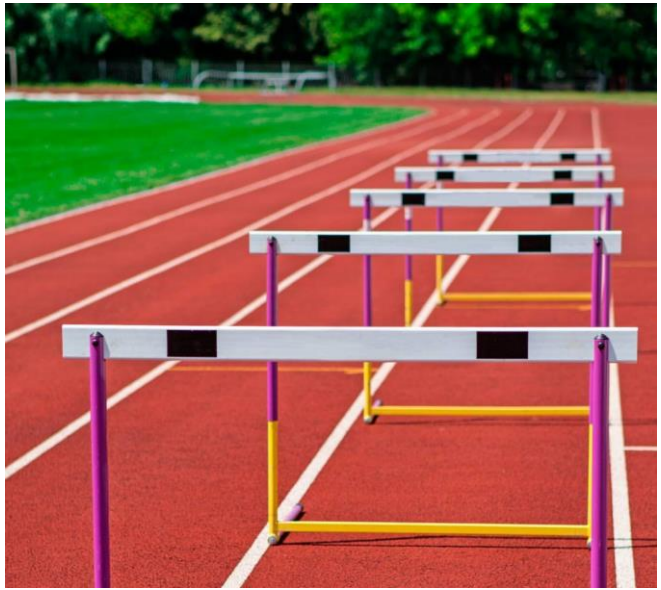

- Results robust to adjusting for gender, grade, day of week, school fixed effects
- Cost per additional child/serving about 28 cents
- No evidence of crowding out of motivation
- Habit formation vs new taste acquisition vs social norms

Price J, Loewenstein G, Volpp KG. Journal of Health Economics. 2015; Volpp and Loewenstein, ODHPP 2020

# Key points

- People respond to price
- Don’t assume that people automatically respond to changes in price if not sufficiently salient
- Small incentives can work
- Immediacy is important
- Behavioral approaches like leveraging loss aversion can increase financial incentive effectiveness

# Using behavioral science to improve health

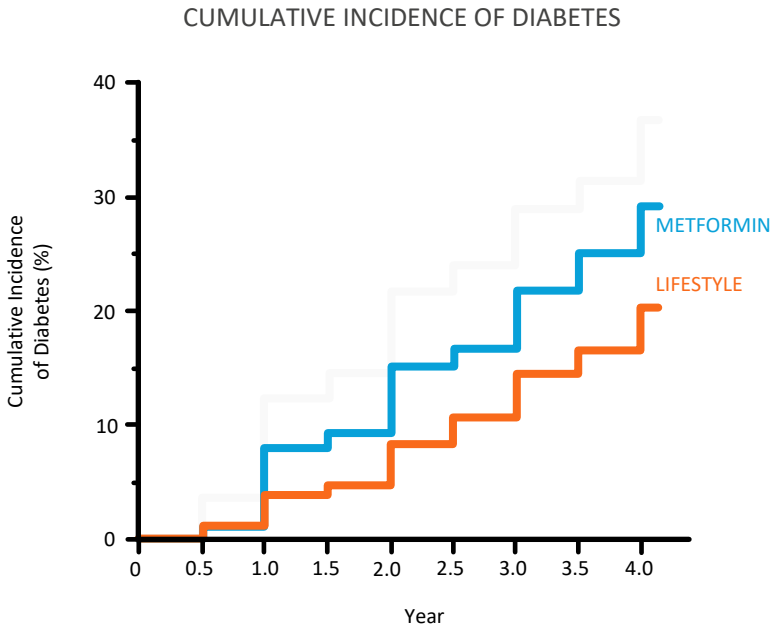


- Change Defaults
- Financial Incentives
- **AHA Food is Medicine Initiative**

# Lifestyle-based interventions can be highly effective

But not always equally covered like pharmaceuticals. . .

