

Social Determinants of Health and AI

Kevin Larsen, MD, FACP

SVP Clinical Innovation and Translation,
OptumLabs



Disclosures

Financial Disclosures:

- None

Definition of Social Determinants of Health

“

Social determinants of health are conditions in the environments in which people are born, live, learn, work, play, worship and age that affect a wide range of health, functioning and quality-of-life outcomes and risks.¹ ”

“

The ‘social determinants of health’ (SDOH) are the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life.² ”

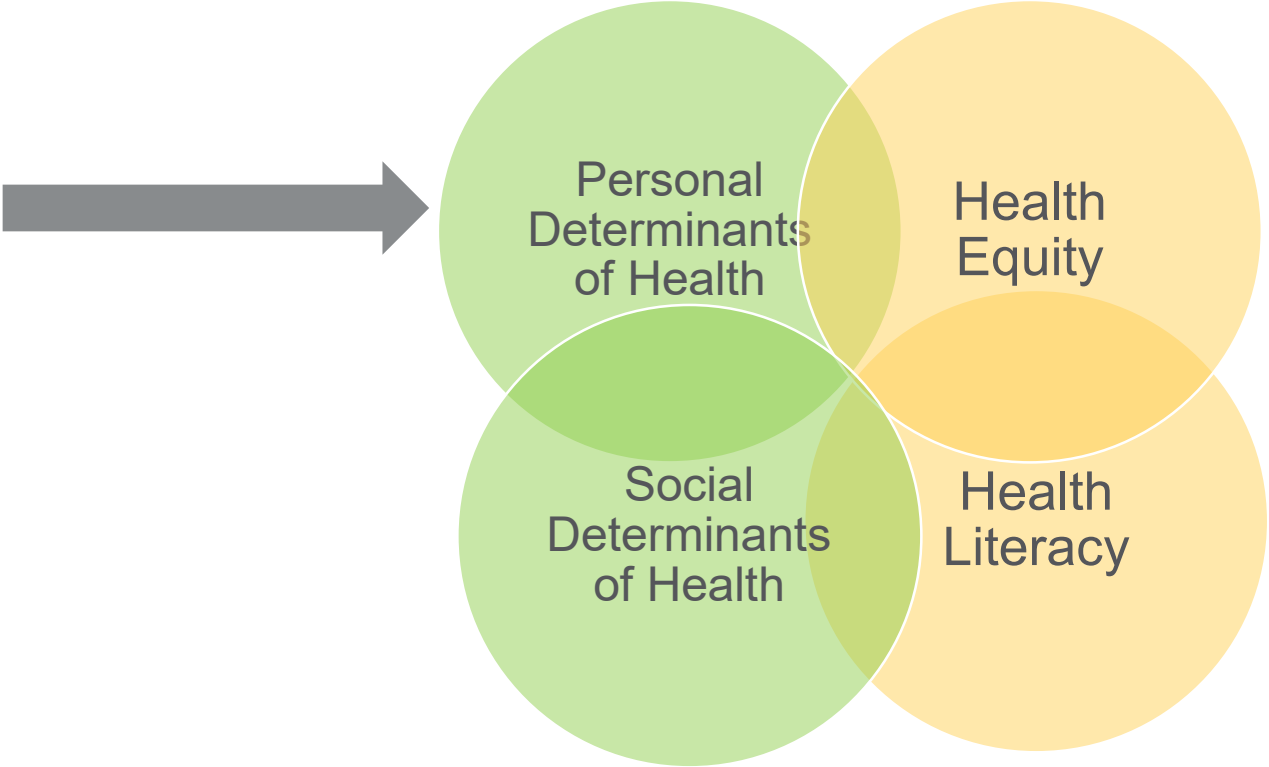
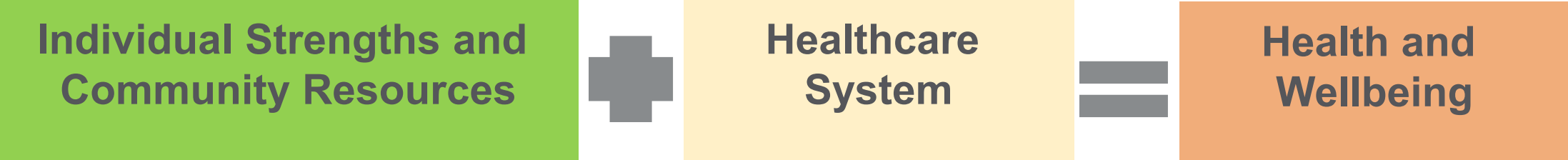


