Clinically Integrated Supply Chain in the Time of Covid: What Now?

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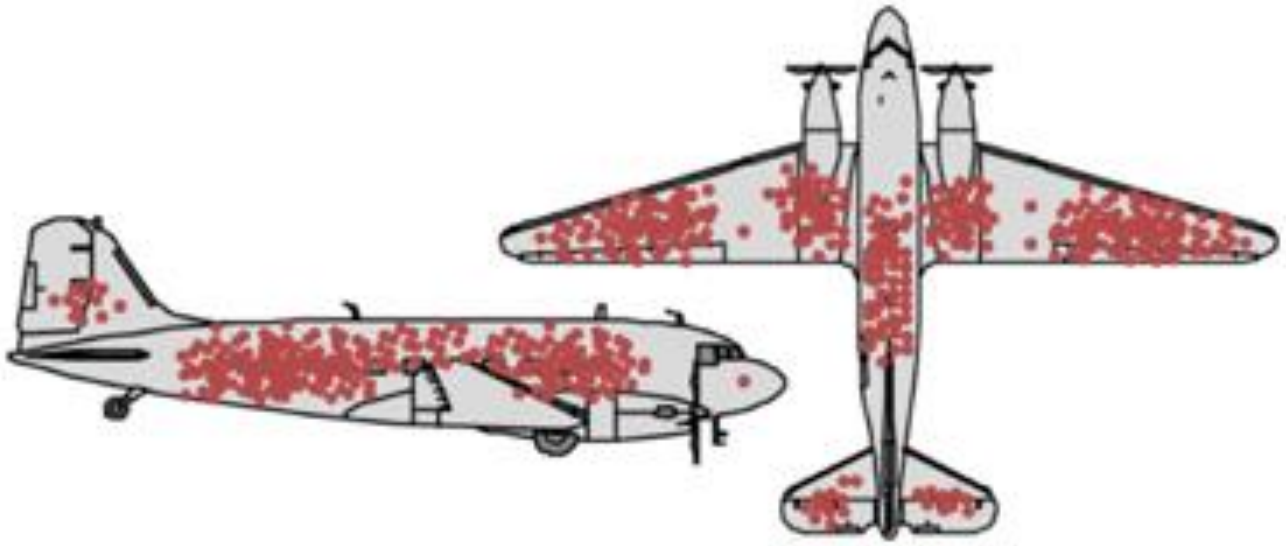
CAHPMM 2021

Abraham Wald (1902-1950)

- Helped defeat the Nazis
- Mathematician
- Escaped Vienna during WWII to America
- Solved mathematical problems for the US military



Lessons

- See what you can't see
- Solution may be opposite of what seems obvious, even when it appears to be supported by evidence
- Current solutions have not resolved 40+ years of health care crisis
- We must be willing to turn everything upside down

COVID turned health care upside down

- COVID killed 1 out of 500 Americans
- Healthcare workers overworked, burnt out
- Americans *more* skeptical of health care
- Shortages of PPEs and other supplies
- Supply chain in the spotlight
- Physicians in supply chain
- JIT failed

Supply chain is no longer “supply chain”

- Resource optimization means extending beyond comfort zone
- Supply chain’s role in health equity
- Environmental stewardship and SDOH
- Value-based care drives appropriate use
- Clinical integration is now more than just patient outcomes and quality

But first: The Burning Platform

OVERALL RANKING

COUNTRY RANKINGS

- Top 2*
- Middle
- Bottom 2*

	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING (2013)	4	10	9	5	5	7	7	3	2	1	11
Quality Care	2	9	8	7	5	4	11	10	3	1	5
Effective Care	4	7	9	6	5	2	11	10	8	1	3
Safe Care	3	10	2	6	7	9	11	5	4	1	7
Coordinated Care	4	8	9	10	5	2	7	11	3	1	6
Patient-Centered Care	5	8	10	7	3	6	11	9	2	1	4
Access	8	9	11	2	4	7	6	4	2	1	9
Cost-Related Problem	9	5	10	4	8	6	3	1	7	1	11
Timeliness of Care	6	11	10	4	2	7	8	9	1	3	5
Efficiency	4	10	8	9	7	3	4	2	6	1	11
Equity	5	9	7	4	8	10	6	1	2	2	11
Healthy Lives	4	8	1	7	5	9	6	2	3	10	11
Health Expenditures/Capita, 2011**	$3,800	$4,522	$4,118	$4,495	$5,099	$3,182	$5,669	$3,925	$5,643	$3,405	$8,508

Notes: * Includes ties. ** Expenditures shown in $US PPP (purchasing power parity); Australian $ data are from 2010.

