Expanding the evidence base in vaccine delivery
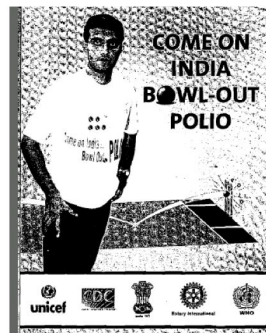

CASES IN GLOBAL HEALTH DELIVERY

GHD-005
APRIL 2011

Polio Elimination in Uttar Pradesh

By the end of the twentieth century, polio had been eliminated from the Americas and Europe and had been confined to a few outposts in Africa and Southeast Asia. In its most devastating form, polio virus...

CASES IN GLOBAL HEALTH DELIVERY
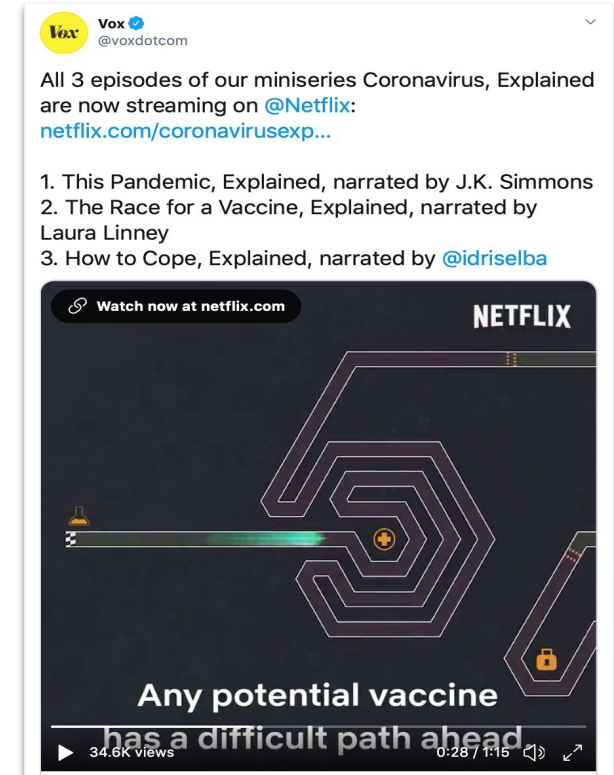
GHD-015
APRIL 2011

The Measles Initiative

Before the discovery of a vaccine in 1963, measles claimed the lives of 8 million children each year. In 1999, nearly 40 years after the introduction of the measles vaccine, 873,000 people, mostly children, died from measles. The disease accounted for more than half of all vaccine-preventable deaths. Between 2000 and 2007, measles deaths fell by 74% worldwide and by 89% in Africa as a result of vaccination campaigns and strengthened routine immunizations in more than 60 countries. The Measles Initiative (MI) – a partnership between the World Health Organization (WHO), United Nations Children's Fund (UNICEF), US Centers for
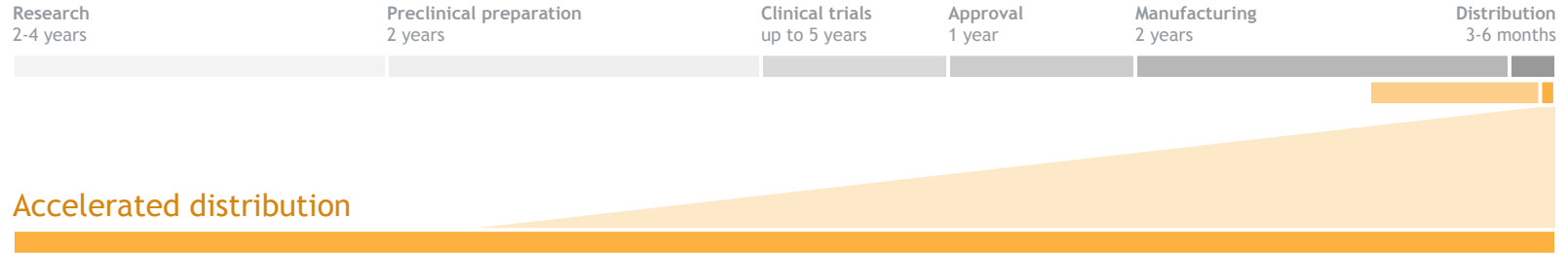
Exhibit 12b *Awareness Campaign Materials, Poster and Inflatable Toys*

COME ON INDIA BOWL-OUT POLIO

Source: Global Polio Eradication Initiative

More at: https://www.globalhealthdelivery.org/case-collection

Narrow Planning Window

A Covid-19 Vaccine Will Need Equitable, Global Distribution

by Rebecca Weintraub , Prashant Yadav and Seth Berkley

April 02, 2020

Summary Save Share 4 Comment Print $8.95 Buy C

The Danger of Vaccine Nationalism

by Rebecca Weintraub , Asaf Bitton and Mark L. Rosenberg

May 22, 2020

Summary Save Share 1 Comment Print $8.95 Buy Copies

Vox ✔
@voxdotcom

All 3 episodes of our miniseries Coronavirus, Explained are now streaming on @Netflix:
netflix.com/coronavirusexp...

1. This Pandemic, Explained, narrated by J.K. Simmons
2. The Race for a Vaccine, Explained, narrated by Laura Linney
3. How to Cope, Explained, narrated by @idriselba

🔗 Watch now at netflix.com   NETFLIX

Any potential vaccine
has a difficult path ahead

▶ 34.6K views   0:28 / 1:15

Harvard Business Review

ARIADNE LABS

https://hbr.org/2020/04/a-covid-19-vaccine-will-need-equitable-global-distribution
https://hbr.org/2020/05/the-danger-of-vaccine-nationalism

https://twitter.com/voxdotcom/status/1273398770995265544

Normal vaccine production timeline: 8-15 years

| Research | Preclinical preparation | Clinical trials | Approval | Manufacturing | Distribution |
| 2-4 years | 2 years | up to 5 years | 1 year | 2 years | 3-6 months |

Accelerated distribution

How do you take a vaccine to vaccination?

ARIADNE LABS
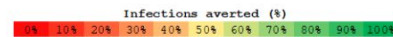
Nine heat plots for 42-day delay to vaccine efficacy

Paltiel AD, Schwartz JL, Zheng A, Walensky RP. Clinical Outcomes Of A COVID-19 Vaccine: Implementation Over Efficacy. Health Affairs. 2020 Nov 19:10-377.