1.<https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>

2.https://www.who.int/social_determinants/en/

Interrelated non-clinical factors impacting health and wellbeing

Adding Personal Determinants of Health to the equation



SDOH and the connection to community health



Housing



Food



Education



Transportation



Safety



Social support



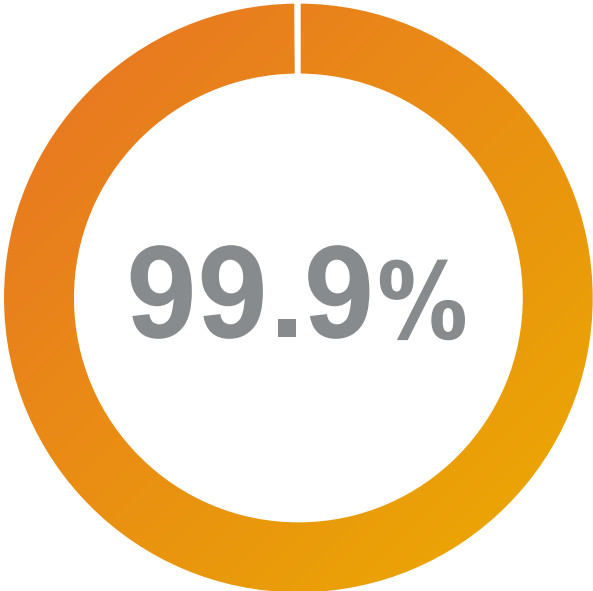
Employment



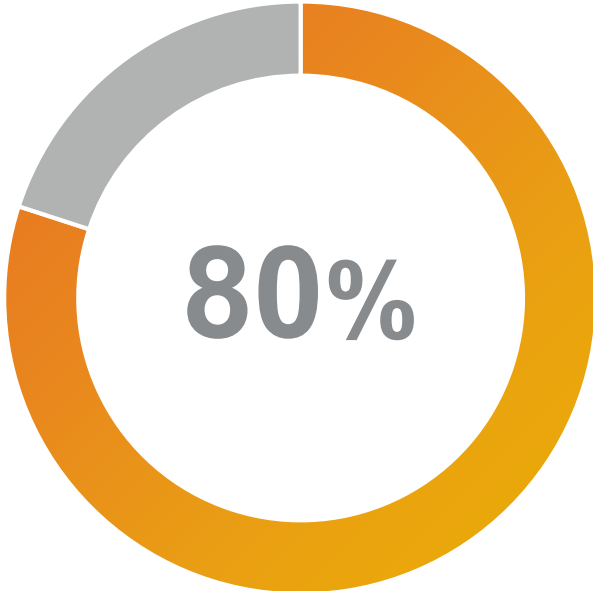
Health literacy

Holistic view of the member

Enables everyone to work smarter by **knowing the customer not just the patient**



Percentage of time members spend outside of a clinician's office



Percentage of member healthcare costs driven by lifestyle and behaviors

Concurrent happenings

Socioeconomic & health care

Related findings/changes validate the need for SDOH inclusion in health care.



53% of US households have no emergency savings; over half of these are people 50 and older



Many SDOH can have a considerable effect on COVID outcomes



CMS has initiatives that require health plans to screen for SDOH and provide referrals

80%

of health is determined by what happens outside of the doctor's office



78% of Americans live paycheck to paycheck



91% of Medicaid plans report activities to address SDOH and 35 states require this



