



University of California  
San Francisco

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Department of  
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Department of  
Medicine

# Integrating social care into healthcare: Looking forward

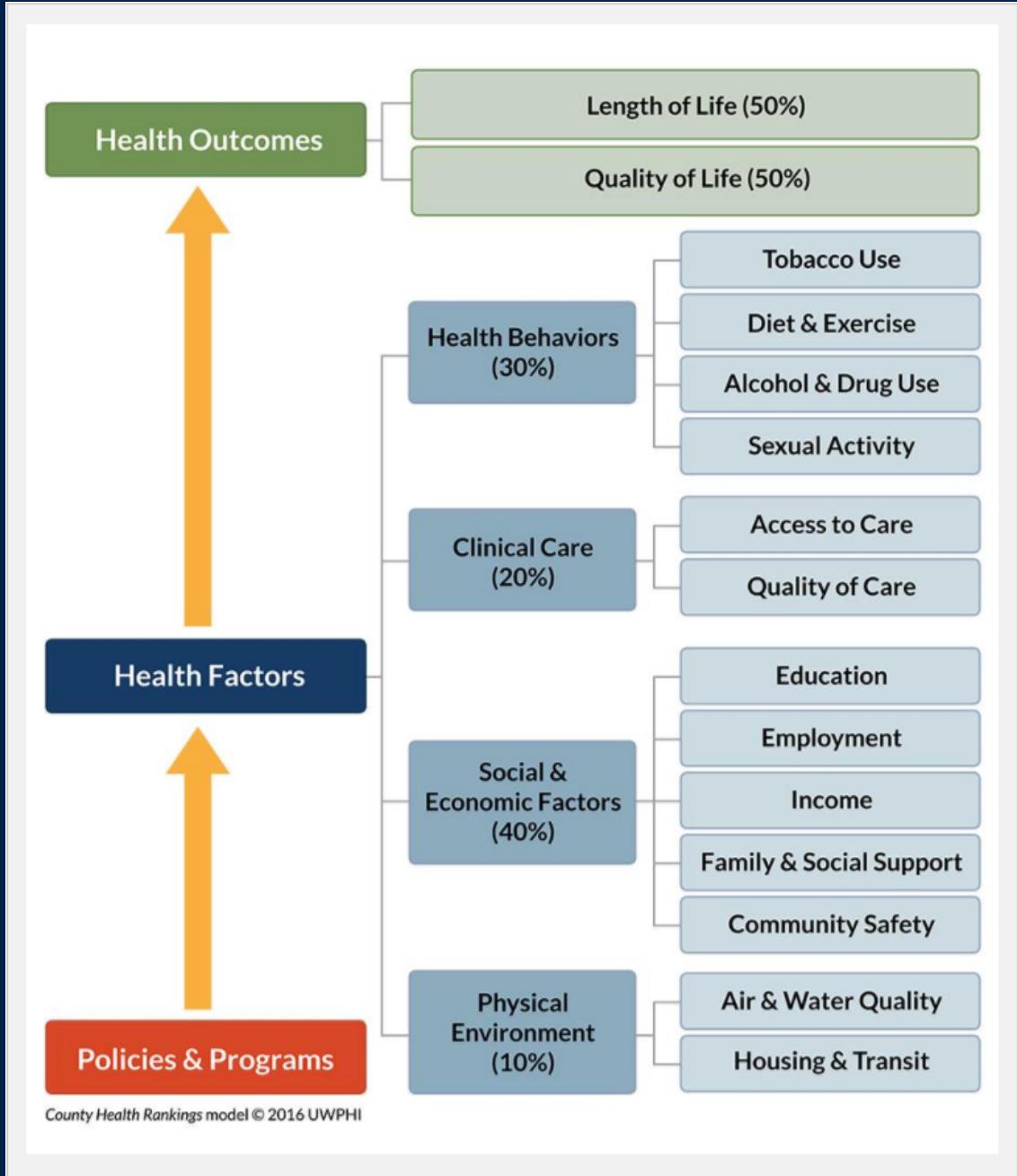
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Imagine. . .