5
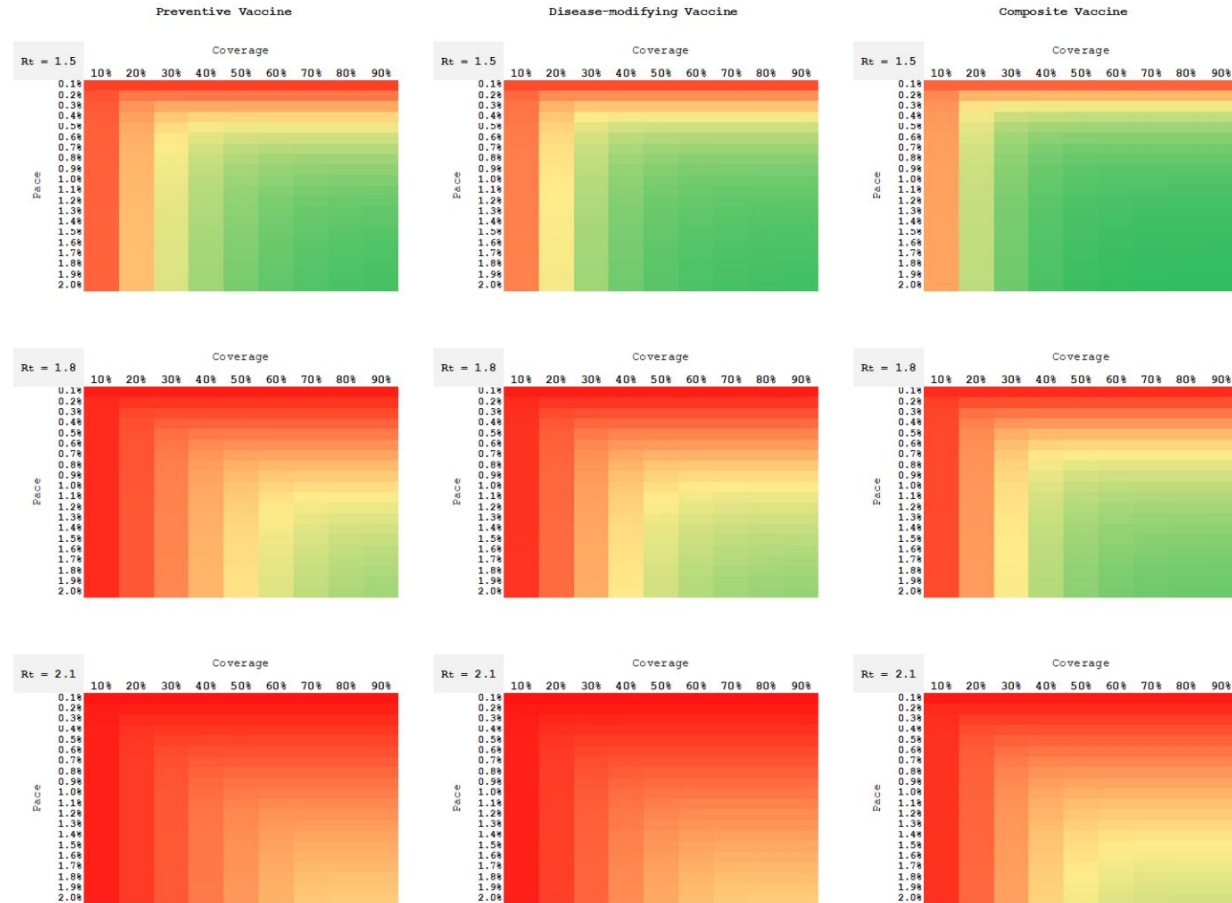
Framework for Equitable and Effective Vaccine Delivery

Demand

Generate demand and understand Vaccine hesitancy, tailor engagement.

PARTNERSHIPS

- Local **media** and **brands** to reach audiences with the right messaging across channels
- **Influencers** and **community leaders** to expand reach on-and-off-line
- **Local NGOs** and **healthcare networks** to train the health workforce

CAPABILITIES

- Public health campaign
- Healthcare workforce training program
- Influencer & KOL engagement program

Allocation

Identify the right populations for effective and equitable distribution

PARTNERSHIPS

- **Biotech/pharma and manufactures** to ensure quality and timely schedule of the supply of vaccines
- **National and Local governments** and **health systems** to identify and segment populations for vaccination

CAPABILITIES

- Population data platforms
- Demand & distribution planning tools
- Vaccine procurement program

Distribution

Get the right vaccine to the right people at the right time

PARTNERSHIPS

- **Global logistics partners** to coordinate and ship vaccine supply
- **Technology vendors** and **training partners** to support inventory management and administration
- **Local NGOs** and **healthcare networks** to facilitate vaccine administration

CAPABILITIES

- Vaccine inventory & supply chain networks
- Vaccine administration site networks
- Resource planning platform

Verification

Ensure proper distribution and track progress towards herd immunity

PARTNERSHIPS

- **Technology vendors** to develop and implement verification systems
- **Local NGOs** and **healthcare networks** to facilitate verification activities at the point of administration
- **Global NGOs** and **training partners** to upskill the workforce

CAPABILITIES

- Verification tools & hardware
- Verification platform
- Verification dashboards & reporting

OVERARCHING CAPABILITIES

Health Affairs

ARIADNE LABS

Weintraub, R; Submaranian, L; Karlage, A; Ahmad, I; Rosenberg, J; COVID-19 vaccine to vaccination: why leaders must invest in delivery strategies now. Health Affairs (*in press*). November 2020.

COVID-19 NEW VACCINE INFORMATION, COMMUNICATION, AND ENGAGEMENT

CONVINCE

At present, CONVINCE has 5 workstream groups:

1. **Healthcare Workforce**
2. Community Engagement
3. Technology
4. Media & Social Media
5. Private Sector

https://sph.cuny.edu/research/convince/

ECONOMICS & SOCIETY

Why Businesses Must Help Build Trust in a Covid-19 Vaccine

by Rebecca Weintraub , Julie Rosenberg , Kenneth Rabin and Scott C. Ratzan
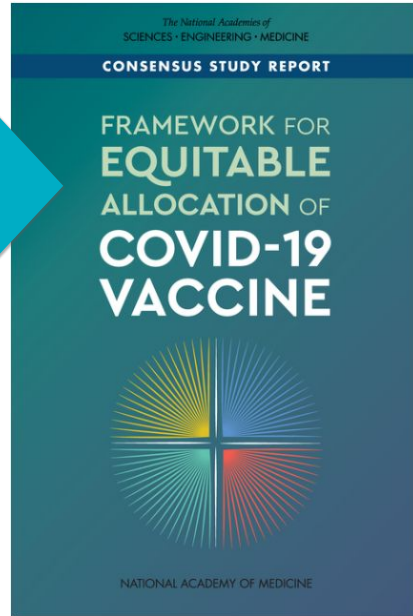
August 20, 2020

