CHARM

Comprehensive Center of Excellence for Health and Risk in Minority Youth and Young Adults

Strategic Science

Kirsten Bibbins-Domingo, MD PhD, MAS
Professor and Chair of Epidemiology and Biostatistics
Lee Goldman, MD Endowed Professor of Medicine
Vice Dean for Population Health and Health Equity
UCSF School of Medicine

Are we doing research that makes a difference to the health of the public?

Does the research we do help to alleviate disparities in health?

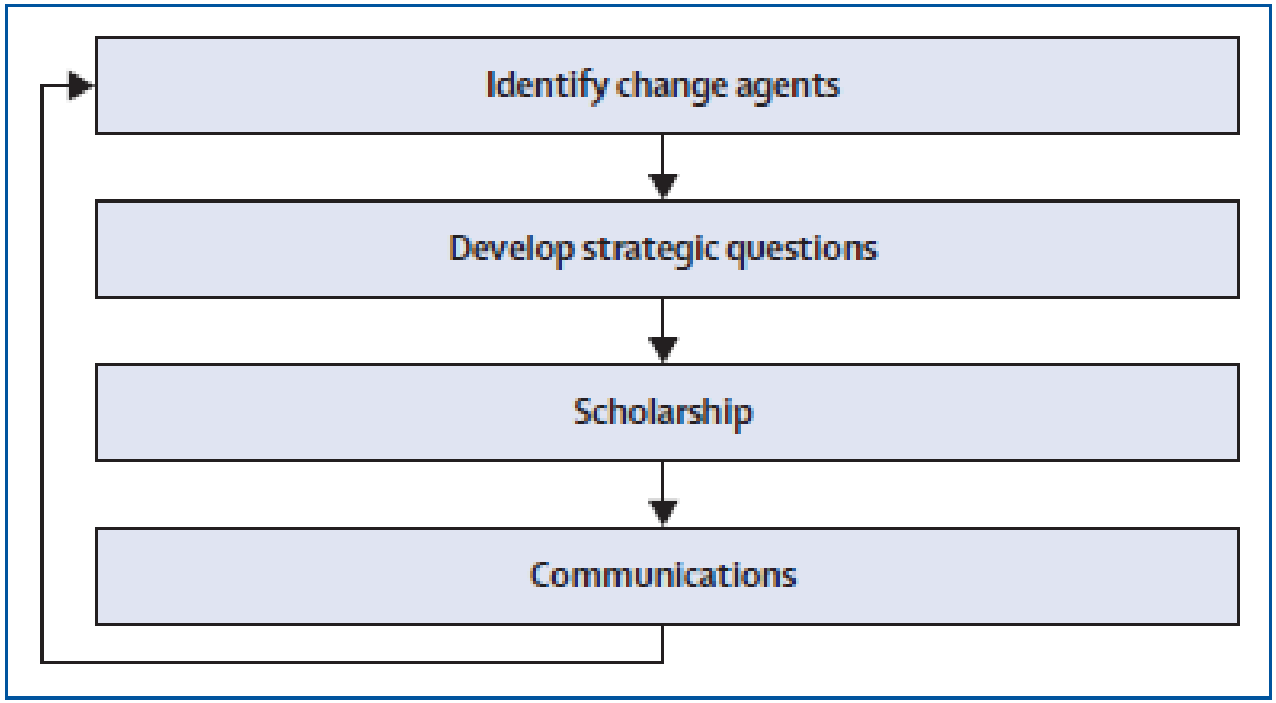


Figure: A model of strategic science designed to enhance links between science and policy

From Brownell and Roberto, Lancet 2015

DEVELOPING RESEARCH QUESTIONS

Strategic research questions

- Be inspired by the things that make you angry, upset, things that are unfair, things that you want to change.
- Understand the gaps in our understanding OR the gaps in awareness that research can address.
- Know what questions you have the tools to address.
- Who is the audience? Who are the change agents?

Additional considerations

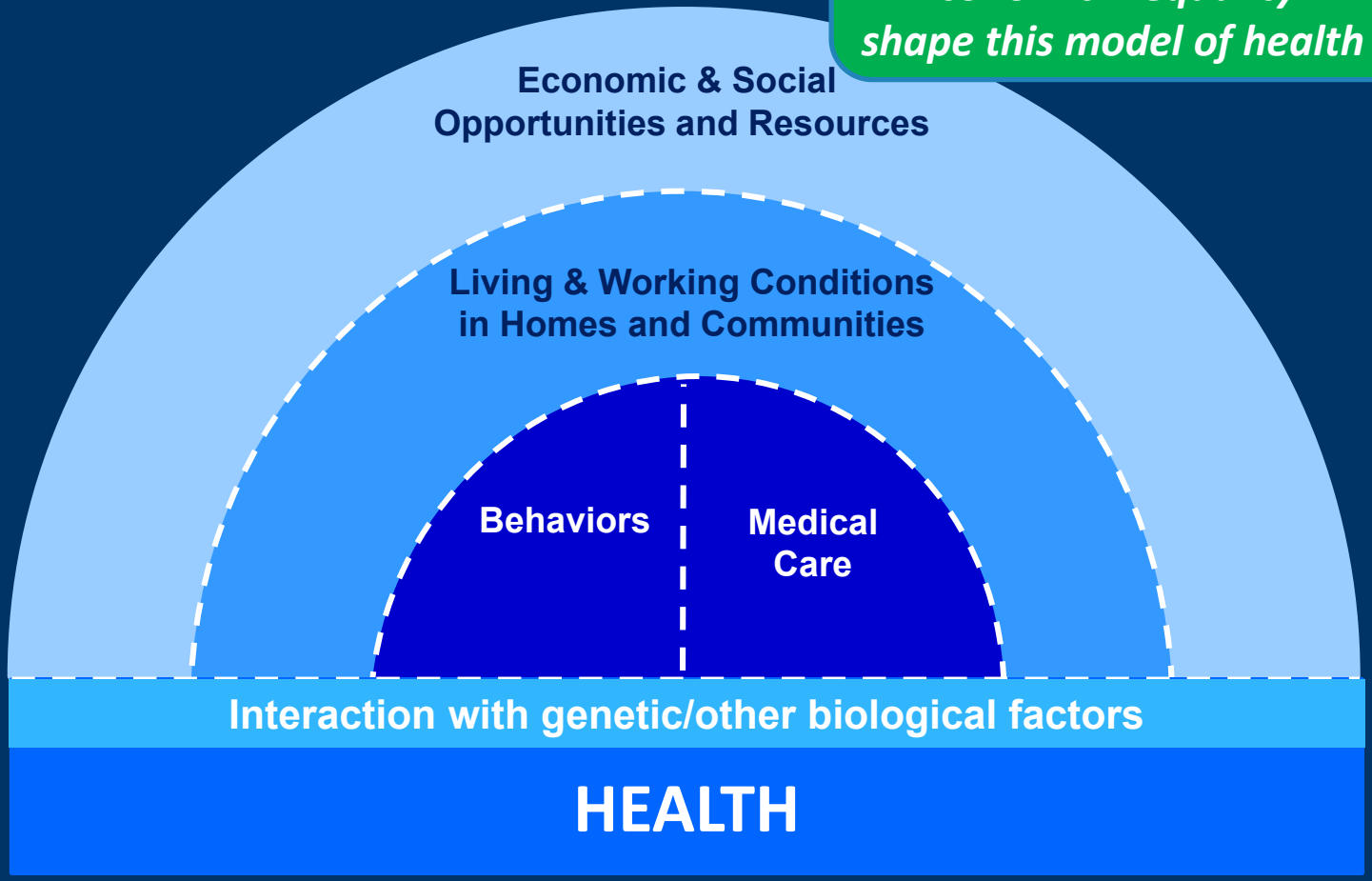
- Be wary of research questions chosen only for expediency
  - But recognize that publications are important
- A good strategic research question may still require several smaller questions to lay the groundwork.
- The value of working in teams/ transdisciplinary research

UNDERSTANDING THE CONTEXT OF YOUR RESEARCH

The Socio-Ecological Model

Structural factors:
- ***Racism***
- ***Economic inequality***

shape this model of health & disease



CONDUCT AND PUBLISH HIGH QUALITY RESEARCH

Academic currency

- Rigorous analysis
- Skeptical objectivity
- Peer review publication
- High impact journals
- Who is the audience you are trying to reach?

- Researcher or advocate?