# More health?

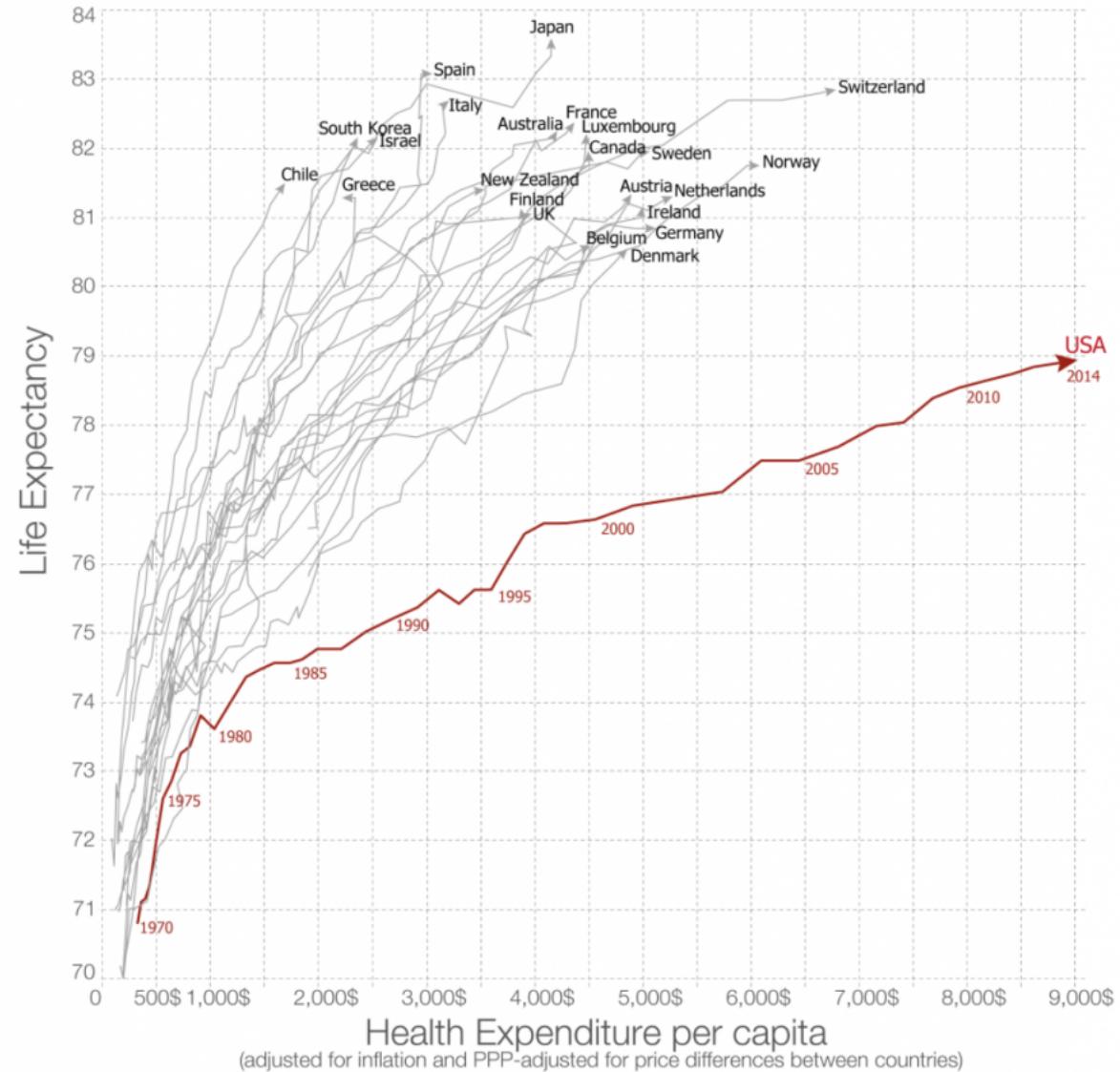


# Better value for healthcare?

## Life expectancy vs. health expenditure over time (1970-2014)

OurWorld  
in Data

Health spending measures the consumption of health care goods and services, including personal health care (curative care, rehabilitative care, long-term care, ancillary services and medical goods) and collective services (prevention and public health services as well as health administration), but excluding spending on investments. Shown is total health expenditure (financed by public and private sources).



Data source: Health expenditure from the OECD; Life expectancy from the World Bank Licensed under CC-BY-SA by the author Max Roser. The data visualization is available at [OurWorldInData.org](http://OurWorldInData.org) and there you find more research and visualizations on this topic.