Lifestyle interventions (Diabetes Prevention Program) had the greatest impact when compared to a placebo and metformin, reducing the incidence of diabetes by 58% compared to 31% for metformin



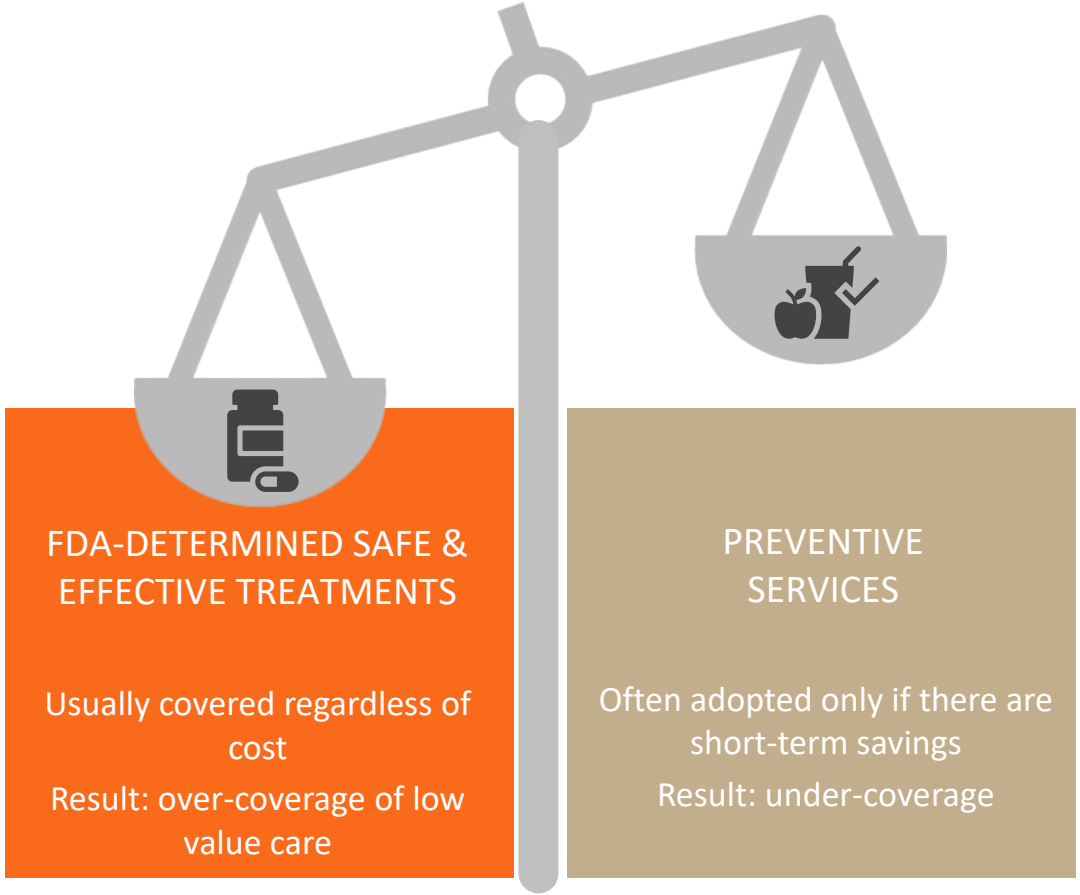

Diabetes Prevention Program Research Group. NEJM 2002
Herman WH. Clinical Diabetes and Endocrinology. 2015

# Coverage decisions: Fighting the double standard

SOLUTION:

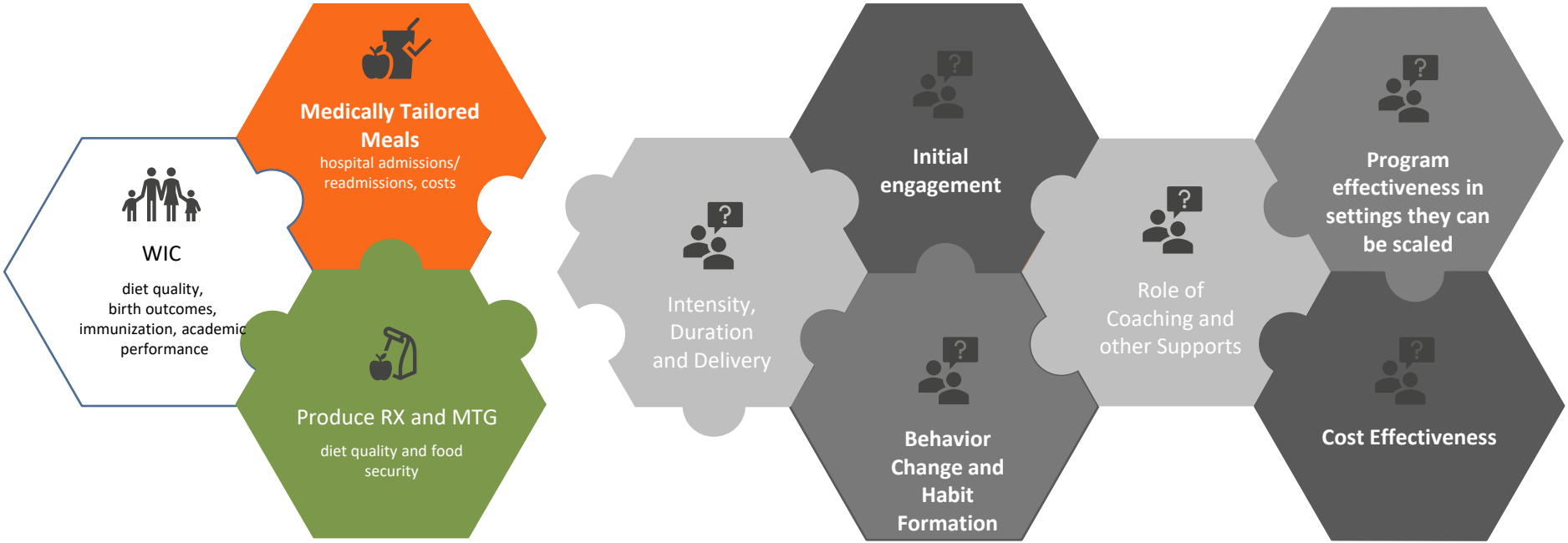
Evaluate all services using same standard

Do they improve health at a reasonable price?



# Strengthening the Evidence

AHA/Rockefeller initiative will build on existing evidence:




Existing Evidence

Gaps in Evidence to Address

# Food Is Medicine Initiative: Research Planning Group

CHAIR
Kevin Volpp, MD, FAHA
University of Pennsylvania

Cheryl Anderson, MS, CMPH, PhD
University of California San Diego

Seth Berkowitz, MD, MPH
University of North Carolina, Chapel Hill

Stacey Chang
New Origin Studio

Robert Harrington, MD, FAHA, FACC
Stanford University

Adrian Hernandez, MD, MHSc
Duke University

Donald Lloyd-Jones, MD, ScM, FACC
Northwestern University

Mark McClellan, MD, PhD
Duke University

Eric Peterson, MD, MPH, FAHA, FACC
University of Texas Southwestern

Hilary Seligman, MD, MAS
University of California San Francisco

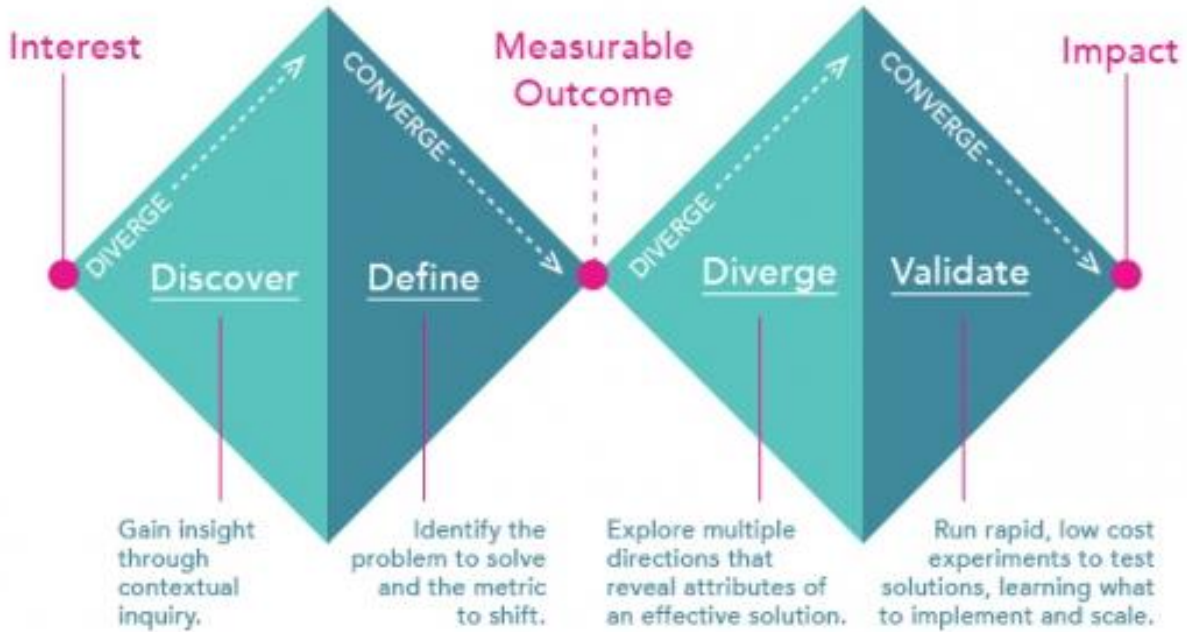
Shreela Sharma, MA, RD, PhD
University of Texas

Andrea Troxel, ScD
NYU Langone Health

STAFF LEAD
Mitchell Elkind, MD, MS, FAHA
American Heart Association

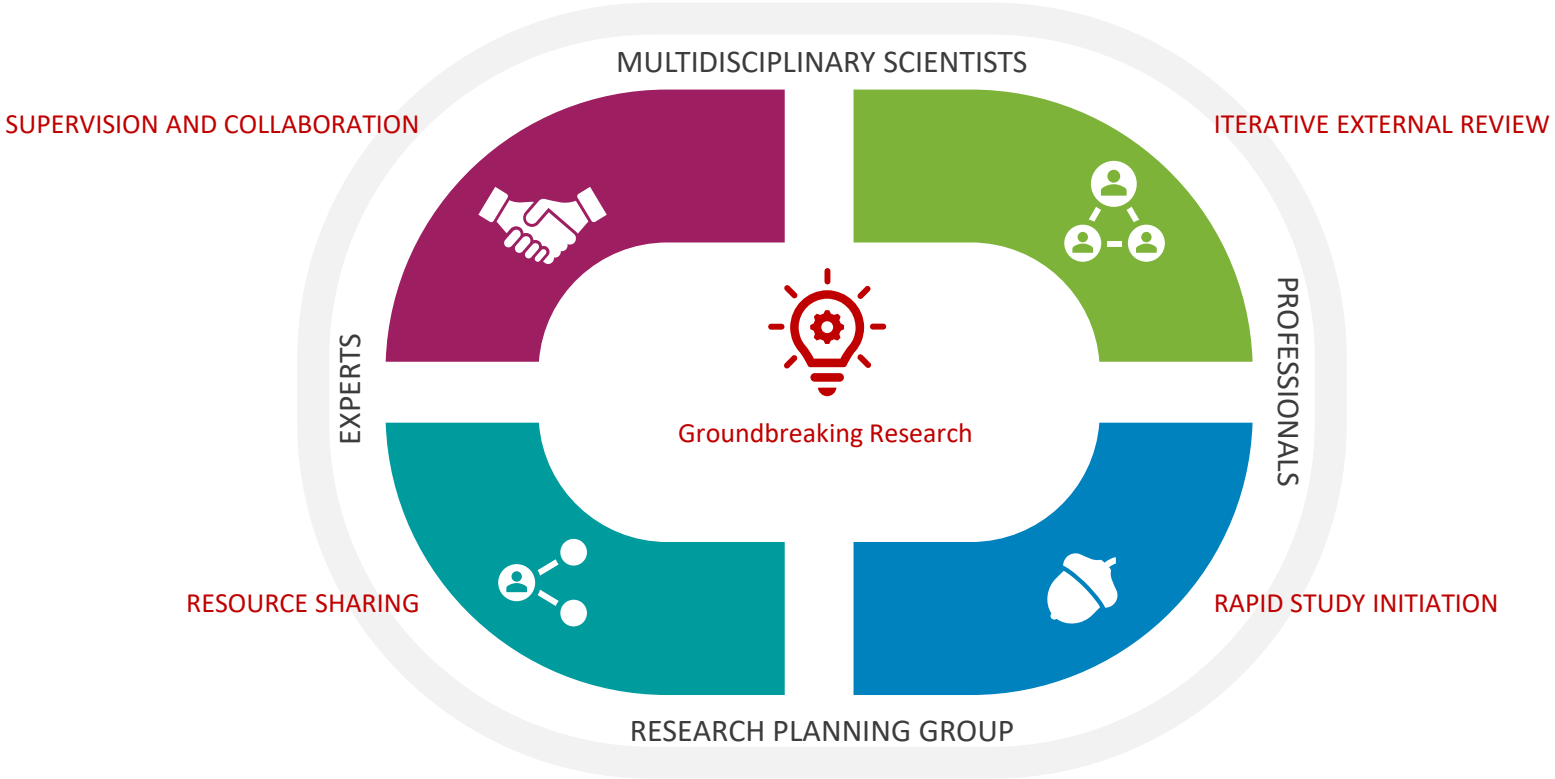
STAFF
Jen Muse, MS, RD, CDN
American Heart Association