Summary   Save   Share   Print

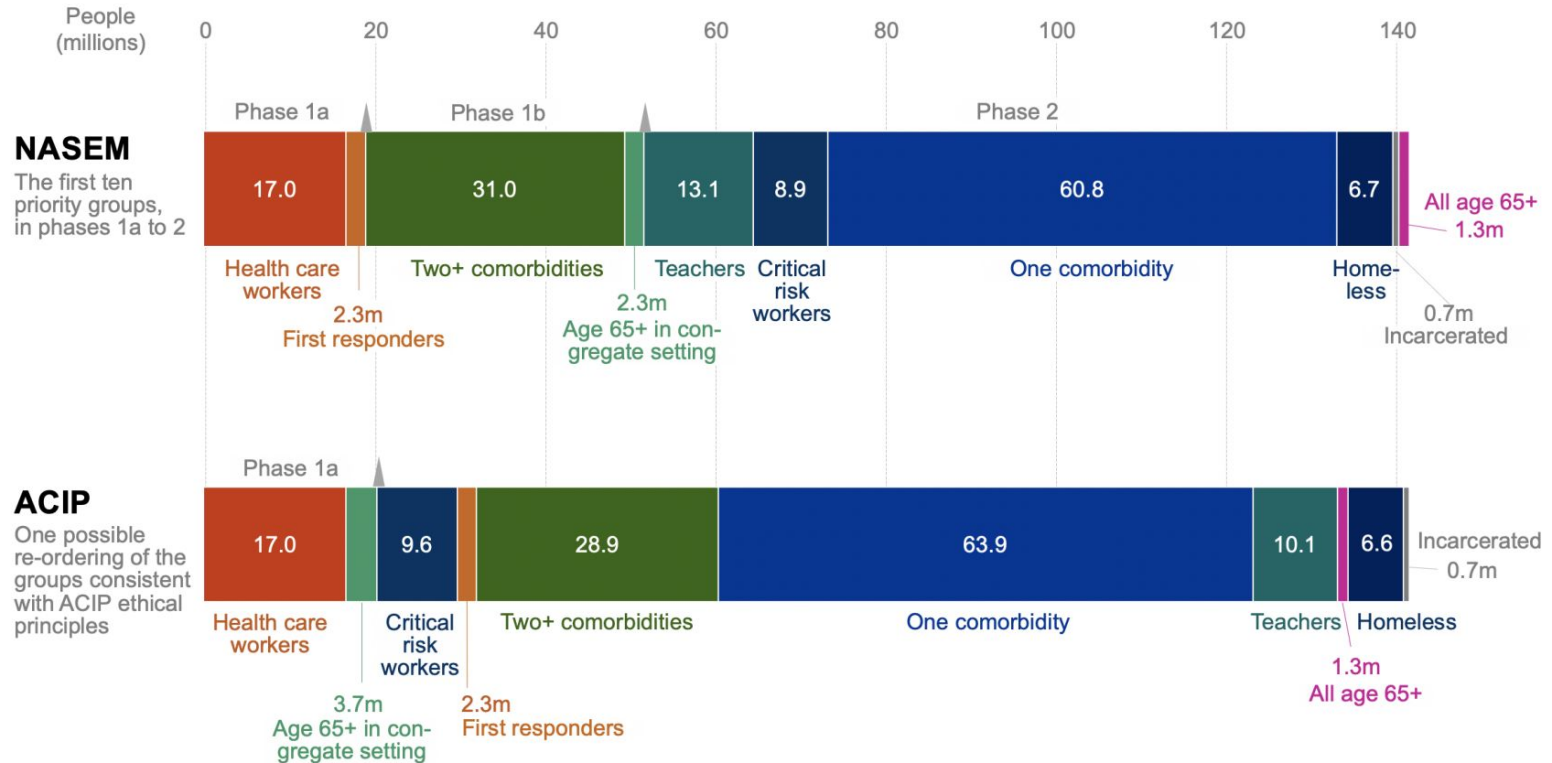Demand **Allocation** Distribution Verification

US
NASEM

FRAMEWORK FOR EQUITABLE ALLOCATION OF COVID-19 VACCINE

WHO Concept for fair access and equitable allocation of COVID-19 health products

Final working version 9 September 2020

Global
WHO/COVAX

Figure 1: Priority groups under NASEM and ACIP frameworks

First144m people in the first 10 NASEM priority groups, accounting for overlap (note: ACIP framework still evolving, showing 1/multiple options. Depiction: Ariadne Labs)

Source: Schmidt, Harald and Weintraub, Rebecca and Williams, Michelle A. and Buttenheim, Alison and Sadecki, Emily and Wu, Helen and Doiphode, Aditi and Gostin, Lawrence O. and Shen, Angela, Equitable Allocation of COVID-19 Vaccines: An Analysis of the Initial Allocation Plans of CDC's Jurisdictions with Implications for Disparate Impact Monitoring (December 1, 2020). Available at SSRN: https://ssrn.com/abstract=3740041

Demand **Allocation** Distribution Verification

Higher vulnerability states | Lower vulnerability states

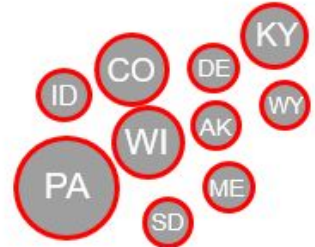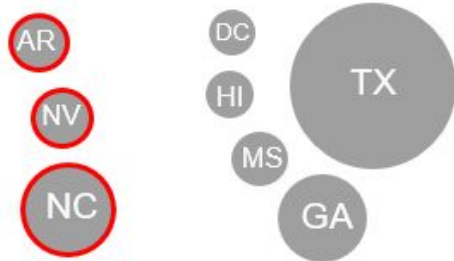Yes, planning to use an index

8 states, 82 m adults | 11 states, 51 m adults

8 states, 47 m adults | 24 states, 76 m adults

No mention of using an index

What groups of people will states vaccinate, and in what order?

A typical plan

Phase 1a	Healthcare workers LTC residents
Phase 1b	Essential workers People with comorbidities
Phase 2	Teachers All age 65+ Homeless Incarcerated
Phase 3	All others

Some plans sub-prioritize HCWs:

State	First priority	Later
OK	Inpatient HCWs	Outpatient HCWs
UT	Hospitals in high COVID prevalence areas	All other hospitals
NM	Vaccinators	All other HCWs

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What groups of people will states vaccinate, and in what order?

Demand   **Allocation**   Distribution   Verification

A typical plan

Phase 1a	Healthcare workers
	LTC residents
Phase 1b	Essential workers
	People with comorbidities
Phase 2	Teachers
	All age 65+
	Homeless
	Incarcerated
Phase 3	All others

CDC Playbook critical populations:

"People at increased risk of acquiring or transmitting COVID-19:
- Racial and ethnic minority groups
- People who are incarcerated
- People experiencing homelessness"

Four states explicitly include "racial and ethnic minority groups"

MT, DE, MO, NE

The New York Times
Opinion

Find Your Place in the Vaccine Line

By Stuart A. Thompson
Illustrations by Jorge Colombo

Ariadne Labs worked closely with NYT reporter Stuart Thompson to build a public-facing tool using data and analysis from the Vaccine Allocation Planner.

Impact and Influence

- 85 media stories (mostly local)
- 450M people reached via media
- Trend of people posting screenshots of their place in line

Ongoing & Upcoming

- 7+ interviews with local outlets by Ariadne Labs and analytics partner Surgo Foundation
- Working with NYT on follow-up piece as well as with Washington Post, Univision, the Guardian and USA Today

Building: A Global Vaccine Allocation Planner

The need

Many countries face gaps in data to allocate the vaccine and plan for distribution.
Based on our US planner, inquiries from Jordan, Colombia, [others?]

Multinational organizations are not filling the need.
Not aware of any plans from [CEPI?, GAVI?, others?] to build such a platform.

Public dialogue is critical, and a planner supports that with data and insight.

Speed is critical, as vaccine stocks ramp up globally.

The planner

A public online tool building on Ariadne's success with the US-based planner.

Scope is flexible: can use a country's internal data or global data sources.

All code and data will be as transparent as possible.

Aim to launch in Q1 2021.