# Reduced health inequities?

# How would *you* answer this question?

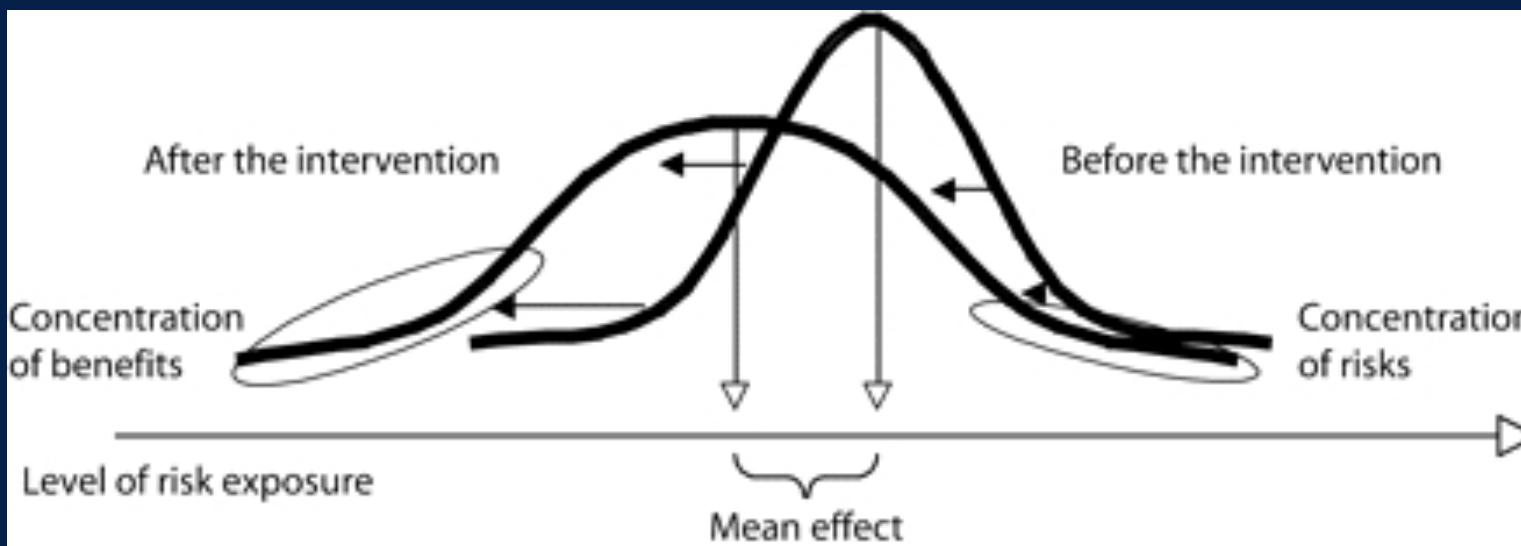
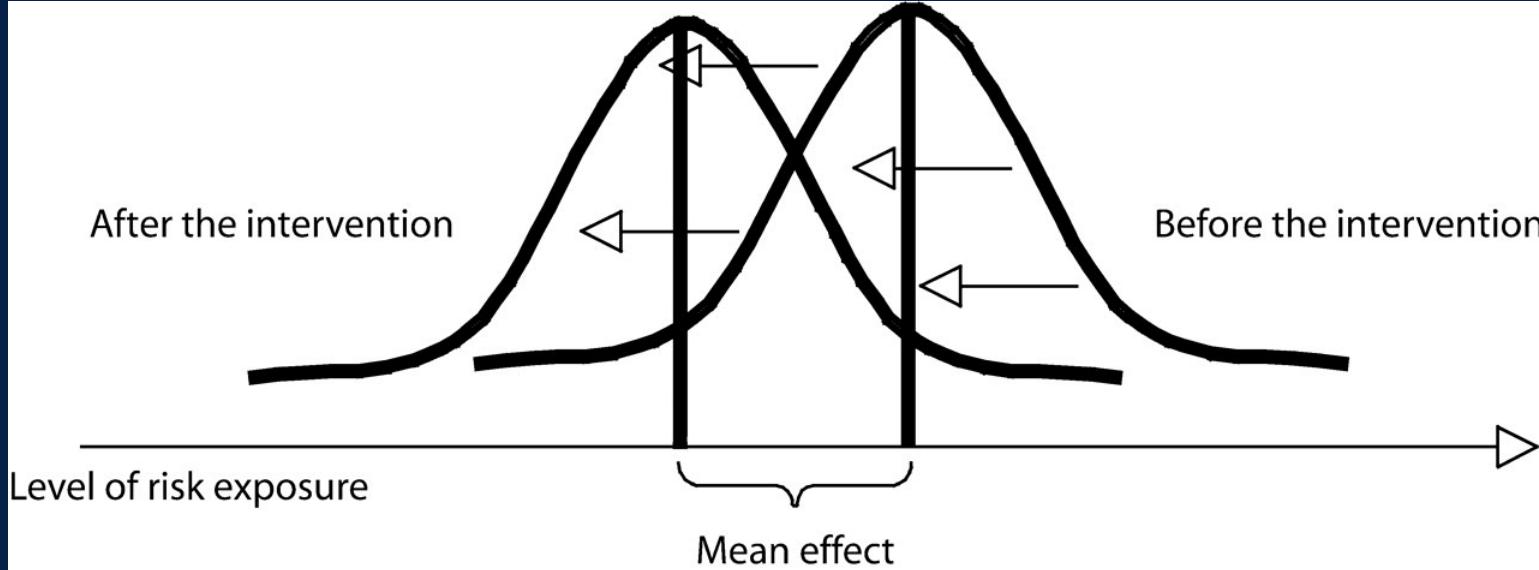
Effective integration of social care into healthcare will ultimately lead to:

- More health?
- Better value for healthcare?
- Reduced health inequities?

**Are we clear on our intermediate to long-term metrics of success?**

**Do we have a shared vision for this work, & what are the implications of different visions?**

# Thinking more explicitly about health equity

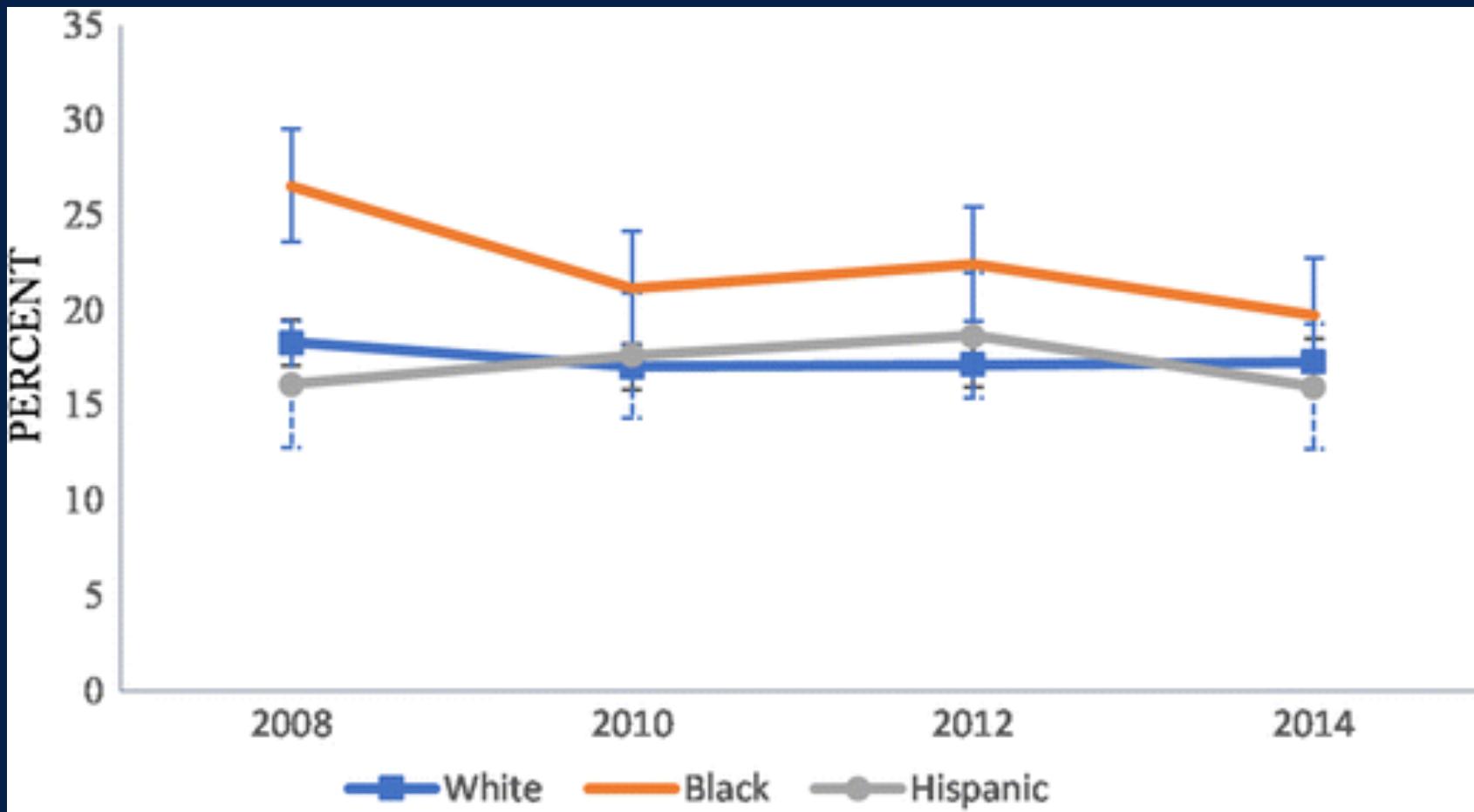


*The  
inequality  
paradox*

# Addressing Fundamental Causes of Health Inequities

- Poverty
- Discrimination / Racism

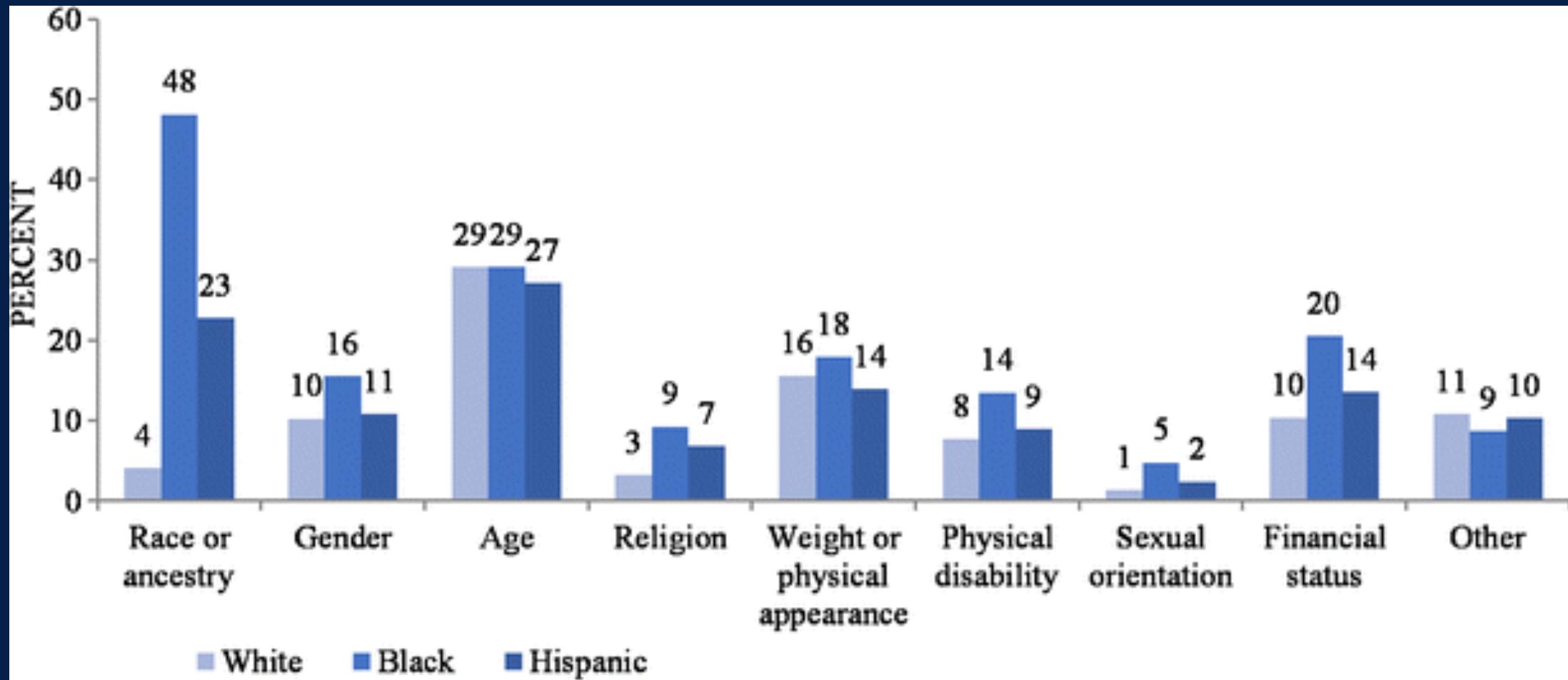
# Self-report of healthcare discrimination