Large employer groups are requesting SDOH product offering

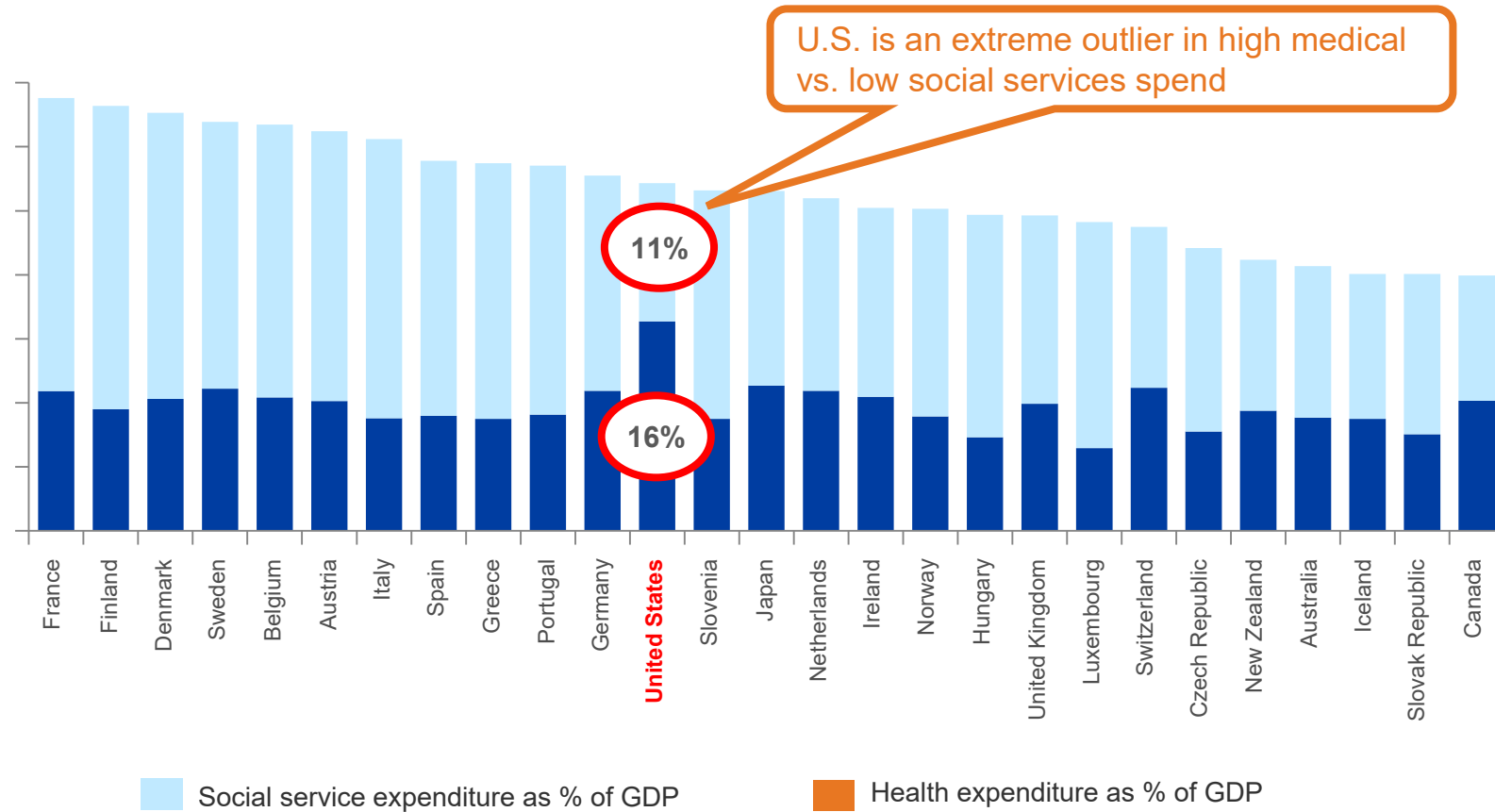
1. AARP Public Policy Institute, Unlocking the Potential of Emergency Savings Accounts, October 2019.
2. Harris Poll survey on behalf of CareerBuilder, August 2017.
3. Abrams, EM & SJ Szeftler, COVID-19 and the impact of social determinants of health, Lancet Resp Med, July 2020.

4. Robert Wood Johnson Foundation. County Health Rankings, 2014. Relationships between Determinant Factors and Health Outcomes.
5. Artiga, S & Hinton E, 2018. Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity.
6. Advisory Board. 2019 Medicare Advantage Growth Outlook, April

2019. Web Conference.
7. Thomas, S. Large employers are on board with social determinants of health and virtual care strategies. Governor's of the Federal Reserve System. report of the Economic Well-Being of U.S. Households in 2017.