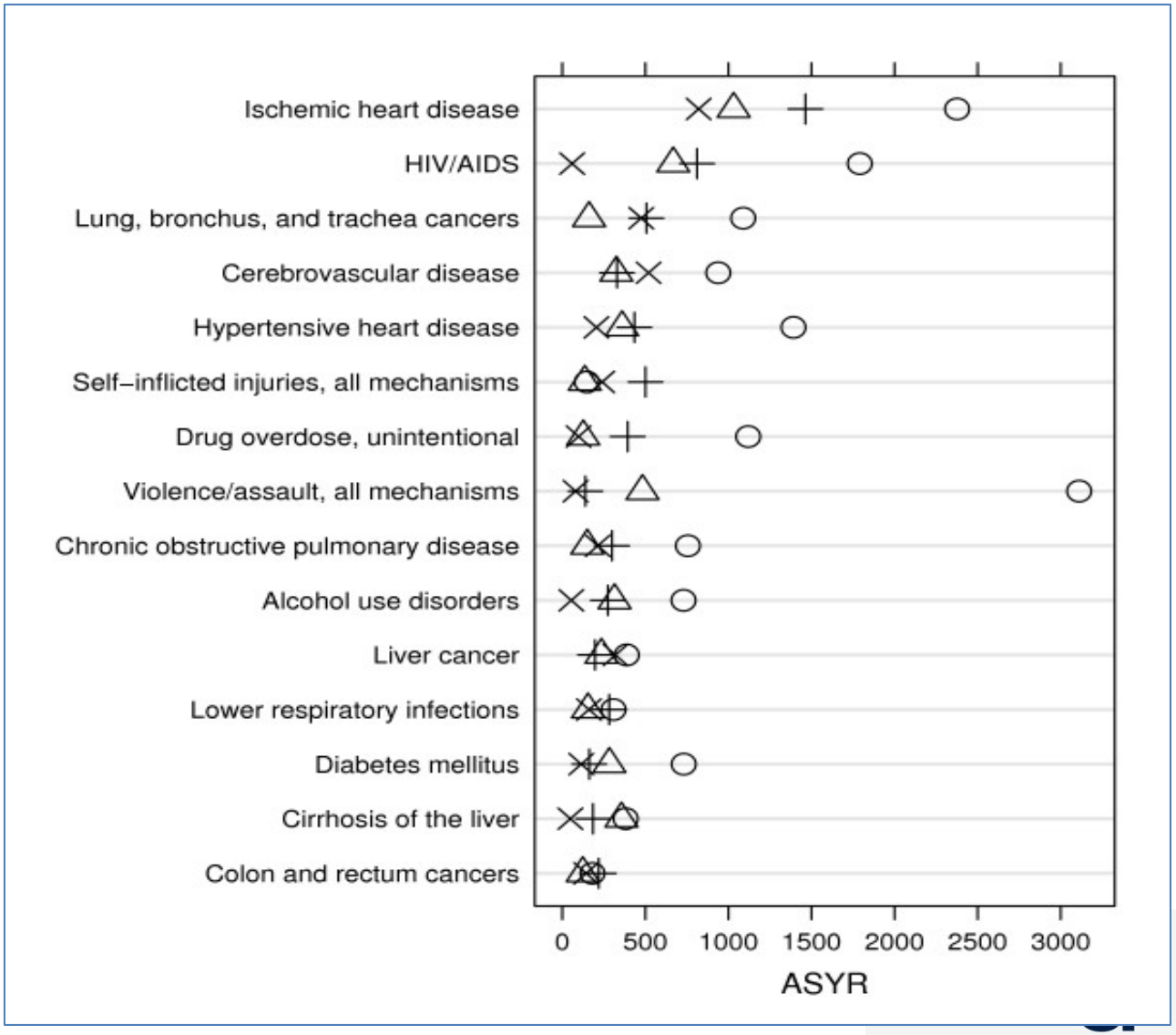
CASE STUDY: MY PATIENT

Causes of premature mortality in SF

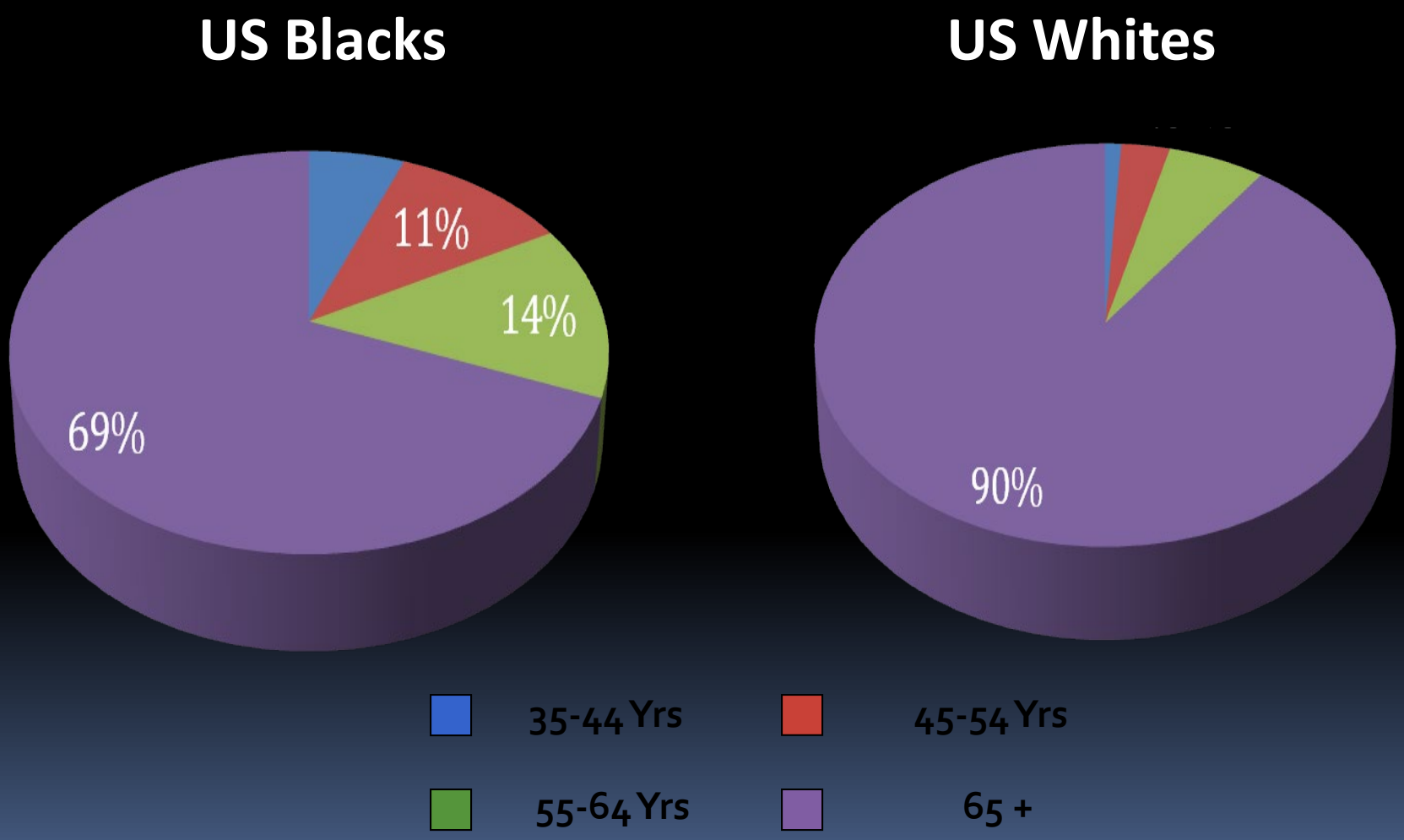
African American (○)
Latino/Hispanic (△)
Asian/Pacific Isl (×)
White (+)

Similar data for women (heart disease #1) but trauma/drugs replaced by cancers

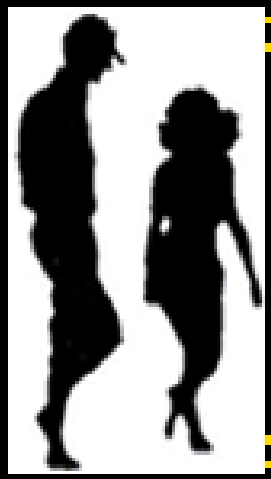
Aragon, et al. BMC Public Health 2008



When do Heart Failure Deaths Occur?



Source: Jolly S, Bibbins-Domingo K. Am J Med 2010; 123(9):811-18



CARDIA

Coronary Artery Risk Development in Young Adults

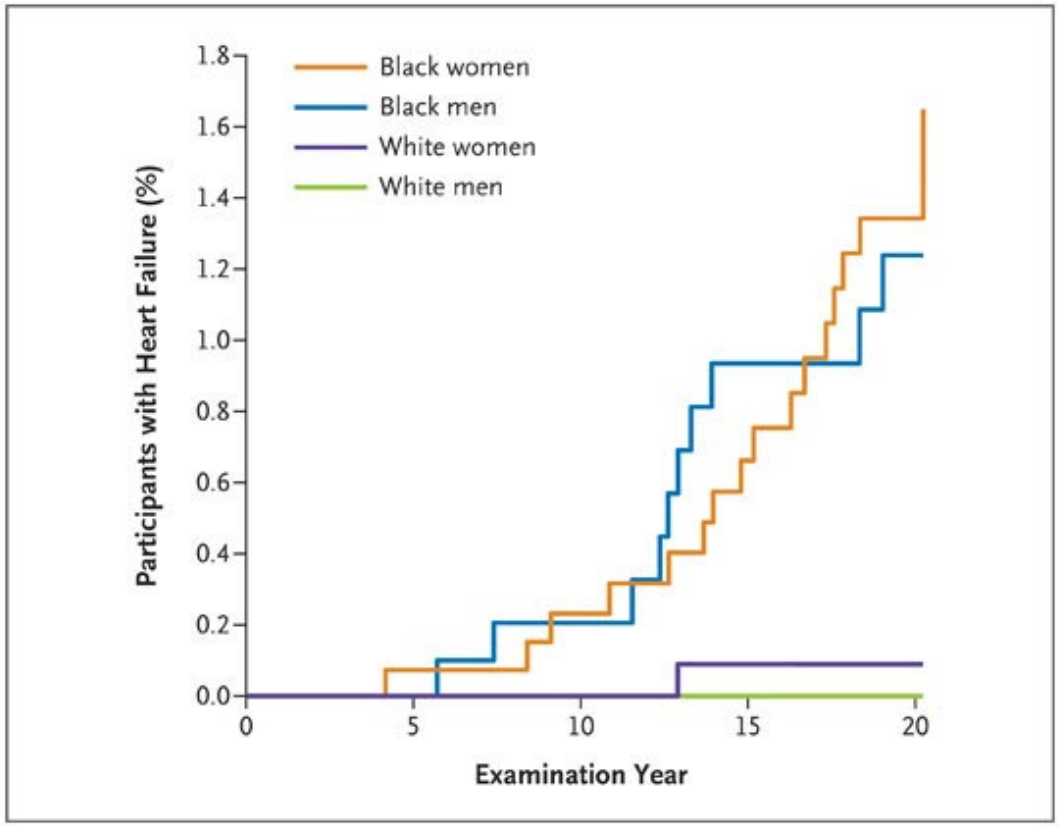
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MARCH 19, 2009 VOL. 360 NO. 12

Racial Differences in Incident Heart Failure among Young Adults

Kirsten Bibbins-Domingo, Ph.D., M.D., Mark J. Pletcher, M.D., M.P.H., Feng Lin, M.S., Eric Vittinghoff, Ph.D., Julius M. Gardin, M.D., Alexander Arynchyn, M.D., Cora E. Lewis, M.D., O. Dale Williams, Ph.D., and Stephen B. Hulley, M.D., M.P.H.