Health and Retirement Survey ( $54+$  years  $N = 13,897$  individuals and 21,078 reports)

JGIM March 2018, pp 291–297

# Attribution of healthcare discrimination



GET ALL THE  
INFORMATION YOU CAN,  
WE'LL THINK OF A  
USE FOR IT LATER.

# Promise and Perils of More Data



demotivateur.fr

**Addressing health equity is unlikely to occur without explicit focus.**

**Making health inequities worse is an important concern.**

How do we stay focused on health equity in  
our science and implementation?

# For researchers and implementers

- Share and report information about your studies and programs that include information about:
  - your setting and context
  - patient sub-groups
  - the applicability of findings to other populations/settings
- Include explicit discussions of health equity and health disparities in the ongoing meetings, publications, forums on this topic

# For those who think about data in healthcare

- Recognize the added dimension of promise and peril as we enter an age of “big data”

PRESS RELEASES

## AMA passes first policy recommendations on augmented intelligence

JUNE 14, 2018

*Promote development of thoughtfully designed, high-quality, clinically validated health care AI that: a. is designed and evaluated in keeping with best practices in user-centered design, particularly for physicians and other members of the health care team; b. is transparent; c. conforms to leading standards for reproducibility; d. identifies and takes steps to address bias and avoids introducing or exacerbating health care disparities including when testing or deploying new AI tools on vulnerable populations; and e. safeguards patients' and other individuals' privacy interests and preserves the security and integrity of personal information.*

# Integrating Social and Medical Care: Could it Worsen Health and Increase Inequity?

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## **ABSTRACT**

As a result of a large and compelling body of evidence documenting the impacts of social determinants, such as income and education, on health outcomes, health care systems are beginning to incorporate social and economic risk data into health care delivery decisions. But there is a risk that some of these efforts could worsen health and widen health inequities. We highlight 3 examples—including recent policy changes in Medicaid, social needs, informed risk prediction models, and advances in precision medicine—where the inclusion of social risk information threatens to reduce care quality or health care access for some groups of patients. A new dialog is needed about both the opportunities and potential consequences of bringing information about patients' social circumstances into a market-based health care system.

*Ann Fam Med* 2019;17:77-81. <https://doi.org/10.1370/afm.2339>.

## SPECIAL ARTICLE

# Ensuring Fairness in Machine Learning to Advance Health Equity

Alvin Rajkomar, MD\*; Michaela Hardt, PhD\*; Michael D. Howell, MD, MPH; Greg Corrado, PhD; and Marshall H. Chin, MD, MPH

Machine learning is used increasingly in clinical care to improve diagnosis, treatment selection, and health system efficiency. Because machine-learning models learn from historically collected data, populations that have experienced human and structural biases in the past—called *protected groups*—are vulnerable to harm by incorrect predictions or withholding of resources. This article describes how model design, biases in data, and the interactions of model predictions with clinicians and patients may exacerbate health care disparities. Rather than simply guarding against these harms passively, machine-learning systems should be used proactively to advance health equity. For that goal to be achieved, principles of distributive justice must be incorporated

into model design, deployment, and evaluation. The article describes several technical implementations of distributive justice—specifically those that ensure equality in patient outcomes, performance, and resource allocation—and guides clinicians as to when they should prioritize each principle. Machine learning is providing increasingly sophisticated decision support and population-level monitoring, and it should encode principles of justice to ensure that models benefit all patients.

*Ann Intern Med.* 2018;169:866-872. doi:10.7326/M18-1990

Annals.org

For author affiliations, see end of text.