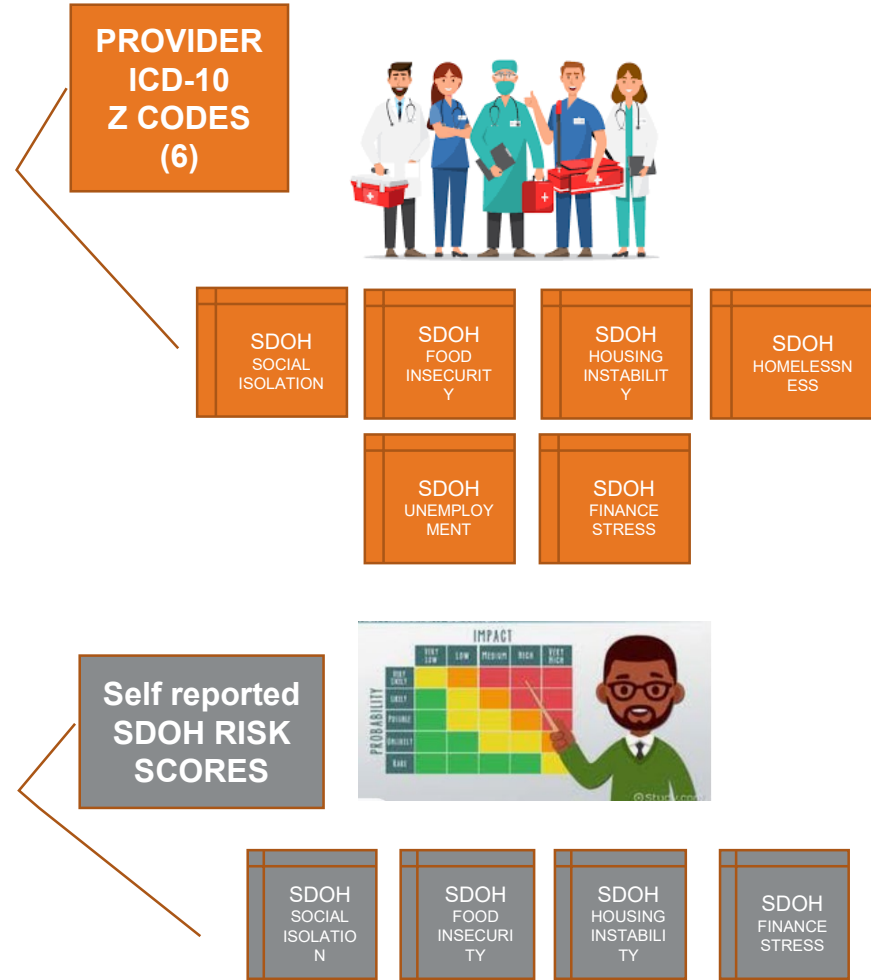
Social factors drive health care spending

Spending on Social and Health Programs by Country (2013)

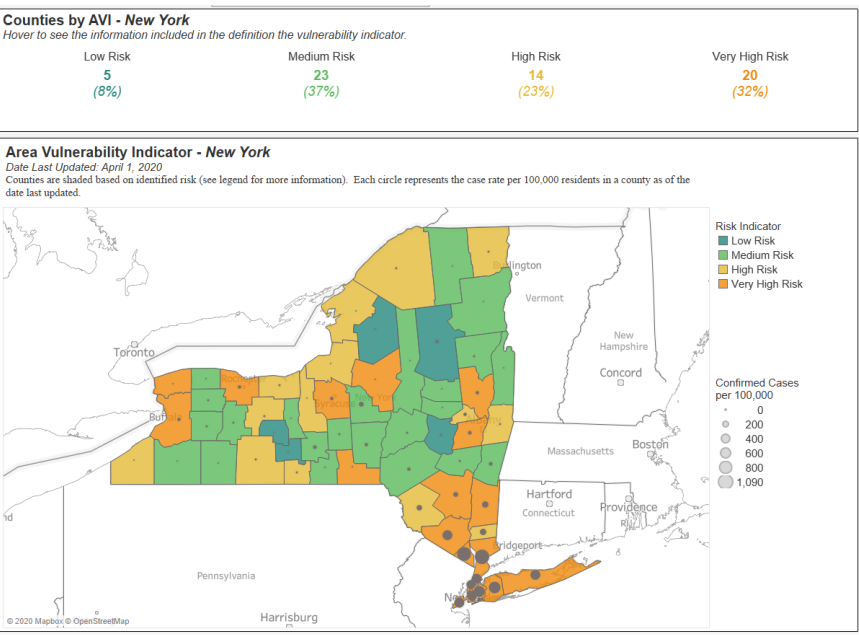


OECD, CDC, CMS. From *The American Healthcare Paradox: Why Spending More Is Getting Us Less* by Elizabeth H. Bradley and Lauren A. Taylor.