New Cases of Heart Failure in the Black and White Young Adults

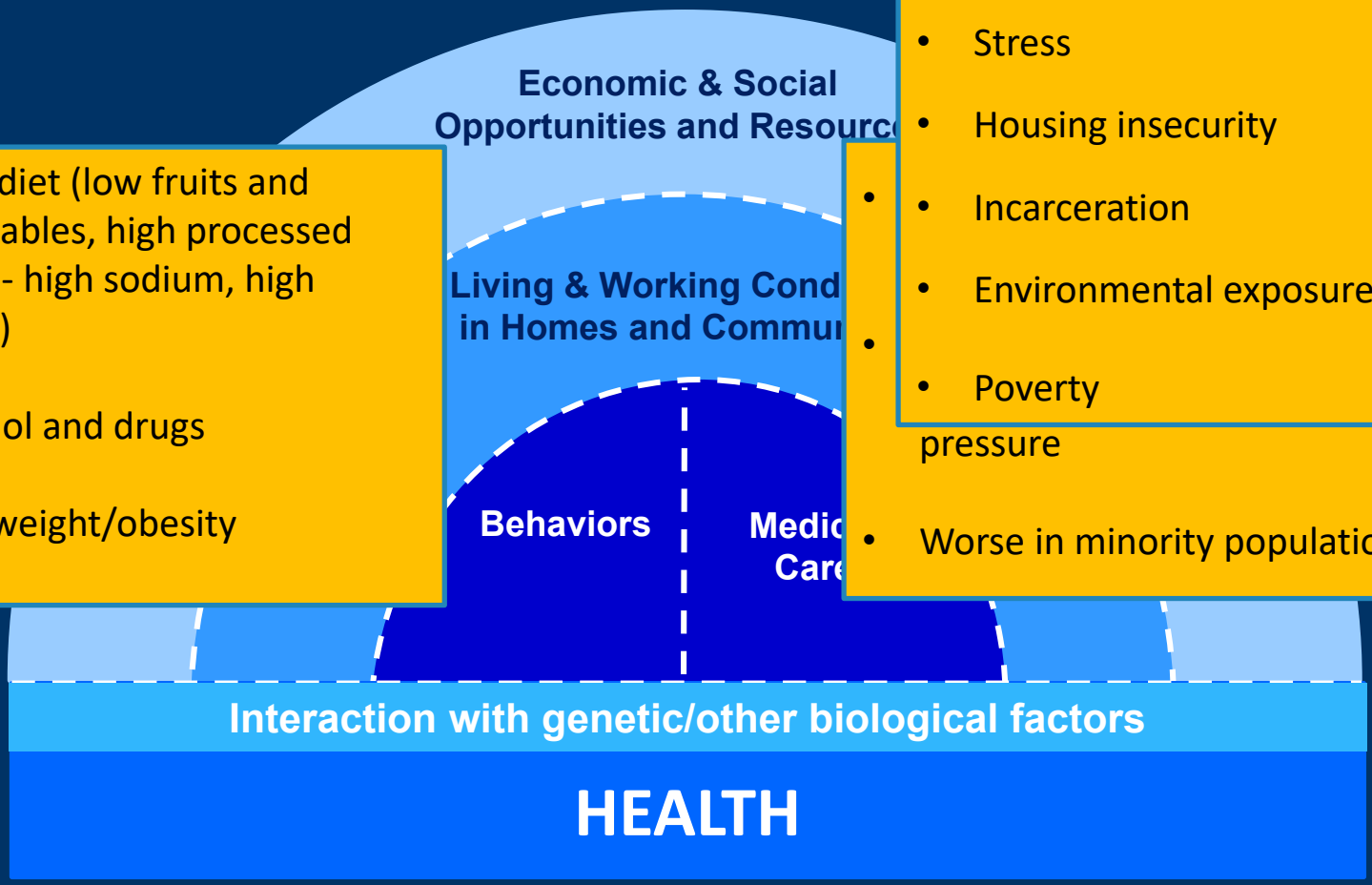


In our study of over 5000 young adults followed for 20 years:

- 1 in 100 black men and women develop heart failure before age 50.
- Blood pressure elevation in 20's was strongest predictor.
- Development of diabetes in 20's and 30's also important.

Source: Bibbins-Domingo et.al. NEJM 2009; 360(12):1179-90.

My mental map for heart failure and hypertension



- Poor diet (low fruits and vegetables, high processed foods- high sodium, high sugar)
- Alcohol and drugs
- Overweight/obesity

- Racial discrimination
- Stress
- Housing insecurity
- Incarceration
- Environmental exposures
- Poverty

pressure

- Worse in minority populations

CHARM
Comprehensive Center of Excellence for Health and Risk in Minority Youth and Young Adults

Adapted from Braveman et al., for Robert Wood Johnson Foundation Commission to Build a Healthier America | www.commissiononhealth.org

UCSF

CASE STUDY: POLICIES THAT HARM OUR EFFORTS AT PREVENTION

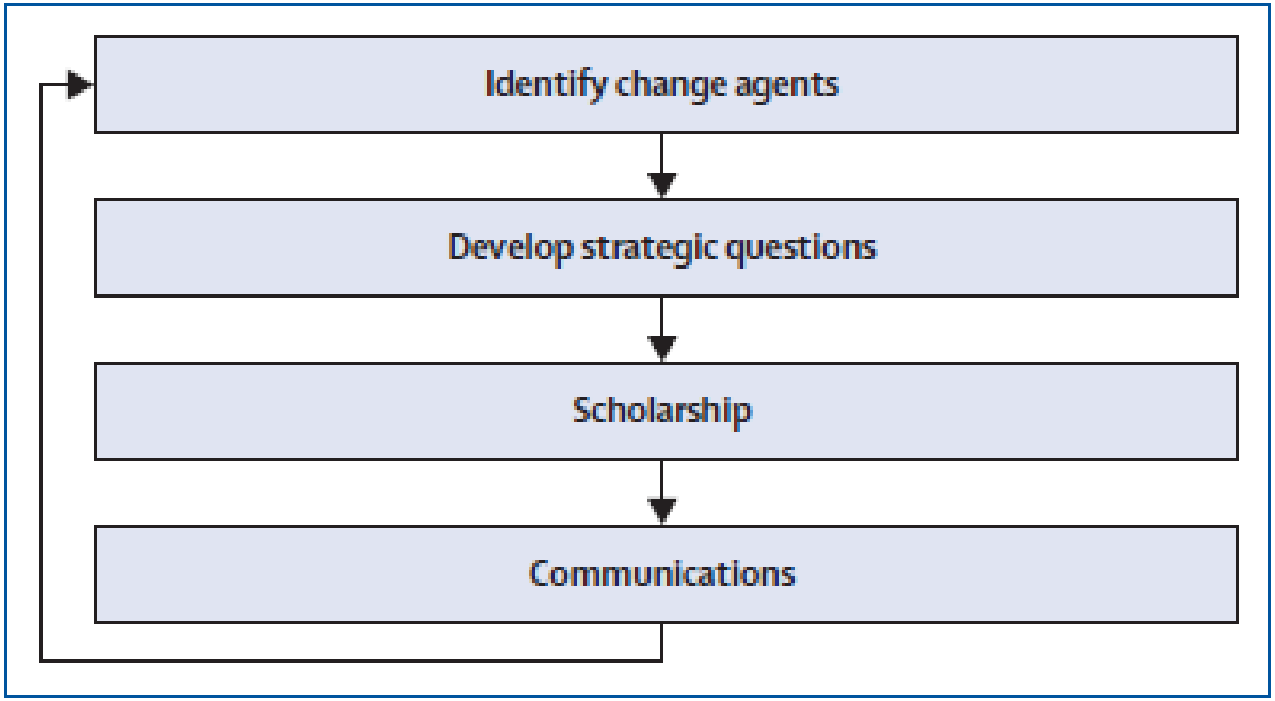
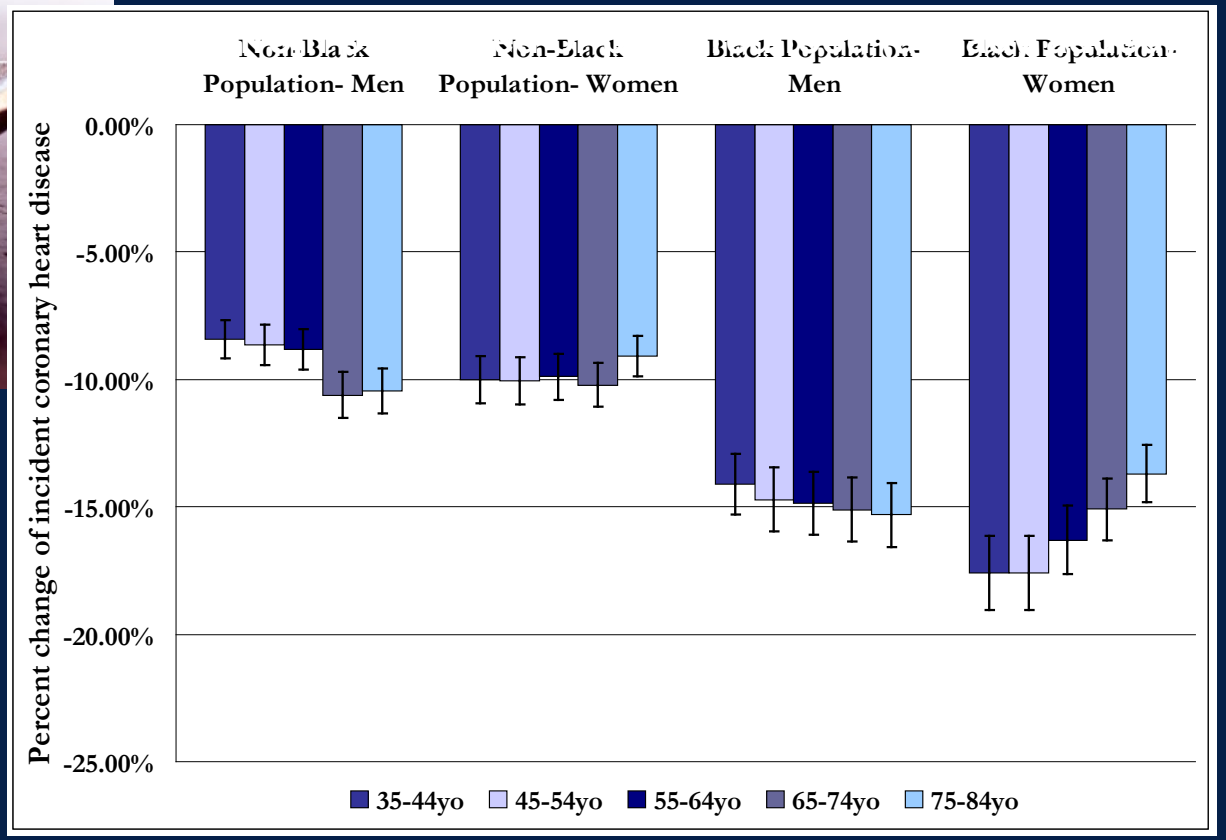