# Human-centered design to better understand current behavior and more rapidly iterate



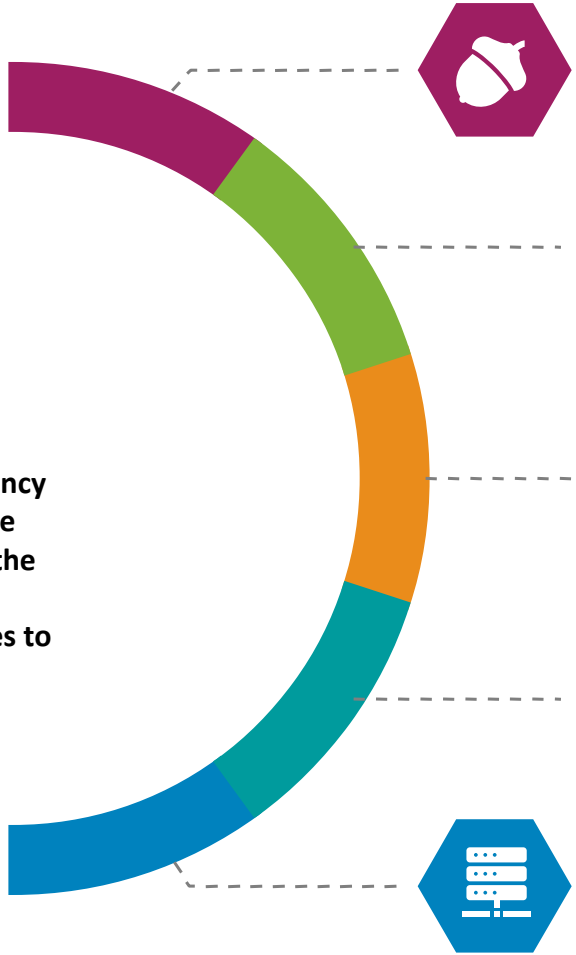

Key is rapid cycle testing and iterating potential solutions in context in which they would be broadly implemented

# Cooperative Studies Model as a Way to Accelerate Learning



# Maximizing Learnings Across Pilots

In addition to increasing transparency and ensuring access to cutting-edge expertise in clinical trials through the cooperative studies model, we are incorporating a variety of strategies to maximize learning across pilots