Three types of SDOH data



Model derived (imputed) based on where you live e.g., Area Vulnerability Index



<https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model>
<https://www.optum.com/content/dam/optum3/optum/en/resources/PDFs/wf2616134-30.7-ohb-vulnerability-index.pdf>

SDOH has been around for decades

Public Health & actuarial perspective



Worksite Health

Health and well-being programs, condition management, advocacy, Employee Assistance Program (EAP)

Community Health

Housing, transportation, food, recreation, health services

School Health

School nurse, nutrition programs, health education and safety



Your ZIP code is a better predictor of your health outcomes than your genetic code¹

1. <https://www.hsph.harvard.edu/news/features/zip-code-better-predictor-of-health-than-genetic-code/>

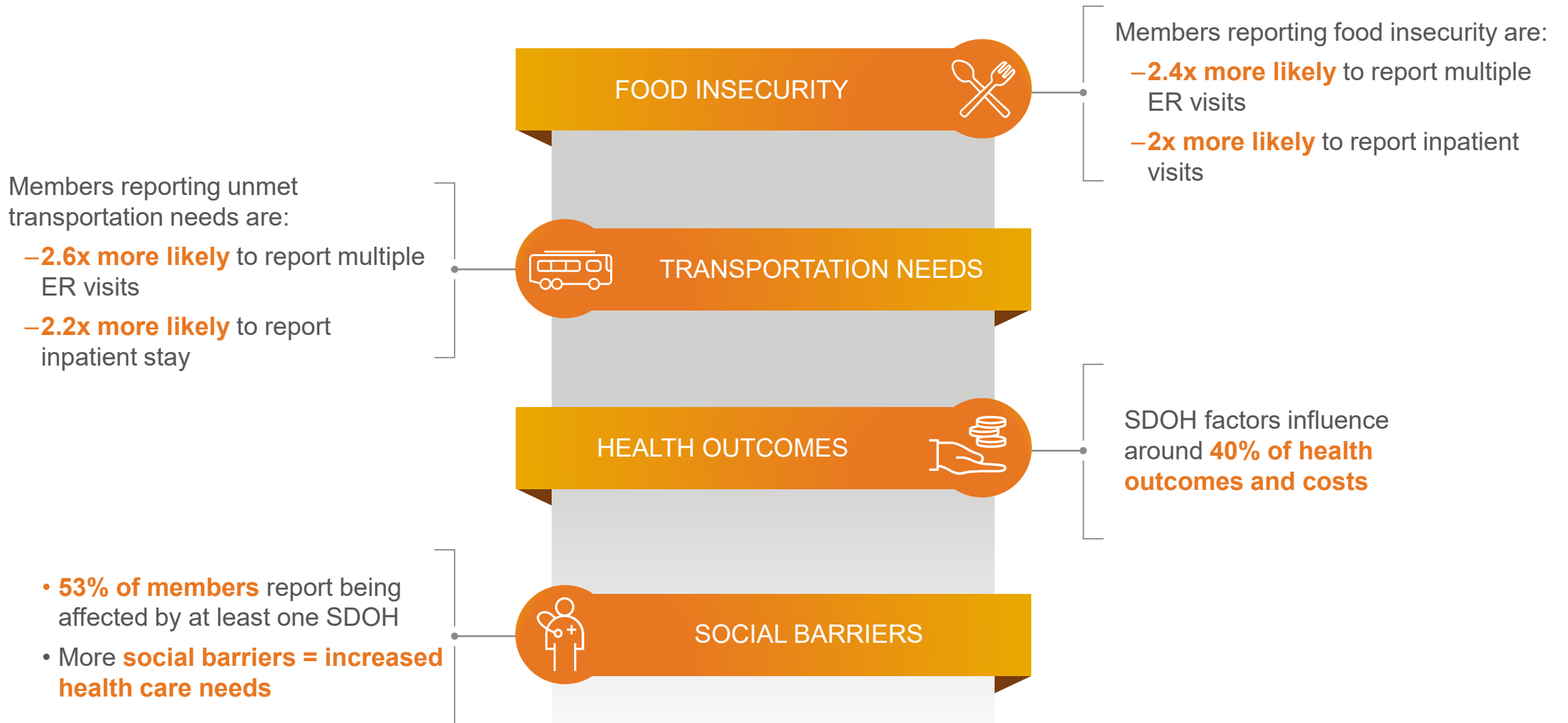


Actuarial pricing indirectly reflects some level of SDOH at the employer level using allowable rating factors:

- ✓ Age/Gender
- ✓ Geographic Area
- ✓ Industry
- ✓ Income (historically)

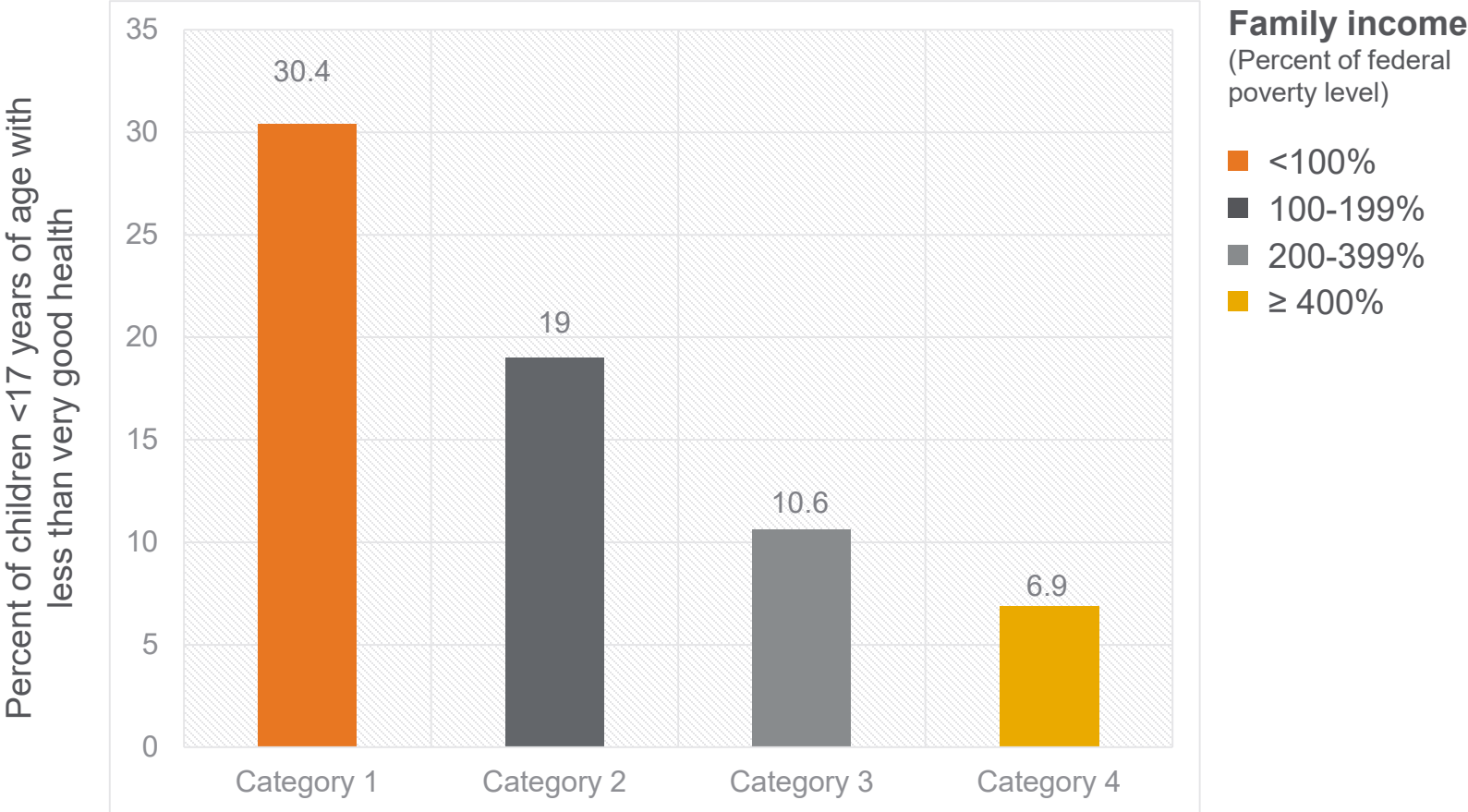
1. <https://www.hsph.harvard.edu/news/features/zip-code-better-predictor-of-health-than-genetic-code/>

Why do SDOH matter?