Figure: A model of strategic science designed to enhance links between science and policy

From Brownell and Roberto, Lancet 2015

Most of us are eating far too much salt

Small reductions in food supply could result in large benefits in cardiovascular disease prevented.



Bibbins-Domingo, K. et. al. NEJM, 2010, 362 (7):590-99.

UCSF

The Washington Post

FDA plans to limit amount of salt allowed in processed foods for health

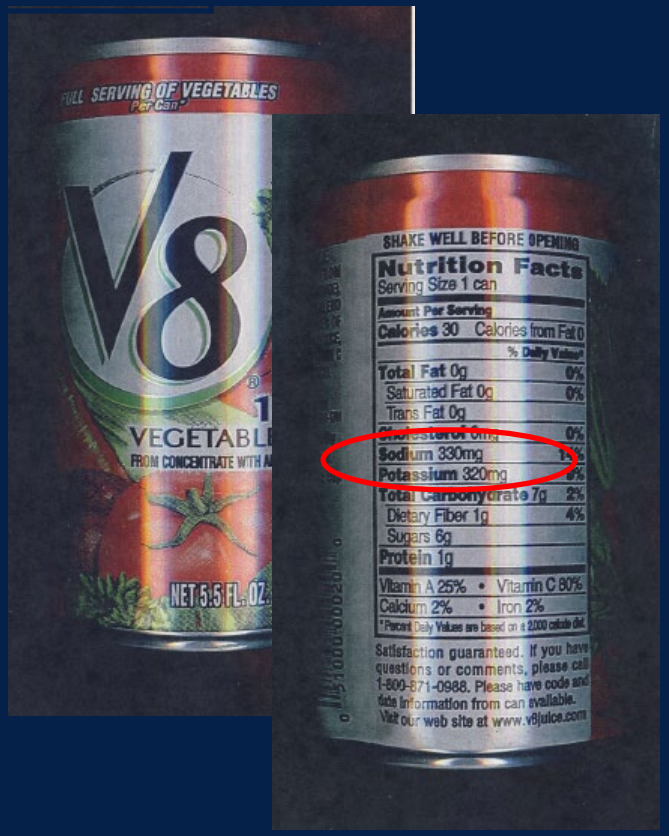
National Sodium Reduction Initiative (NSRI)

National health organizations call for a 50% reduction in the amount of salt in restaurant and processed food in 10 years.

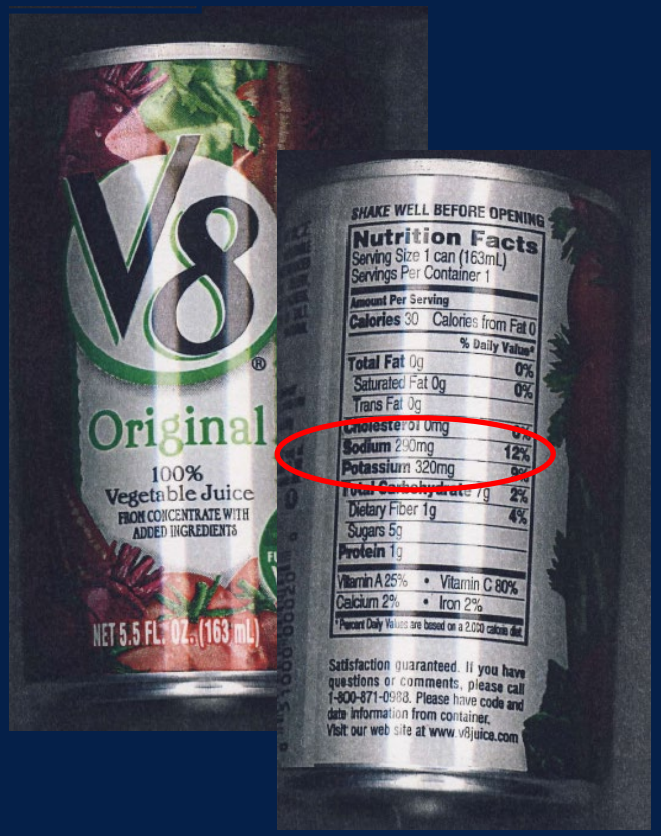
Reduce salt in processed and restaurant food by 50% → ~40% reduction in population salt intake → Decrease in blood pressure = **150,000 lives saved each year** (result of lower intake over lifetime)

To ensure progress toward the 40% reduction in population salt intake, we commit to an interim goal of a 20% reduction in 5 years.

2006



2011



Slide courtesy of Dr. Cheryl Anderson

UCSF

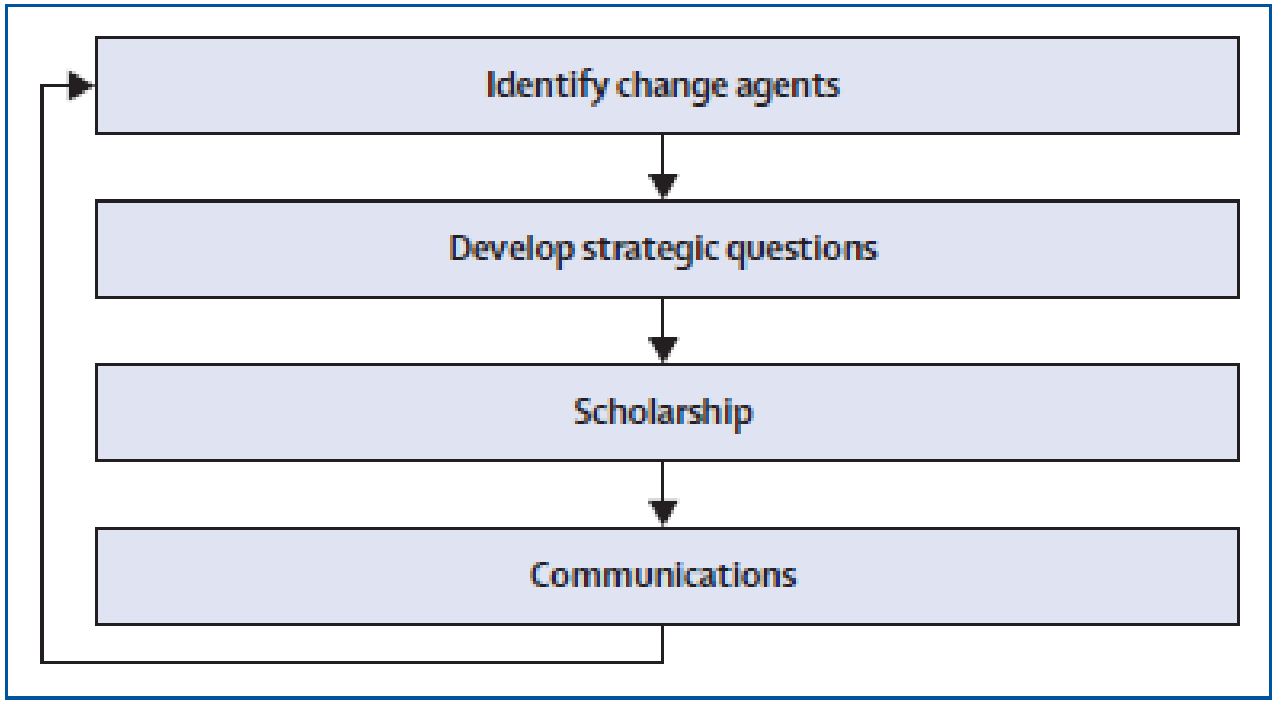


Figure: A model of strategic science designed to enhance links between science and policy