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Scarcity will persist, planning is needed

Target 1: medical staff
(115 million doses)

Target 2: adults over 65
(1,615 million doses)

**Target 3: Adults with
comorbidities
(4,265 million doses)**

Target 4: Whole world
(18 billion doses)

McDonnell, Anthony, Robert Van Exan, Steve Lloyd, Laura Subramanian, Kalipso Chalkidou, Adrian La Porta, Jiabin Li, et al. "COVID-19 Vaccine Predictions: Using Mathematical Modelling and Expert Opinions to Estimate Timelines and Probabilities of Success of COVID-19 Vaccines." Center For Global Development. https://www.cgdev.org/publication/covid-19-vaccine-predictions.
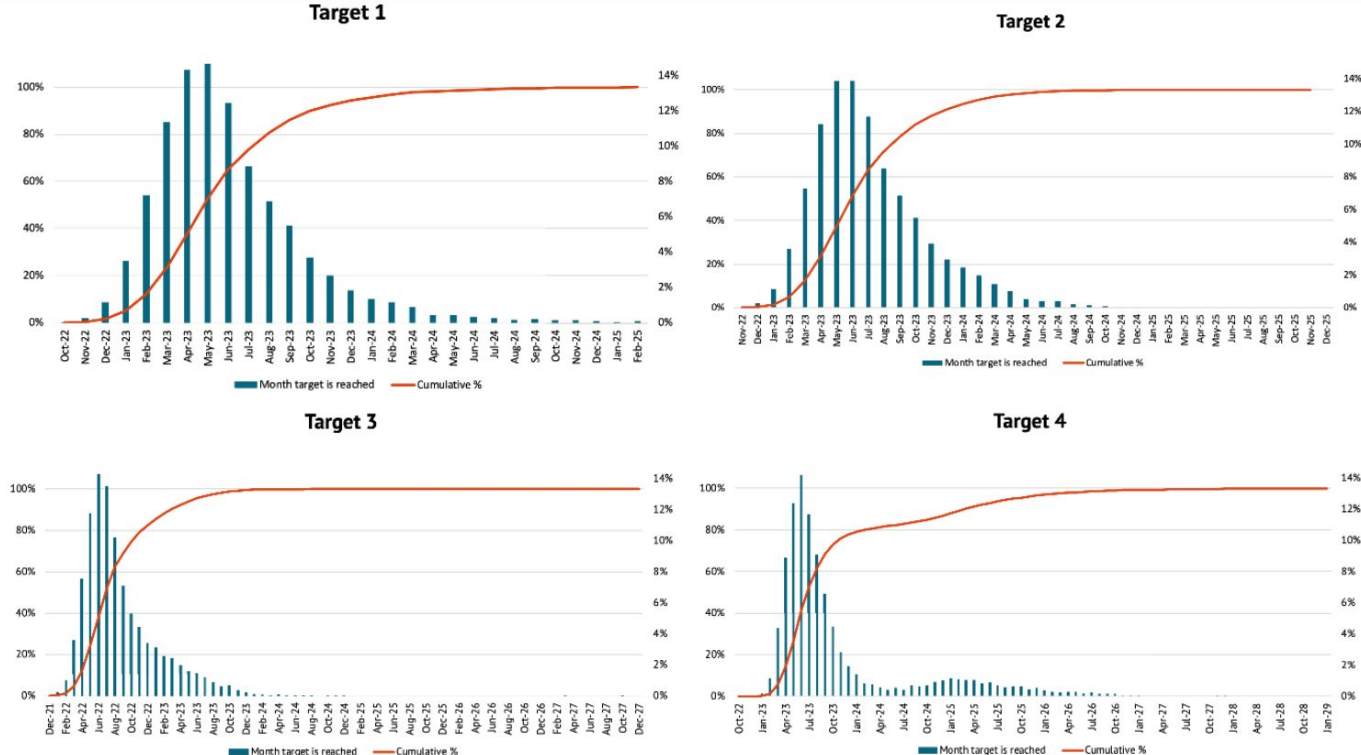
Clinical Outcomes Of A COVID-19 Vaccine: Implementation Over Efficacy

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

Our findings demonstrate the urgent need for health officials:

➢ to invest greater financial resources and attention to vaccine production and distribution programs

➢ to redouble efforts to promote public confidence in COVID-19 vaccines

➢ to encourage continued adherence to other mitigation approaches, even after a vaccine becomes available.

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Demand   Allocation   Distribution   **Verification**

Screening
- Enforce eligibility protocols
- Maintain waitlist
- Address vaccine hesitancy

Vaccination
- Verify completion all doses (biometrics)
- Monitor for adverse events
- Reminders and follow-ups

Followup
- Continue to follow up to monitor for adverse events
- Certification of vaccination

WHO Digital Implementation Investment Guide (DIIG): Integrating Digital Interventions into Health Programmes, and follows protocols and guidance from COVAX, WHO, and the CDC.

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https://www.dimagi.com/blog/covid-19-equitable-vaccine-delivery/

Social Vulnerability Index (SVI)

- NASEM-recommended index which incorporates social, economic, racial and ethnic factors
- Multiple applications by states
  - Weighting for initial allocation (ex. Ohio)
  - Reserving a portion of doses to distribute proportional to SVI (ex. Tennessee)
  - Designing communication strategies (ex. Arizona)
- In use by at least 26 states

We are in a sea of uncertainty
but should try to get as close to certainty as we can.

– Dr. William Foege, MD, MPH

ARIADNE LABS

We work to deliver the best possible care for every patient, everywhere, every time

Our mission is to help translate evidence into action to bridge the "know-do gap"and improve health outcomes

Diagnoses
Treatments
Drugs

Delivery systems
Information management
Human resources
Policy
Communications

Patients &
Families
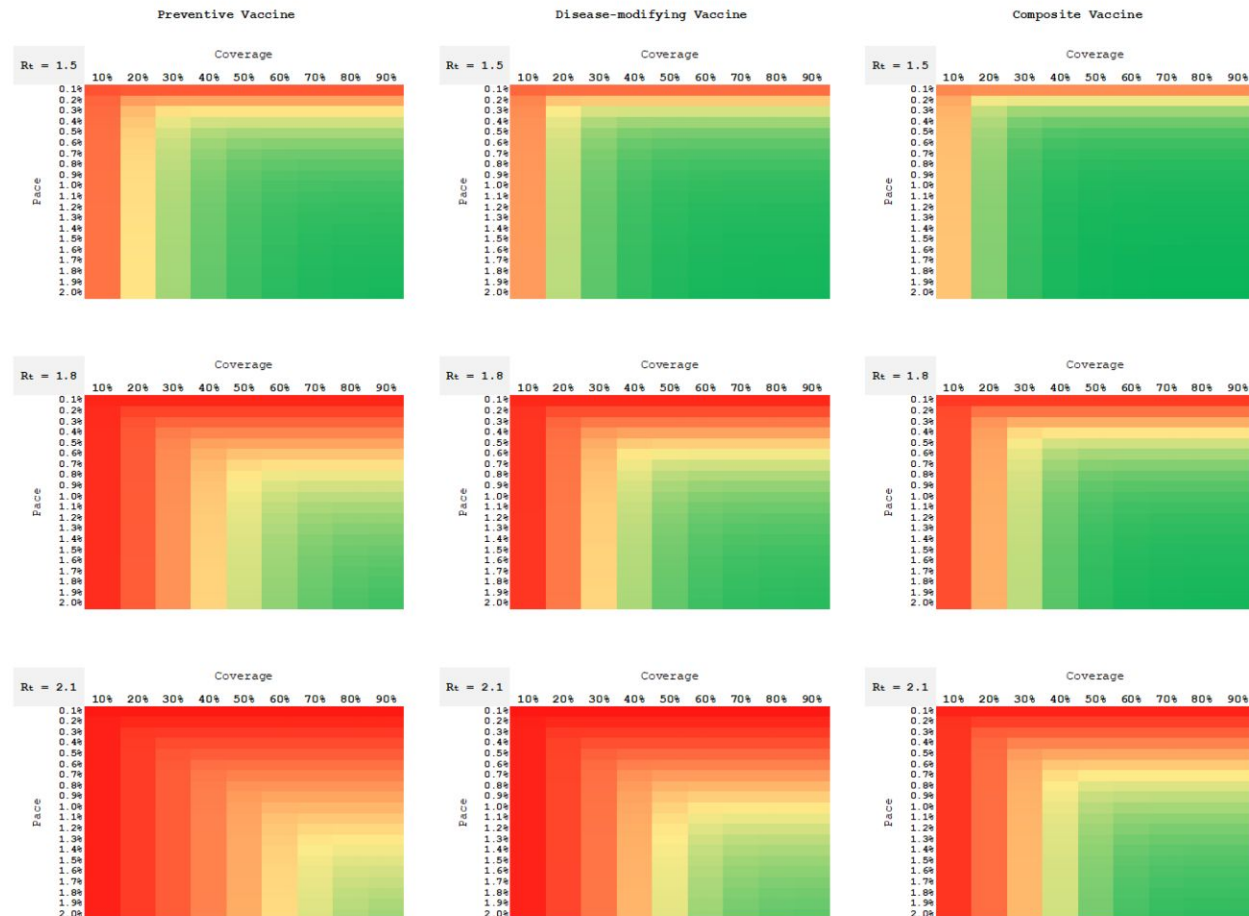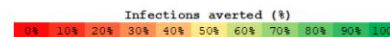
Nine heat plots for 14-day delay to vaccine efficacy