Income & health status

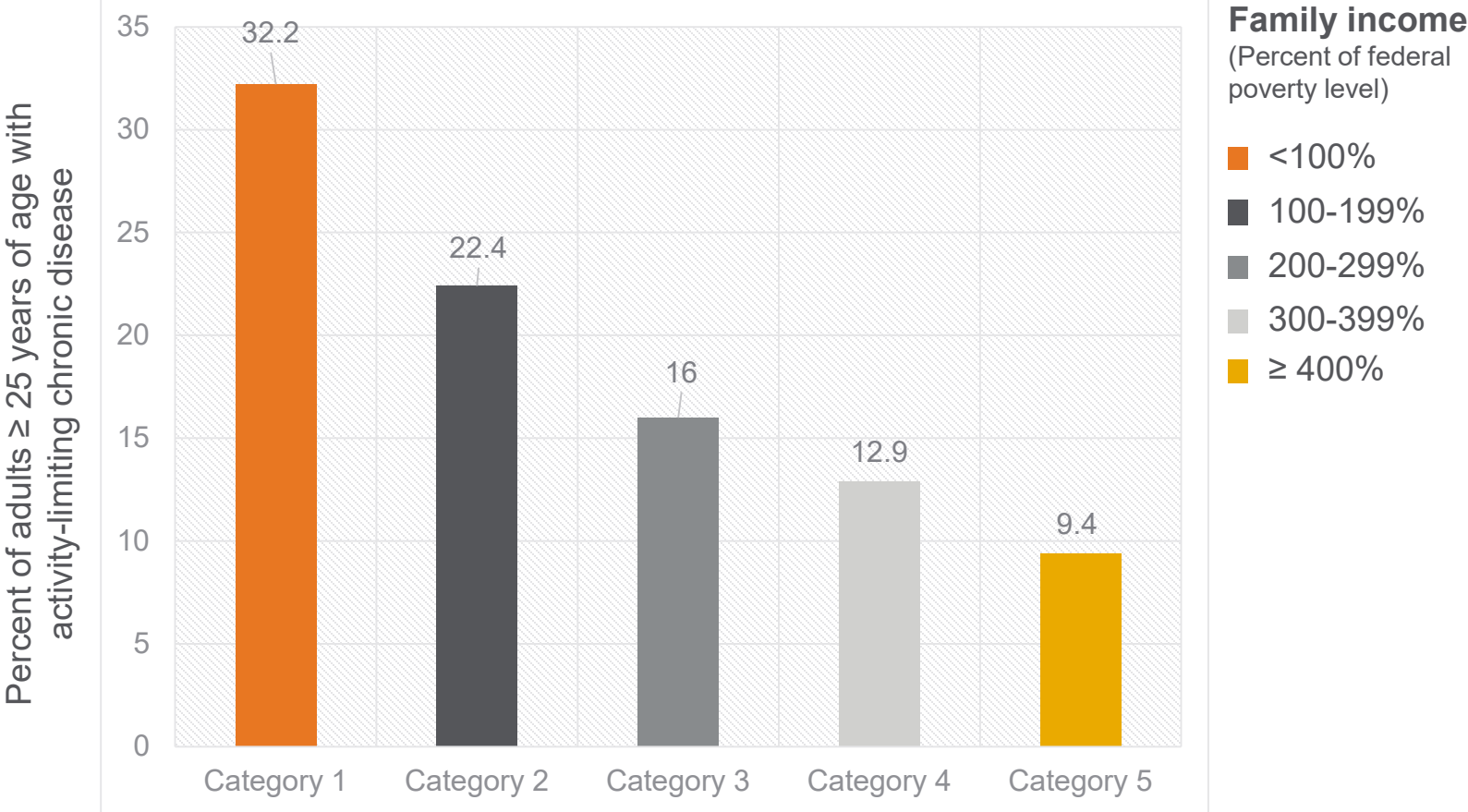
Low income
associated with **poor**
health early in life:



Public Health Reports: The Social Determinants of Health: It's Time to Consider the Causes of the Causes.