From Brownell and Roberto, Lancet 2015

New Drugs for Cholesterol Lowering: PCSK9 Inhibitors

By The Cardiology Times · December 16, 2016 · 1647 · 2

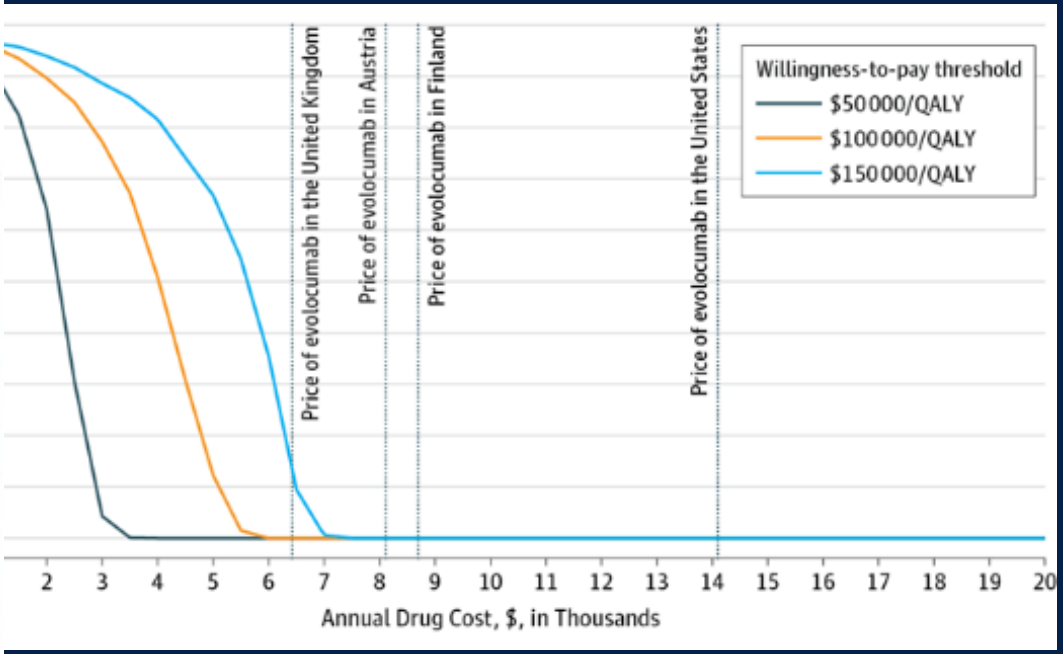
Price Chop for Evolocumab: PCSK9 Inhibitor Cost Cut by 60%

The reduction is intended to improve access for Medicare patients, a group with high monthly copays who frequently never fill their prescriptions.

By Michael O'Riordan · October 25, 2018

Highly effective cholesterol-lowering agents

riced at $14,000 per year



Kazi, et al. JAMA. 2016;316(7):743-753

UCSF

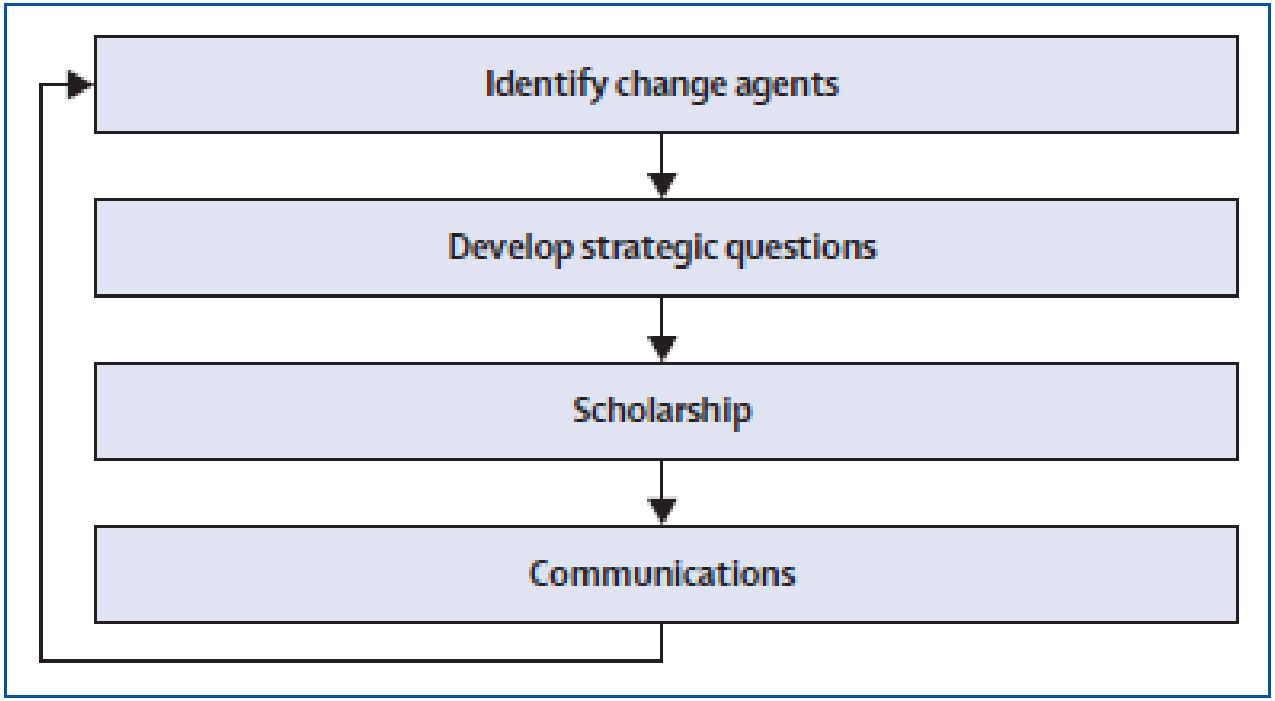


Figure: A model of strategic science designed to enhance links between science and policy

From Brownell and Roberto, Lancet 2015

17 billion dollar savings from cardiovascular disease avoided

Additional 13 billion revenue from tax

EXHIBIT 2

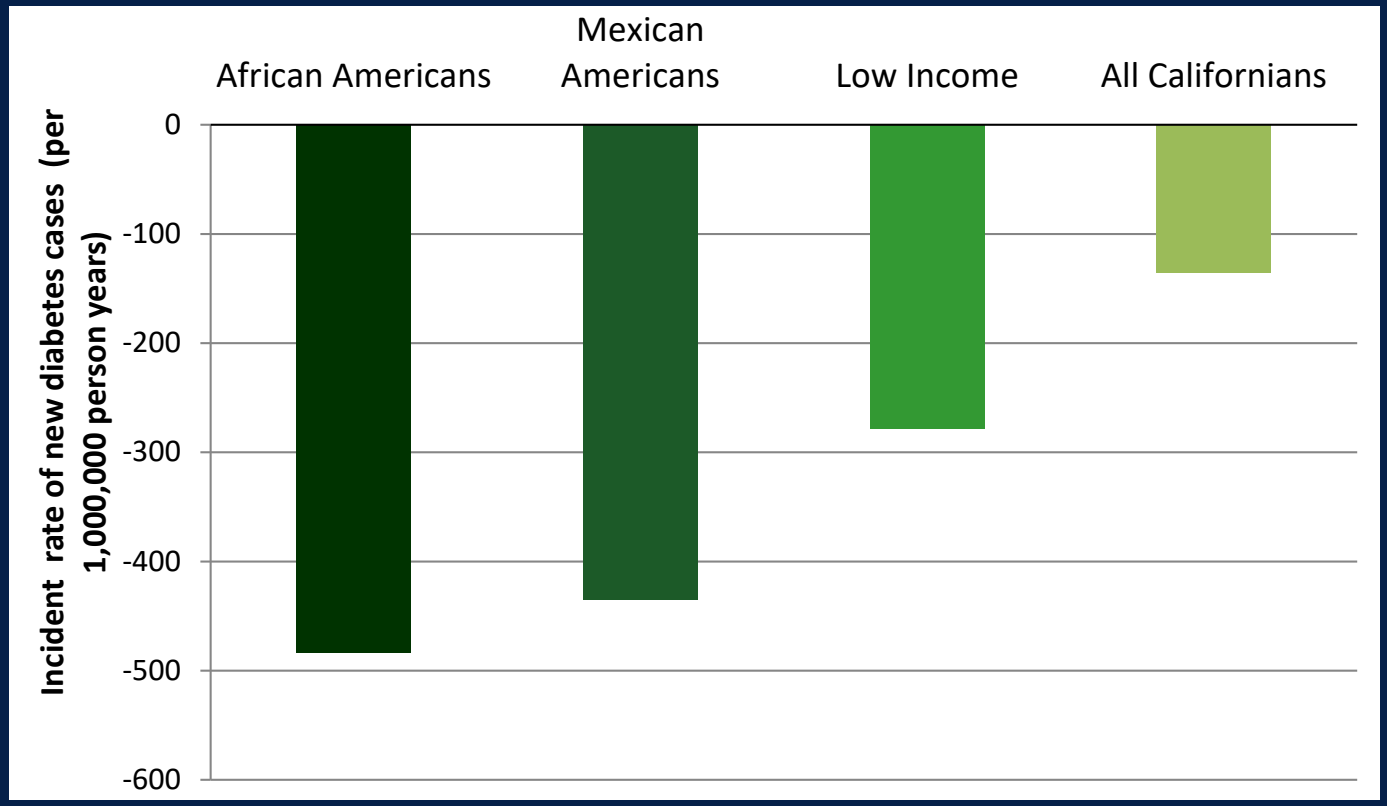
Projected Ten-Year Savings In Medical Costs From A Penny-Per-Ounce Tax On Sugar-Sweetened Beverages

Group	Diabetes cost savings ($ billions)	Cardiovascular disease cost savings unrelated to diabetes ($ billions)	Total cost savings ($ billions)
Both sexes, ages 25–64	9.6	7.4	17.1
Men			
Ages 25–44	1.6	1.5	3.2
Ages 45–64	4.6	3.5	8.1
Women			
Ages 25–44	0.9	0.9	1.8
Ages 45–64	2.5	1.6	4.1

Wang, et al. Health Affairs (Millwood) 2012 Jan;31(1):199-207.