Testing the underlying assumptions via small bets before large bets

Work with partners to test ideas in settings where they can scale

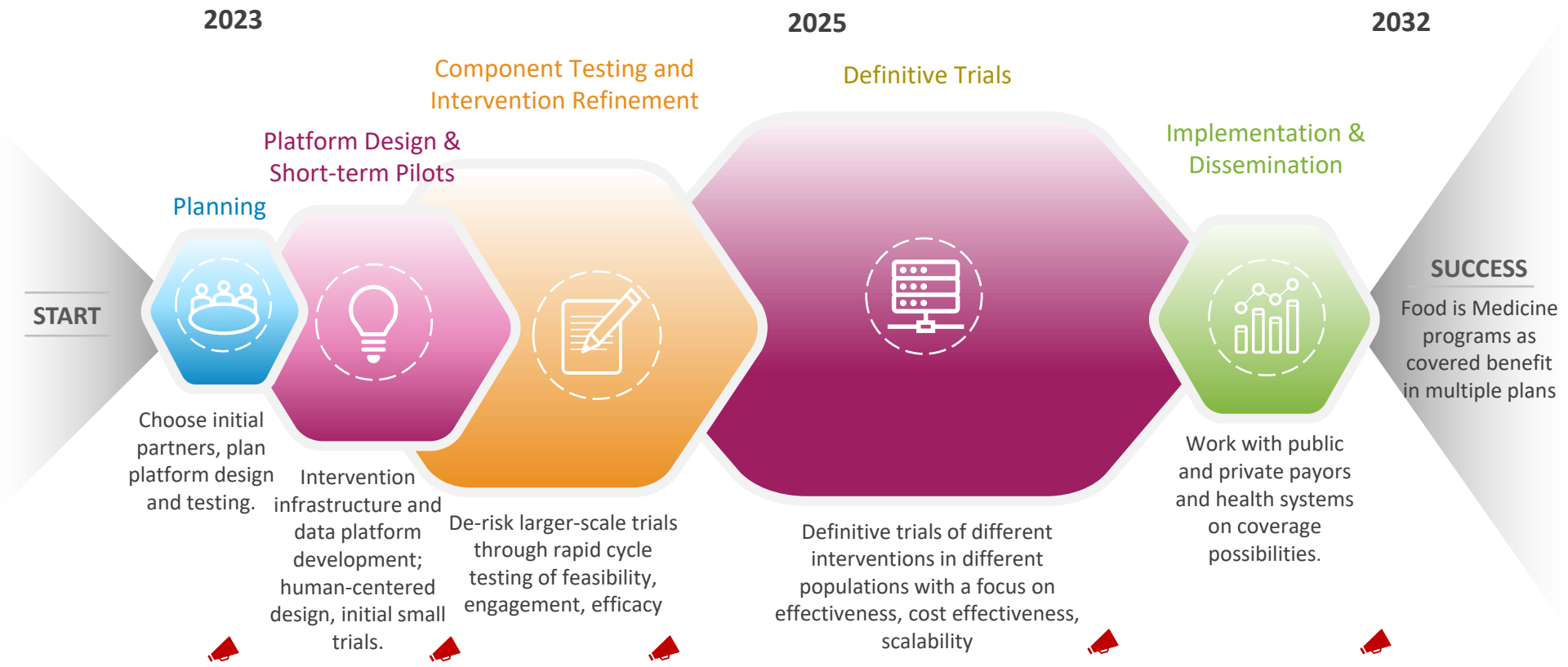
Coordinating common measurements, including for nutrient assessment

Providing transparency, through both publicly available datasets and resources for developing and executing FIM interventions

Use of automated trial platforms

# Food Is Medicine: Research Timeline

DRIVING FOOD SYSTEM TRANSFORMATION AT THE INTERSECTION OF HEALTH CARE




Publications and news releases, significant milestones

# Thank you!

**Kevin Volpp, MD, PhD**
Mark V. Pauly Presidential Distinguished Professor

Center for Health Incentives & Behavioral Economics

Wharton University of Pennsylvania

Penn Medicine

@Kevin_Volpp