Income & activity-limiting chronic disease

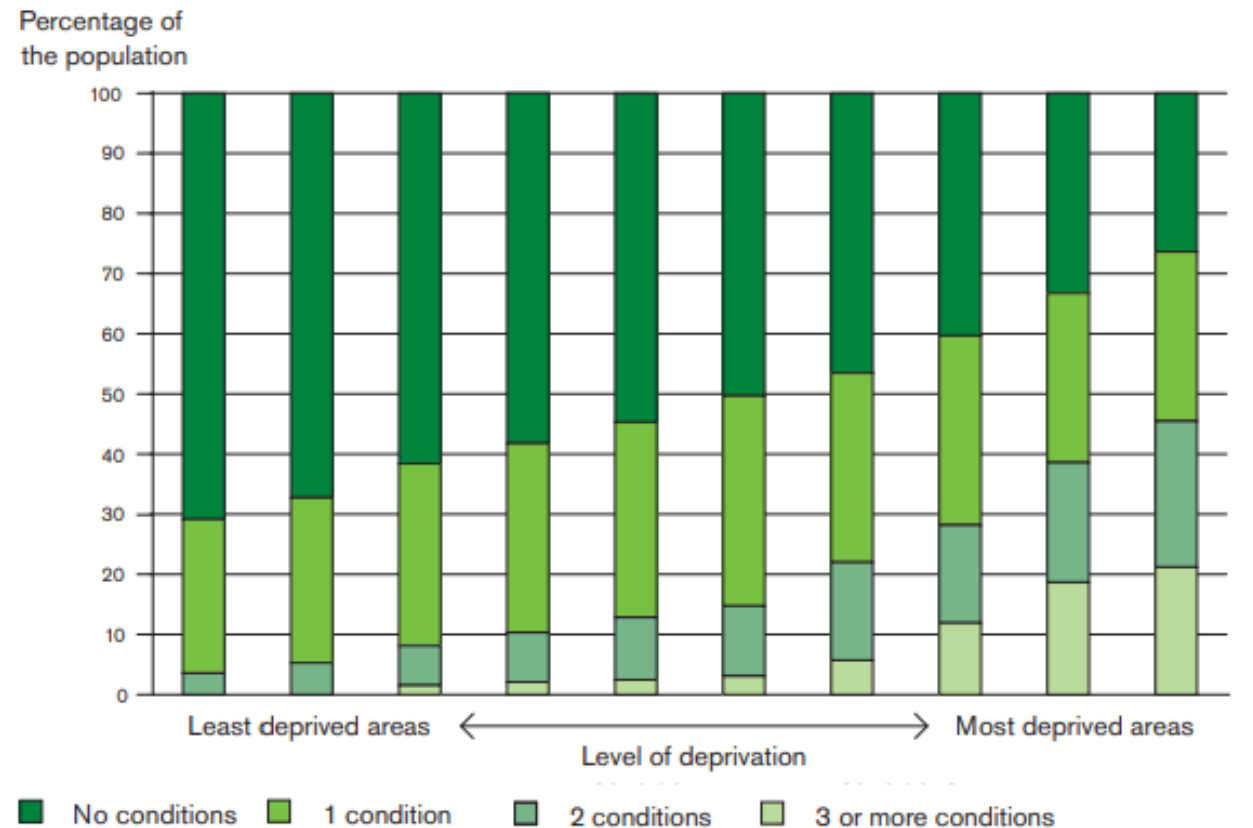
Low income
associated with
poor health later in
life:



Public Health Reports: The Social Determinants of Health: It's Time to Consider the Causes of the Causes.

Environmental conditions & chronic conditions

Populations living in areas with, in relative terms, the **least favorable environmental conditions**, 2001-2006



Environmental conditions: river water quality, air quality, green space, habitat favourable to biodiversity, flood risk, litter, detritus, housing conditions, road accidents, regulated sites (e.g. landfill)

Source: Department for Environment, Food and Rural Affairs²³

The Marmot Review: Fair Society, Healthy Lives, 2010.

What correlations
in our models may
be due to
unmeasured
SDOH?



Further reading

Hardt's class <https://fairmlclass.github.io/>

<https://towardsdatascience.com/a-tutorial-on-fairness-in-machine-learning-3ff8ba1040cb>

Long tutorial <https://slideslive.com/38921491/representation-learning-and-fairness>

<https://www.propublica.org/article/how-we-analyzed-the-compas-recidivism-algorithm>

and rejoinder https://www.uscourts.gov/sites/default/files/80_2_6_0.pdf

<http://www.econ2.jhu.edu/people/hu/Econometrics-of-unobservables.pdf>

From Stephen Few

“The ethical practices that can serve as a code of conduct for data sensemaking professionals are, in my opinion, built upon a single fundamental principle. It is the same principle that medical doctors swear as an oath before becoming licensed: Do no harm.”

As data sensemakers, we stand at the gates of understanding. Ethically, it is our job to serve as gatekeepers. In many cases, we will be the only defense against harm.

Please view the principles of ethical data sense-making <http://www.stephen-few.com/blog/2019/07/22/ethical-data-sensemaking/>