UCSF

Isn't the soda tax a regressive tax?



Mekonnen PLOSOne 2013 Dec 11;8(12):e81723

UCSF

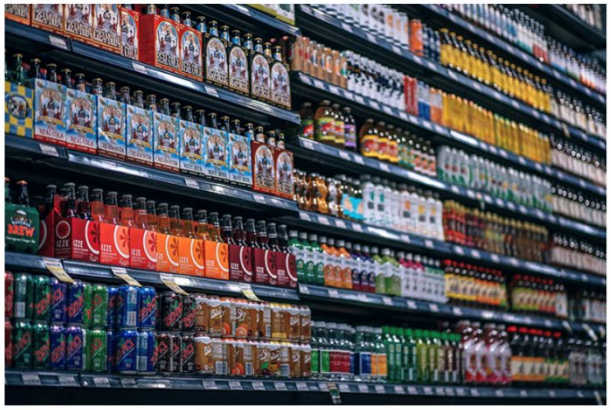
Three years into soda tax, sugary drink consumption down more than 50 percent in Berkeley

By Kara Manke | FEBRUARY 21, 2019

Tweet | Share 1.5K | Email | Print

Consumption of sugary drinks in Berkeley's diverse and low-income neighborhoods dropped precipitously in 2015, just months after the city levied the nation's first soda tax on sugar-sweetened beverages.

Three years later, residents in these neighborhoods reported drinking 52 percent fewer servings of sugary drinks than they did before the tax was passed in November 2014, shows a new report from the University of



Consumption of sugary drinks dropped 52 percent among Berkeley's low-income residents in the three years after the city enacted a penny-per-ounce excise tax on sugar-sweetened beverages in early 2015. (Image courtesy Pexels.com)

Sugary Drink Ban Tied to Health Improvements at Medical Center

Workers at the University of California, San Francisco, lost belly fat and showed metabolic benefits after a ban on sugary drinks went into effect.

UCSF

CASE STUDY: WRITING TO REFRAMING THE DISCUSSION

The story of BiDil

- 1990's - V-Heft trial mortality benefit from isordil/hydralazine combination
  - Use superseded by ACE inhibitors

- 2000's – Nitromed creates combo pill
  - FDA refuses NDA
  - Trial in African Americans only
  - FDA approves NDA for African Americans
  - Price of generic medications -> increases to 3000/yr

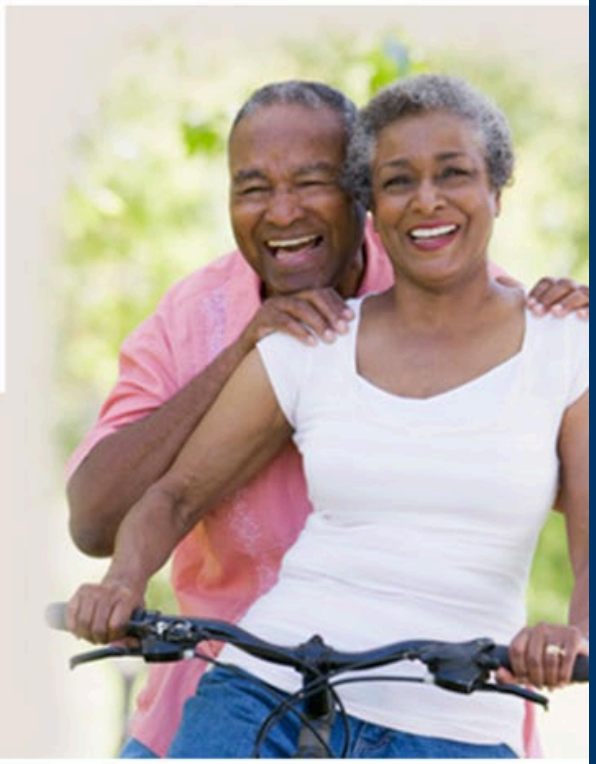
BiDil®
isosorbide dinitrate/hydralazine HCl

arbor patient DIRECT
ArborPatientDirect.com

CO-PAY AS LOW AS
$25*
Click here to find out how

I am a healthcare provider interested in prescribing BiDil to my patients

I am a patient/ caregiver interested in learning about BiDil for African Americans with heart failure



Annals of Internal Medicine | In the Balance

BiDil for Heart Failure in Black Patients: Implications of the U.S. Food and Drug Administration Approval

Kirsten Bibbins-Domingo, PhD, MD, and Alicia Fernandez, MD

In 2005, the combination of hydralazine hydrochloride and isosorbide dinitrate was approved by the U.S. Food and Drug Administration (FDA) for treating heart failure in black patients. In departing from its long history of approving drugs for general clinical indications without regard to demographic classification, the FDA cited the need to address racial disparities in health as an important contributor to their decision. The authors argue that this decision, although perhaps well-intentioned, was based on flawed scientific interpretation of trial results that claimed differential drug response by race and ignored the considerable literature on the cause of racial disparities in health and health care. Because of its potential impact on future drug approvals, the FDA's decision is a setback in the scientific and policy discourse on medical therapeutics and race and specifically hinders the efforts aimed at eliminating health and health care disparities.

Ann Intern Med. 2007;146:52-56. www.annals.org
For author affiliations, see end of text.

1. Drug approval for a specific group implies a differential response that has not been tested

2. In approving a drug for a specific race-ethnic group, FDA risks incentivizing trials in less diverse patient populations

3. In turn, this may lead to more studies designed solely for niche marketing

Annals of Internal Medicine | In the Balance

BiDil for Heart Failure in Black Patients: Implications of the U.S. Food and Drug Administration Approval

Kirsten Bibbins-Domingo, PhD, MD, and Alicia Fernandez, MD

In 2005, the combination of hydralazine hydrochloride and isosorbide dinitrate was approved by the U.S. Food and Drug Administration (FDA) for treating heart failure in black patients. In departing from its long history of approving drugs for general clinical indications without regard to demographic classification, the FDA cited the need to address racial disparities in health as an important contributor to their decision. The authors argue that this decision, although perhaps well-intentioned, was based on flawed scientific interpretation of trial results that claimed differential drug response by race and ignored the considerable literature on the cause of racial disparities in health and health care. Because of its potential impact on future drug approvals, the FDA's decision is a setback in the scientific and policy discourse on medical therapeutics and race and specifically hinders the efforts aimed at eliminating health and health care disparities.

Ann Intern Med. 2007;146:52-56. www.annals.org
For author affiliations, see end of text.

1. By endorsing race as a treatment indication, the FDA unscientifically endorsed a biological model of race.

2. The use of the health disparities argument to justify approval suggests a "solution" (race-targeted pharmacology) for a "problem" (racial disparities in health) and elevates biological difference in medication response to an important cause of health disparities without evidence.

3. Using health disparities to justify the "creation" of an expensive medication is perverse.

SFGATE ☰ SECTIONS

Focus on the right health fight

Kirsten Bibbins-Domingo, Alicia Fernandez Published 4:00 am, Monday, March 5, 2007

READ ANOTHER OPINION >

It's official: The House Intelligence Committee is a joke 6:13 AM

What's a Jeff Flake or John Kasich to do?

With Republicans nervous, more Democrats need to weigh in on...

Damage control at White House to reverse Trump's stunning blunder

In its quest to advance civil rights and end disparities in health, the **NAACP** has picked the wrong fight.

The NAACP's New England branch recently accused Medicare of racism for deciding not to require coverage of BiDil, a heart failure drug approved by the **Food and Drug Administration** for the treatment of African-American patients. But the venerable civil rights organization has fallen for the same marketing ploy that the FDA did in approving BiDil in the first place, and that could set a dangerous