Paltiel AD, Schwartz JL, Zheng A, Walensky RP. Clinical Outcomes Of A COVID-19 Vaccine: Implementation Over Efficacy. Health Affairs. 2020 Nov 19:10-377.

Building Trust in COVID-19 Vaccines and Promoting Uptake among Communities of Color in the US

Bisola Ojikutu MD MPH
Division of Global Health Equity and Division of Infectious Diseases, BWH
Infectious Disease Division, MH
December 15, 2020
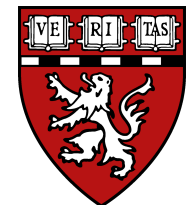
**COVID-19 in the US:
>16,00,000 Cases and ~300,000 Deaths**

As of December 13, 2020

Willingness to take a COVID-19 vaccine
by race and ethnicity
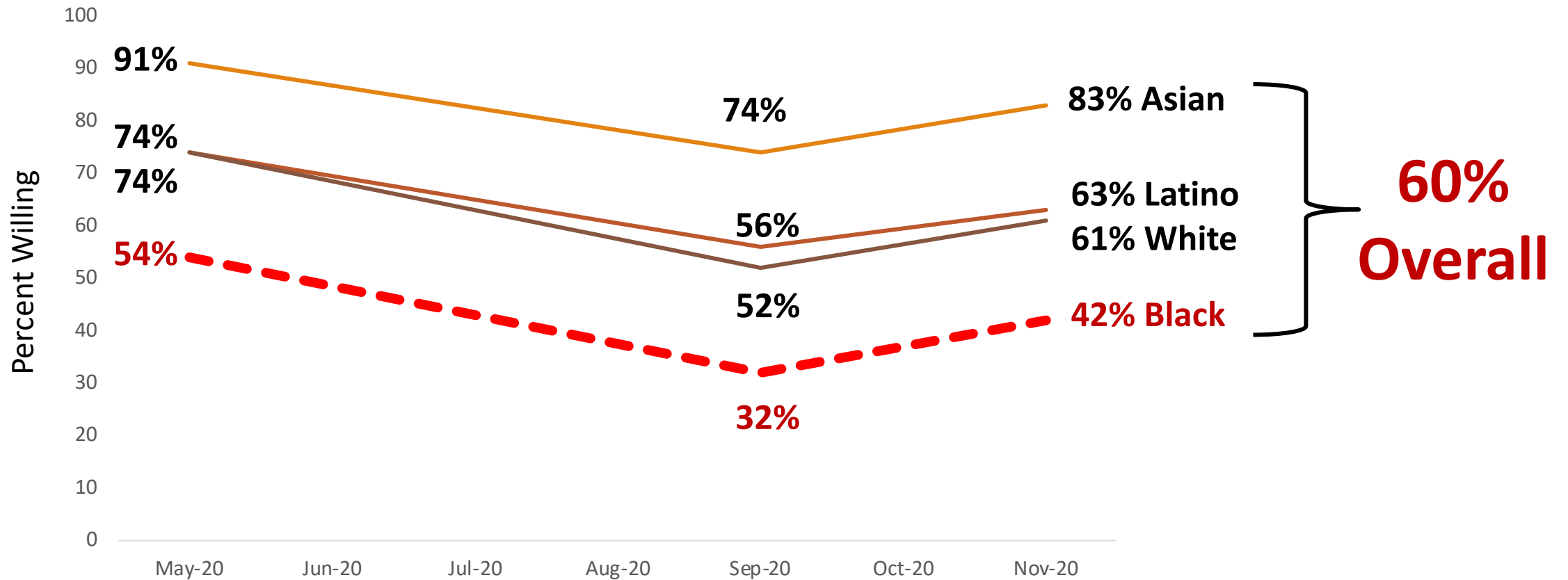
Percent Willing

100
90 — 91%
80 — 74%
74% — 74%
70 — 74%
60 — 56%
54% — 50
52%
40 — 32%
30
20
10
0

May-20   Jun-20   Jul-20   Aug-20   Sep-20   Oct-20   Nov-20

83% Asian

63% Latino
61% White

42% Black

60% Overall

Suboptimal Vaccine Uptake by Race and Ethnicity

	Overall	White	Black	Latinx	Indigenous
Seasonal Influenza Vaccination (≥18)	49%	53%	41%	38%	42%

CDC. Influenza Vaccination Coverage, 2019-2020

Suboptimal Vaccine Uptake by Race and Ethnicity

	Overall	White	Black	Latinx	Indigenous
Seasonal Influenza Vaccination (≥18)	49%	53%	41%	38%	42%
Pneumococcal Vaccination (≥65)	72%	75%	60%	60%	

CDC. Influenza Vaccination Coverage, 2019-2020; CDC. Pneumococcal Vaccination Coverage, 2018