This article was published at Annals.org on 4 December 2018.

\* Drs. Rajkomar and Hardt contributed equally to this work.

## Annals of Internal Medicine

### Table. Recommendations

#### Design

Determine the goal of a machine-learning model and review it with diverse stakeholders, including protected groups.

Ensure that the model is related to the desired patient outcome and can be integrated into clinical workflows.

Discuss ethical concerns of how the model could be used.

Decide what groups to classify as protected.

Study whether the historical data are affected by health care disparities that could lead to label bias. If so, investigate alternative labels.

#### Data collection

Collect and document training data to build a machine-learning model.

Ensure that patients in the protected group can be identified (weighing cohort bias against privacy concerns).

Assess whether the protected group is represented adequately in terms of numbers and features.

#### Training

Train a model taking into account the fairness goals.

#### Evaluation

Measure important metrics and allocation across groups.

Compare deployment data with training data to ensure comparability.

Assess the usefulness of predictions to clinicians initially without affecting patients.

#### Launch review

Evaluate whether a model should be launched with all stakeholders, including representatives from the protected group.

#### Monitored deployment

Systematically monitor data and important metrics throughout deployment.

Gradually launch and continuously evaluate metrics with automated alerts.

Consider a formal clinical trial design to assess patient outcomes.

Periodically collect feedback from clinicians and patients.



Poverty  
Racism/  
Discrimination

# Take home points to consider

- Be explicit about our goals
  - Improved health
  - Better value
  - Reduced inequities
- Recognize the threats to health equity and work to both mitigate threats and actively promote
- Remember that the clout and resources of healthcare institutions and practitioners to advocate for *upstream policy change* are also powerful tools to improve health for our patients

# Equality



# Equity



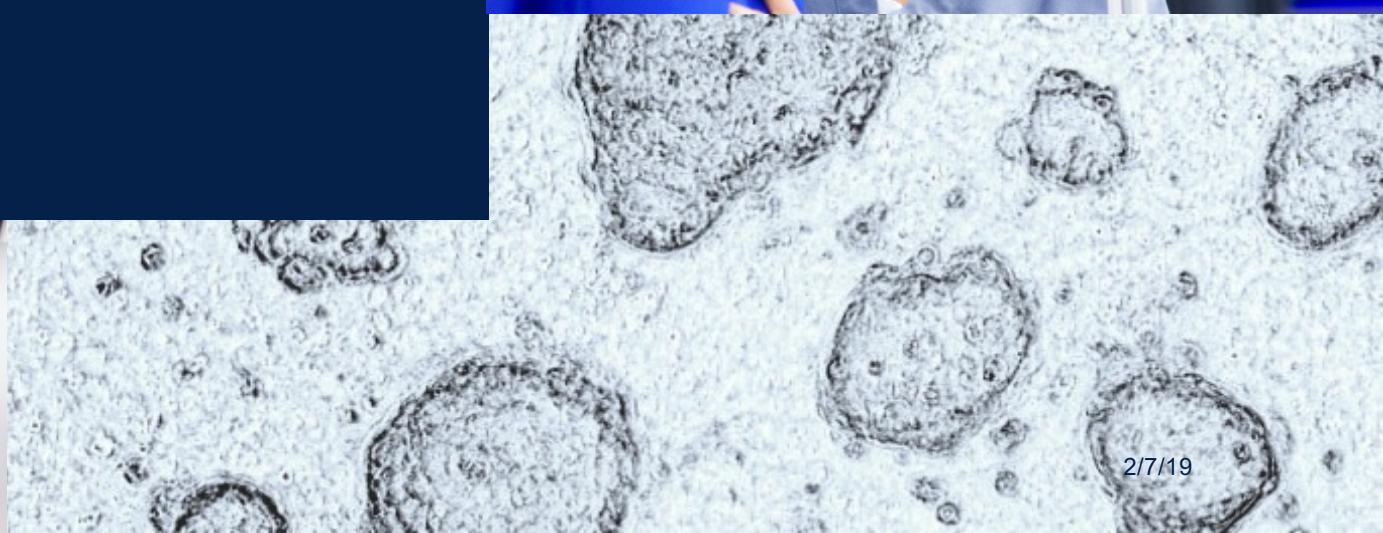
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UCSF



DVD Prevention and Precision Medicine



2/7/19