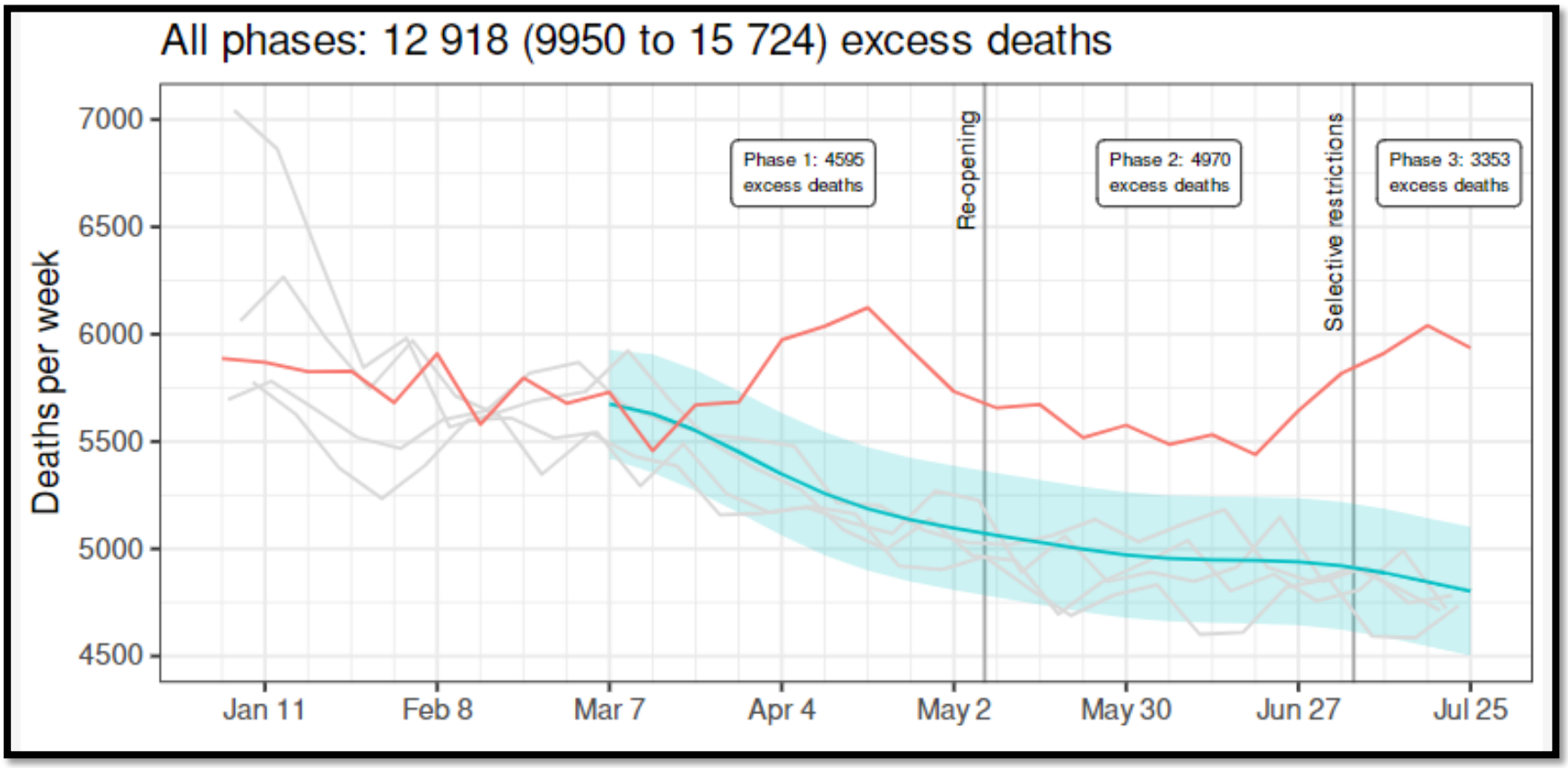
If we want to get at the root causes of disparities in heart disease, we need to look at a number of factors, such as under-use of common, standard therapies in African Americans, as well as inadequate preventive care. We need to pay attention to the complex social problems -- most notably poverty and inequality -- that interact with human biology to produce poor health. And finally, we must recognize that eliminating health disparities also requires access to high-quality, affordable health care for all Americans -- the important issue that Congress is rightly debating.

Dissemination

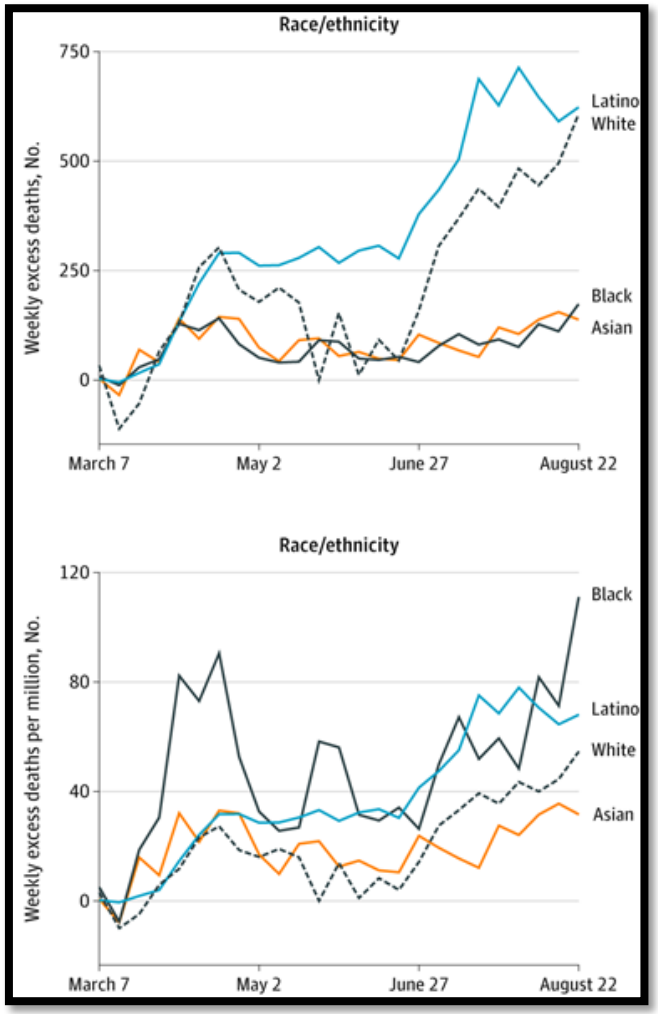
- For academic publications – think about the simple take-home message for the audience you want to reach
- Do not confuse academic publication with the type of dissemination that can create change.
- Learn to use the language of:
  - Media, Healthcare organizations, Guideline-making organizations, Politicians, Advocacy groups, Community members
- Takes time, but has its own rewards

CASE STUDY: COVID 19

Excess deaths in California (March-July 2020)

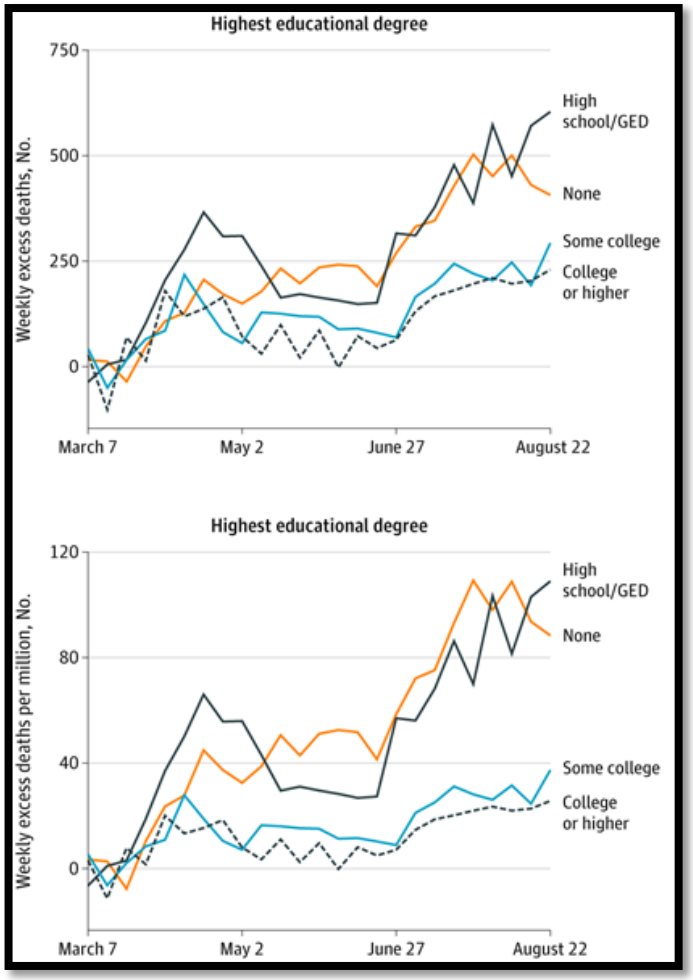


Yea-Hung Chen, Maria Glymour….. Kirsten Bibbins-Domingo



- Black Californians had higher per capita excess mortality than other racial/ethnic group in most weeks of the pandemic
- Late in the shelter-in-place period, most groupshad a decline in excess per capita mortality.
- In contrast, Latino Californians saw a substantial and sustained increase in per capita mortality – account for ½ of excess mortality

JAMA Internal Medicine - Excess Mortality in California During the Coronavirus Disease 2019 Pandemic, March to August 2020 – December 2020

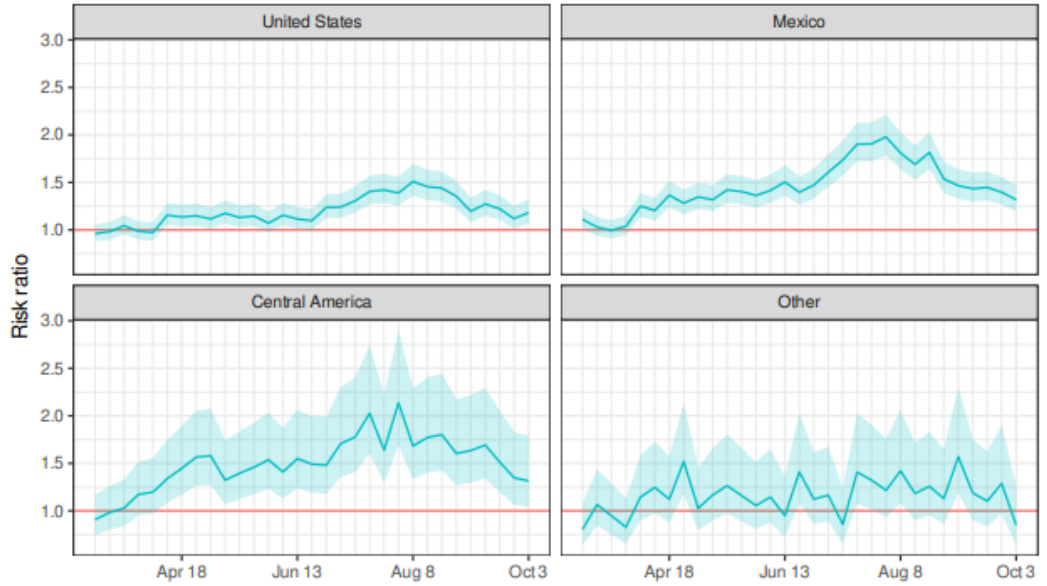


Two-thirds of the excess deaths in California adults during the first six months of the pandemic occurred in *those with only a high school degree or less*.