COVID Collaborative Survey
Vaccine Hesitancy

1,050 Black   258 Latinx Respondents

https://www.langerresearch.com/category/our-impact/; https://www.covidcollaborative.us/;
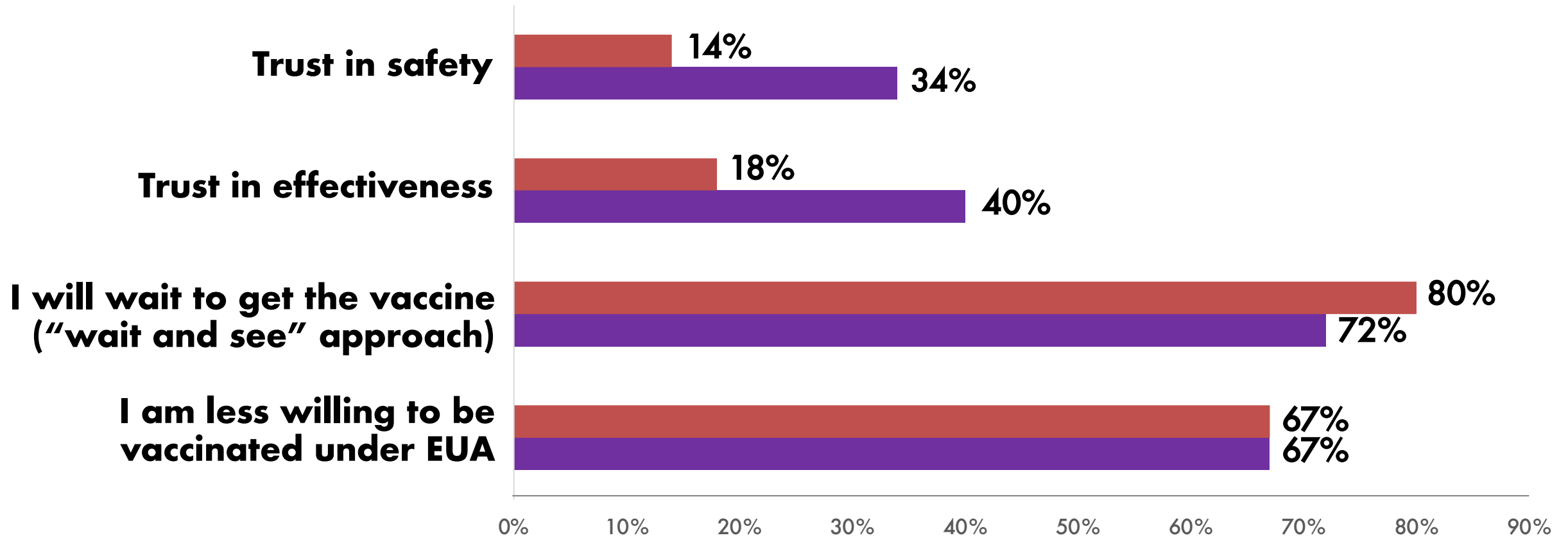
COVID Collaborative Survey
Vaccine Hesitancy
1,050 Black & 258 Latinx Respondents

Top predictors of trust that a vaccine will be safe	
	Black adults
Trust in the vaccine process	0.34
Subjective norm of getting vaccinated	0.31
Perceived vaccine risk	-0.20
Perception of racial fairness	0.14
	Latinx adults
Trust in the vaccine process	0.34
Subjective norm of getting vaccinated	0.31
Perceived vaccine risk	-0.18
Perceived disease risk	0.17

p<0.05 (Black adults – Trust in the vaccine process, Subjective norm of getting vaccinated)

p<0.05 (Latinx adults – Trust in the vaccine process, Subjective norm of getting vaccinated)

Standardized coefficient estimates are from OLS regression

https://www.langerresearch.com/category/our-impact/

COVID-19 mistrust

Black Adults living with HIV in Los Angeles County, CA

- CV-19 is man-made — 50%
- A lot of information about CV-19 is being held back by the government — 63%
- The government cannot be trusted to tell the truth about CV-19 — 60%
- I am worried that the vaccine could be harmful — 51%
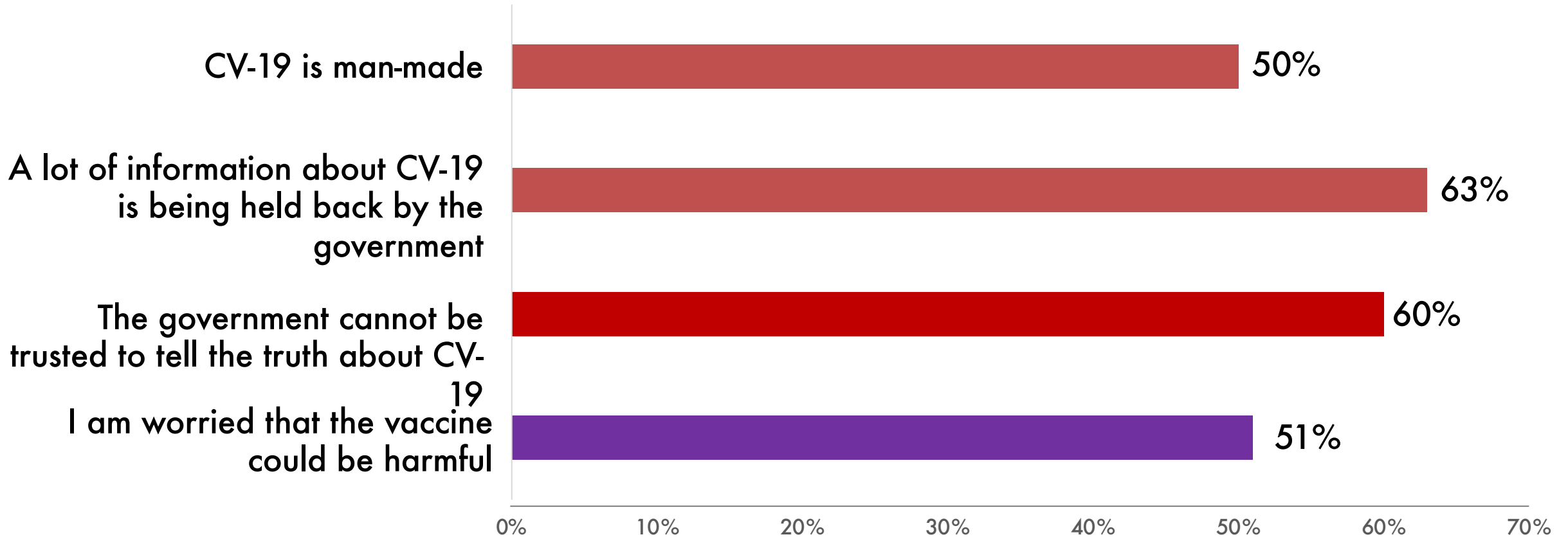
Note: 97% agreed with at least one mistrust belief (of 10 items)

JAIDS, 2020

How does medical mistrust affect COVID-19 outcomes?

✓ **Less** adherence to preventive measures (social distancing, mask wearing)

✓ **Lower** acceptability of COVID-19 treatment

✓ **Higher** COVID-19 vaccine hesitancy

JAIDS, 2020

Vaccine Hesitancy

Value → **Access**
Affordability
Availability
→ ***Trust***
Effectiveness
Safety
Reliability &
Competence of the
Health System
Motivations of
policymakers