JAMA Internal Medicine - Excess Mortality in California During the Coronavirus Disease 2019 Pandemic, March to August 2020 – December 2020

Understanding heterogeneity in excess deaths among California Latinos

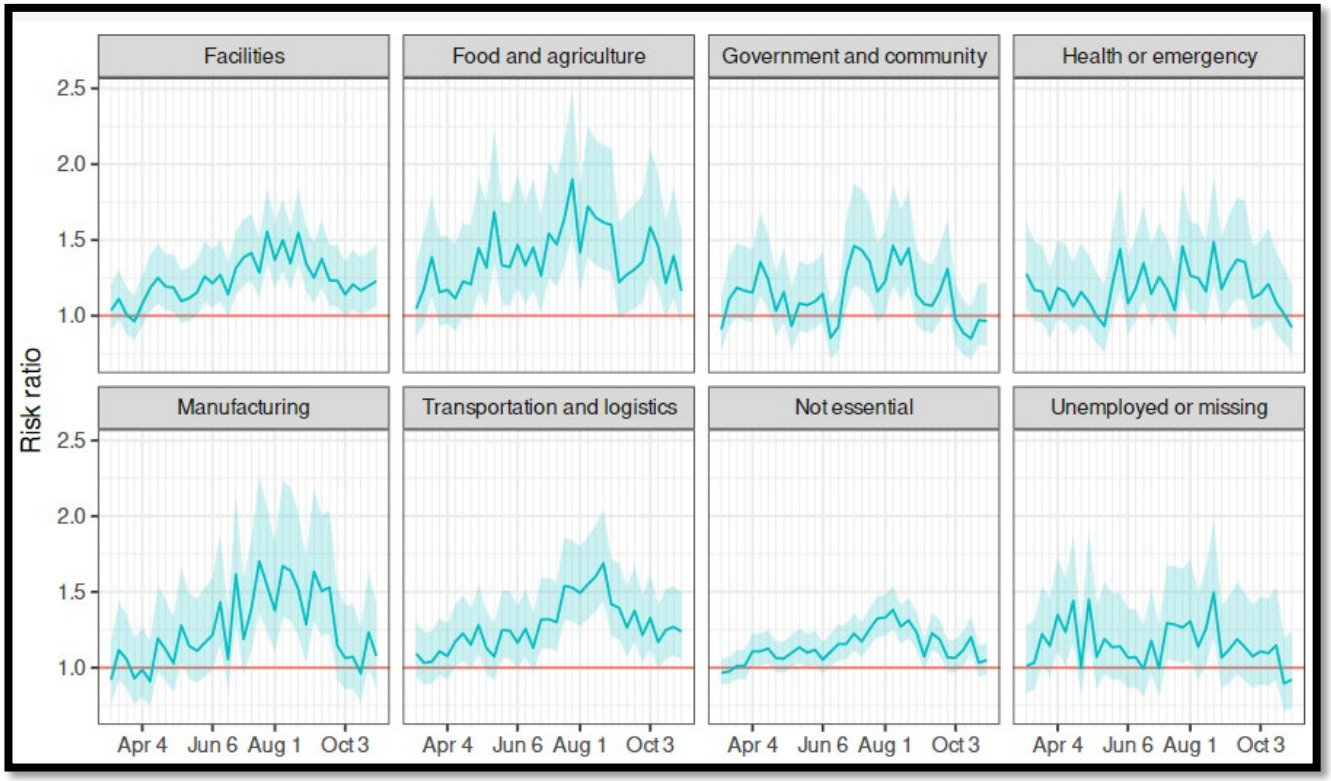
Figure 4. Weekly excess mortality during the COVID-19 pandemic among Latinos in California, by place of birth



Note: Risk ratio (observed/expected) for all-cause mortality, comparing the pandemic period (March 1, 2020 to October 3, 2020) to previous years (January 3, 2016 to February 29, 2020); Source: California Department of Public Health Death Records.

Excess death among Latino people in California during the COVID-19 pandemic – Alicia Riley, et al (preprint MedRxiv)

Excess deaths in essential work sectors among adult Californians (age 18-65 years)



Excess mortality associated with the COVID-19 pandemic among Californians 18–65 years of age, by occupational sector and occupation: March through October 2020 - Yea-Hung Chen, et al (preprint MedRxiv

Table 3. Risk ratios for mortality, comparing pandemic time to non-pandemic time, among California residents 18–65 years of age, by occupation, March through October 2020.

Code	Description	Deaths[a]	Risk ratio
4020	Cooks	828	1.60
8800	Packaging and filling machine operators and tenders	172	1.59
6050	Miscellaneous agricultural workers	617	1.55
7800	Bakers	104	1.50
6260	Construction laborers	1,587	1.49
8965	Production workers, all other	452	1.46
8320	Sewing machine operators	127	1.44
5610	Shipping, receiving, and traffic clerks	146	1.44
4250	Grounds maintenance workers	712	1.40
5240	Customer service representatives	562	1.37
4000	Chefs and head cooks	532	1.35
1107	Computer occupations, all other	136	1.35
9600	Industrial truck and tractor operators	364	1.34
3500	Licensed practical and licensed vocational nurses	109	1.34
0410	Property, real estate, and community association managers	157	1.33
4230	Maids and housekeeping cleaners	378	1.33
3930	Security guards and gaming surveillance officers	707	1.32
9130	Driver/sales workers and truck drivers	1,962	1.32
9830	Military, rank not specified	111	1.32
9620	Laborers and freight, stock, and material movers, hand	2,550	1.31
5940	Office and administrative support workers, all other	123	1.30
7750	Miscellaneous assemblers and fabricators	354	1.29
2010	Social workers	217	1.28
4040	Bartenders	148	1.28
2540	Teacher assistants	183	1.28

[a] Number of deaths in pandemic time. The table is restricted to occupations with 100 or more pandemic-time deaths.

Excess mortality associated with the COVID-19 pandemic among Californians 18–65 years of age, by occupational sector and occupation: March through October 2020 - Yea-Hung Chen, et al (preprint MedRxiv

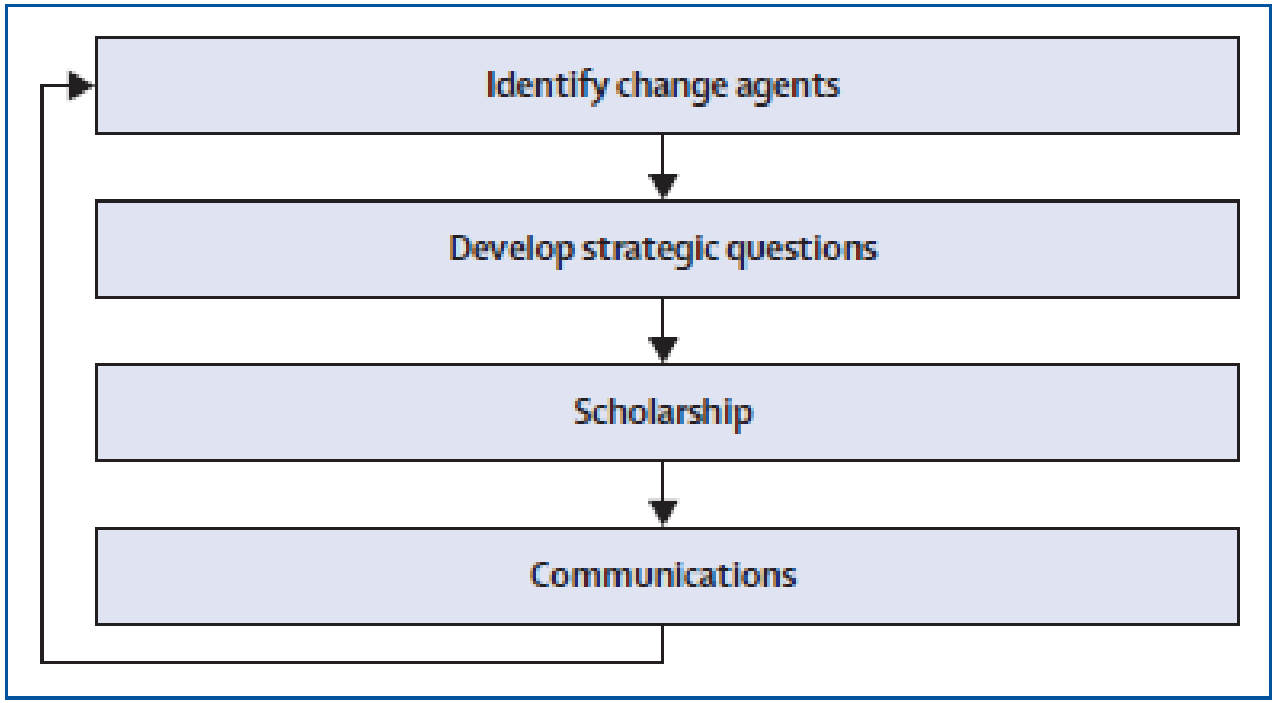


Figure: A model of strategic science designed to enhance links between science and policy

From Brownell and Roberto, Lancet 2015