Osterholm MT. *Lancet Infect Dis.* 2012; Quinn SC et al. *Vaccine.* 2019
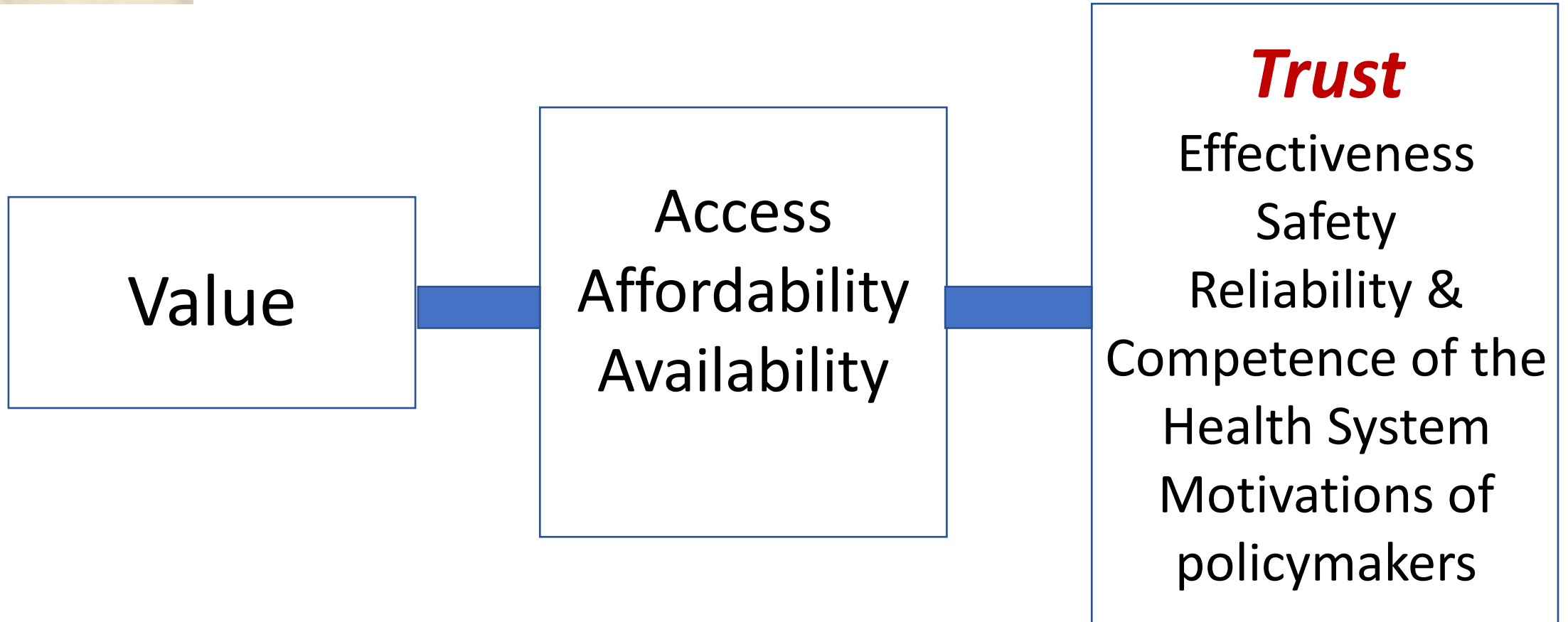
Mistrust

Healthcare systems

Providers

Research

Absence of trust that providers/organizations/researchers genuinely care for patients', participants' or their communities' interests, are honest, and transparent

Roots of Mistrust

"Historical and Contemporary Structural Inequity Drives Mistrust"

- Baseline inequity
- Limited access to high quality care
- Adverse environmental exposures
- Delays in accessing care
- More illness, worse outcomes, premature deaths
- Rational and normal response to adverse circumstances

HEALTH

'Like watching a train wreck': Experts say America is behind on COVID-19 vaccine messaging, call for honest, straight talk

Elizabeth Weise USA TODAY

Published 6:00 a.m. ET Nov. 10, 2020 | Updated 9:47 a.m. ET Nov. 10, 2020

'Like watching a train wreck': Experts say America is behind on COVID-19 vaccine messaging, call for honest, straight talk

Elizabeth Weise USA TODAY

Published 6:00 a.m. ET Nov. 10, 2020 | Updated 9:47 a.m. ET Nov. 10, 2020

Potential Messaging Themes:

- Acknowledge systemic inequity and racism as a root causes of mistrust
- Transparency regarding known side effects of vaccination
- Clearly communicate risks and the unknown
- Social responsibility
- Responsibility to family
- Reframe vaccination as a form of empowerment
- Emphasize choice

https://www.langerresearch.com/category/our-impact/; https://www.covidcollaborative.us/;

Messengers

Trusted Messengers
- Health care providers***
- Faith leaders
- Community organizations/community leadership
- Peers and social networks

Patient-Provider Racial, Ethnic, Language Concordance
- Associated with enhanced patient-provider communication
- Increased uptake of preventive health interventions
- Increased acceptance of vaccination
- Patient entered communication, cross cultural communication and structural inequity
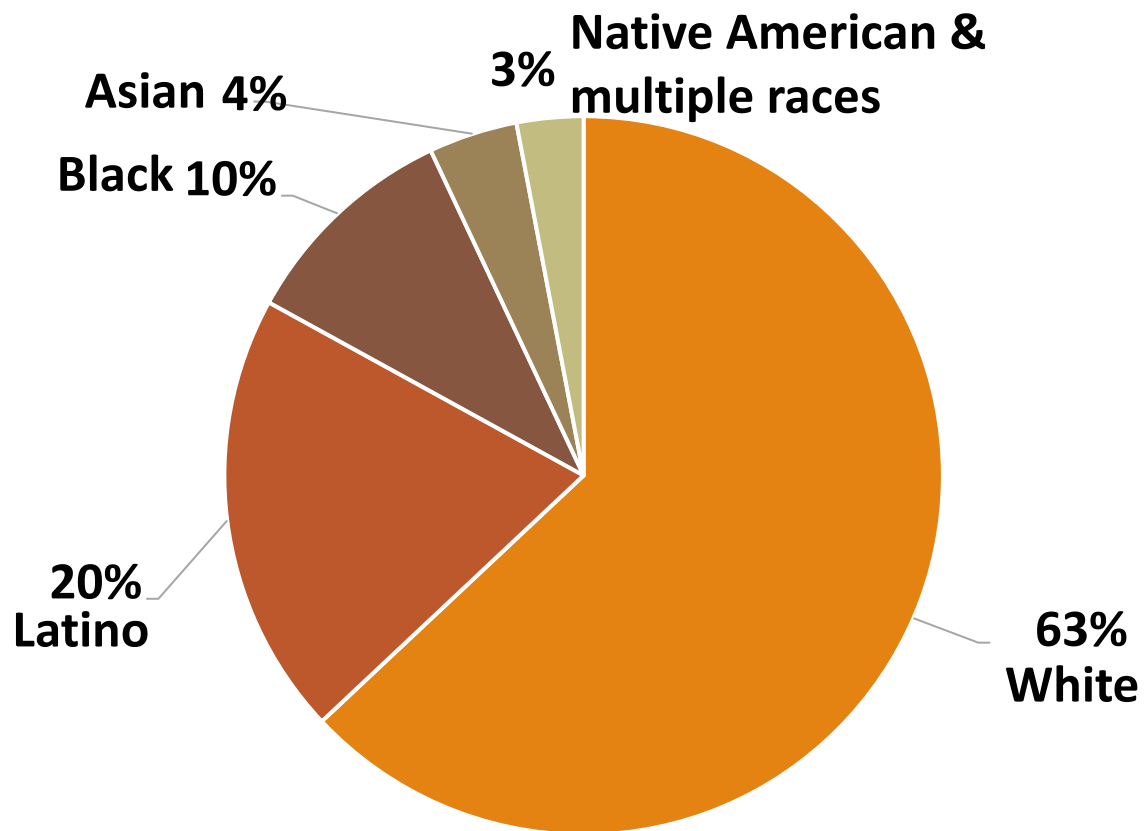
Cartmell KB et al. J Cancer Educ. 2019; Fu LY et al. Hum Vaccin Immunother. 2019; Yitalo KR et al. Am J Public Health. 2013; Shen MJ et al. J Racial Ethn Health Disparities. 2018; Saha S et al. J Gen Intern Med. 2020.

Our beliefs will determine our patients' actions...

Vaccine hesitancy among healthcare providers[1]

- 609 UCLA Health System employees (physicians, nurses, NPs, medical assistants, administrators and others);Surveyed from Sept-Oct
  - **High** overall vaccine confidence
  - **28%** stating they were not confident in the COVID-19 vaccine development process
  - **47%** unwilling to participate in a novel coronavirus trial
  - **67%** would delay vaccination

1. Gadoth A et al. medRxiv, 2020; 2. Dubé E.Clin Microbiol Infect. 2017; 3.Paterson P et al. Vaccine. 2016;4. Hollmeyer HG et al. 2009

Moderna mRNA-1273
Participant Demographics
~30,000

- Native American & multiple races
- 3%
- Asian 4%
- Black 10%
- 20% Latino
- 63% White

Pfizer and BioNtech - BNT162b2
Participant Demographics
~44,000
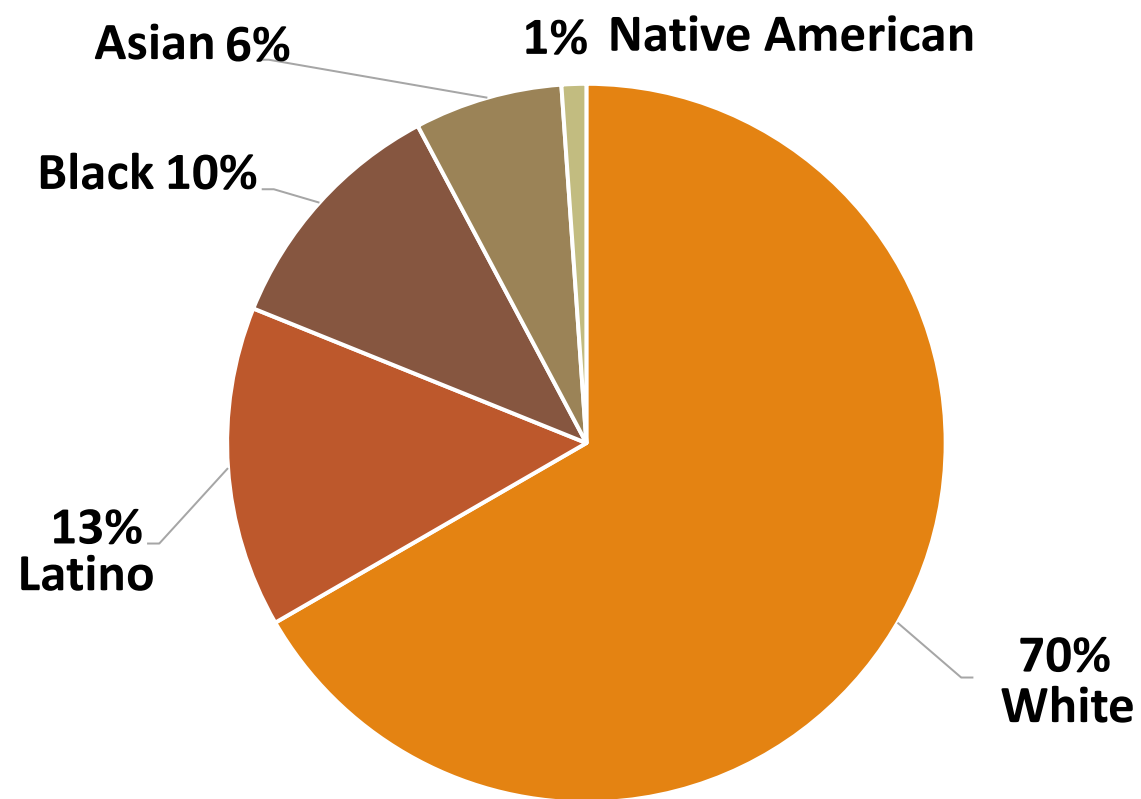
- Asian 6%
- 1% Native American
- Black 10%
- 13% Latino
- 70% White

*US participant demographics

Communicating Effectively About Emergency Use Authorization and Vaccines in the COVID-19 Pandemic

Sandra Crouse Quinn PhD, **Amelia M. Jamison** MAA, MPH, **Vicki Freimuth** PhD

TRANSPARENCY
➢ FDA must communicate to the public about the monitoring process during the vaccine trials and after EUA
➢ FDA must confirm that they will release full data on adverse events and modify EUA approvals and fact sheets accordingly
➢ Pharmaceutical companies must release all protocols for review by independent scientists
➢ Pharmaceutical companies must continue to update the public in regards to enrollment

Quinn SC et al. Am J Public Health. 2020

COVID-19 Vaccine Dilemma

| Financial Investment: Government and Industry |

| Research Investment |

Ongoing transmission, morbidity and mortality

COVID-19 Vaccine Dilemma

Financial Investment: Government and Industry

Community Engagement & Investment

Research Investment

Selected Investment Strategies to Support Diversity and Engagement in Research (Build Trust)

Invest in Community Based-Organizations and Institutions

- Provide in-kind resources including technical expertise, mentoring, clinical and non-clinical resources to help to strengthen and build capacity in community organizations

Invest in Building Trust

- Require government/industry establish contracts with minority-owned businesses in proportion to the public dollars invested

Invest in Future Research Leadership

- Increase funding to support the development of careers of racial and ethnic minority investigators
- Support programming to increase community research literacy

25

AJPH, December 2020

Provider Strategies

Recommendations for Providers:

- Raise provider awareness about the levels of mistrust in communities and the origins of mistrust in systemic racism

- Provide education about how mistrust is related to health inequities
  - Affects healthcare interactions, reduces healthcare engagement and adherence, affects outcomes and will likely inhibit COVID-19 vaccine uptake

- Discuss how to recognize mistrust (verbal/nonverbal cues)

Recommendations for Providers

- Respond to mistrust in a sensitive manner, while conveying accurate information
  - Validate mistrust
  - Be non-judgmental and non-confrontational
  - Ask open-ended questions
  - Use reflection/reflective listening
  - Make eye contact, body language matters

Recommendations for Providers: Motivational Interviewing

- Use <u>open-ended questions and reflective listening</u>
  - Show you care about them holistically
  - Fully hear their concerns

- <u>Reflect/roll with resistance</u>: Leave room for patients to state concerns in their own words (why they do not want to do something), and reflect their concerns back to them
  - Hold back your "righting reflex"
  - Give them accurate information about the vaccines
  - **Then allow patients to make their own decision (don't tell them what to do)**

Increasing Vaccination Rates: Lessons Learned

Equitable access, removal of financial barriers and community reach

Within the health care system:

- Effective communication
    - Scripts
    - Toolkits

- Vaccine ambassadors

- Practice champions

- Reminders/alerts/standing orders

Smith TC. Open Forum Infect Dis. 2017 Resnick B et al. Transl Behav Med. 2018;

Acknowledgements

- RAND Corporation Stakeholder Partnership
  - Laura Bogart PhD
  - Lulu Dong PhD
  - National Advisory Committee

- Kenneth H. Mayer MD, The Fenway Institute

Thank You!