Source: Calculated by The Commonwealth Fund based on 2011 International Health Policy Survey of Sicker Adults; 2012 International Health Policy Survey of Primary Care Physicians; 2013 International Health Policy Survey; Commonwealth Fund *National Scorecard 2011;* World Health Organization; and Organization for Economic Cooperation and Development, *OECD Health Data, 2013* (Paris: OECD, Nov. 2013).

Source: http://www.commonwealthfund.org/publications/fund-reports/2014/jun/mirror-mirror

Health Care System Performance Rankings

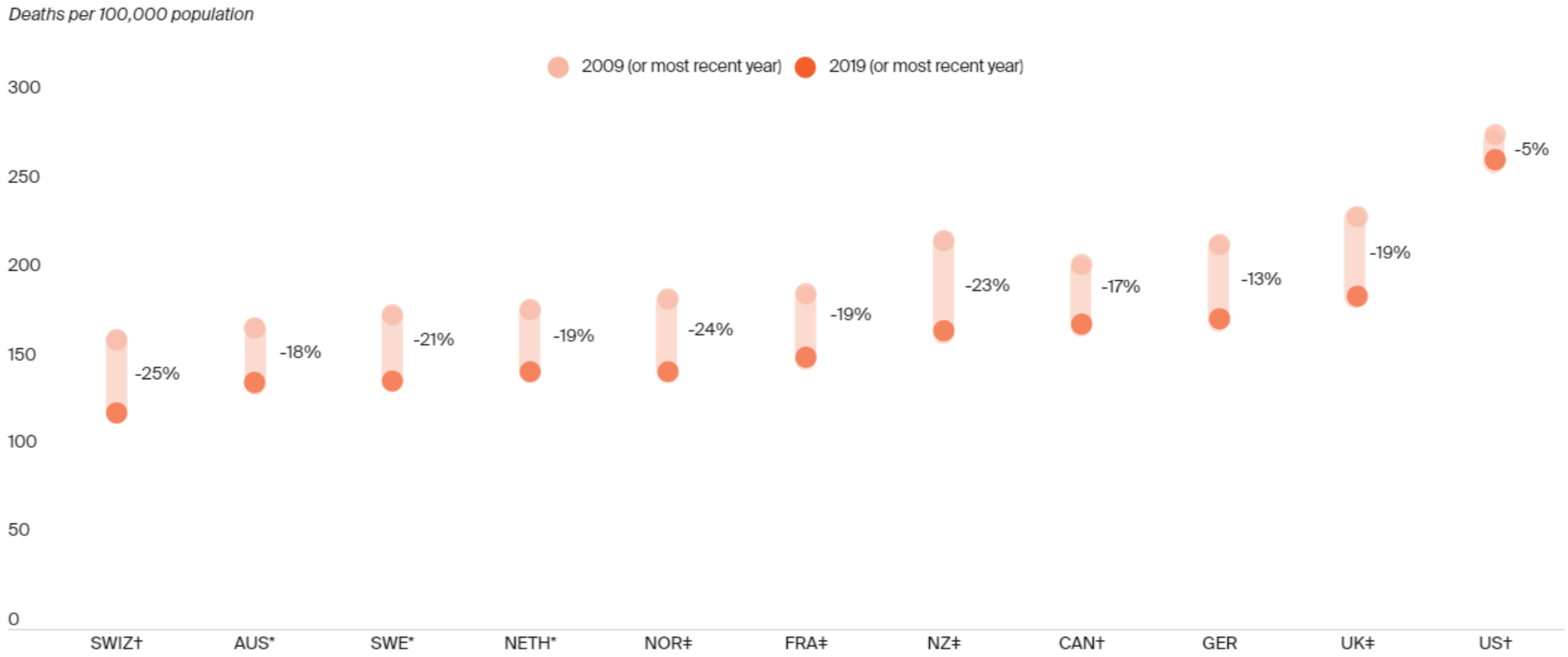
	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING	**3**	**10**	**8**	**5**	**2**	**6**	**1**	**7**	**9**	**4**	**11**
Access to Care	8	9	7	3	1	5	2	6	10	4	11
Care Process	6	4	10	9	3	1	8	11	7	5	2
Administrative Efficiency	2	7	6	9	8	3	1	5	10	4	11
Equity	1	10	7	2	5	9	8	6	3	4	11
Health Care Outcomes	1	10	6	7	4	8	2	5	3	9	11

Data: Commonwealth Fund analysis.

Source: Eric C. Schneider et al., Mirror, Mirror 2021 — Reflecting Poorly: Health Care in the U.S. Compared to Other High-Income Countries (Commonwealth Fund, Aug. 2021).

The Commonwealth Fund

Avoidable Deaths and 10-Year Reduction in Avoidable Mortality Across Countries

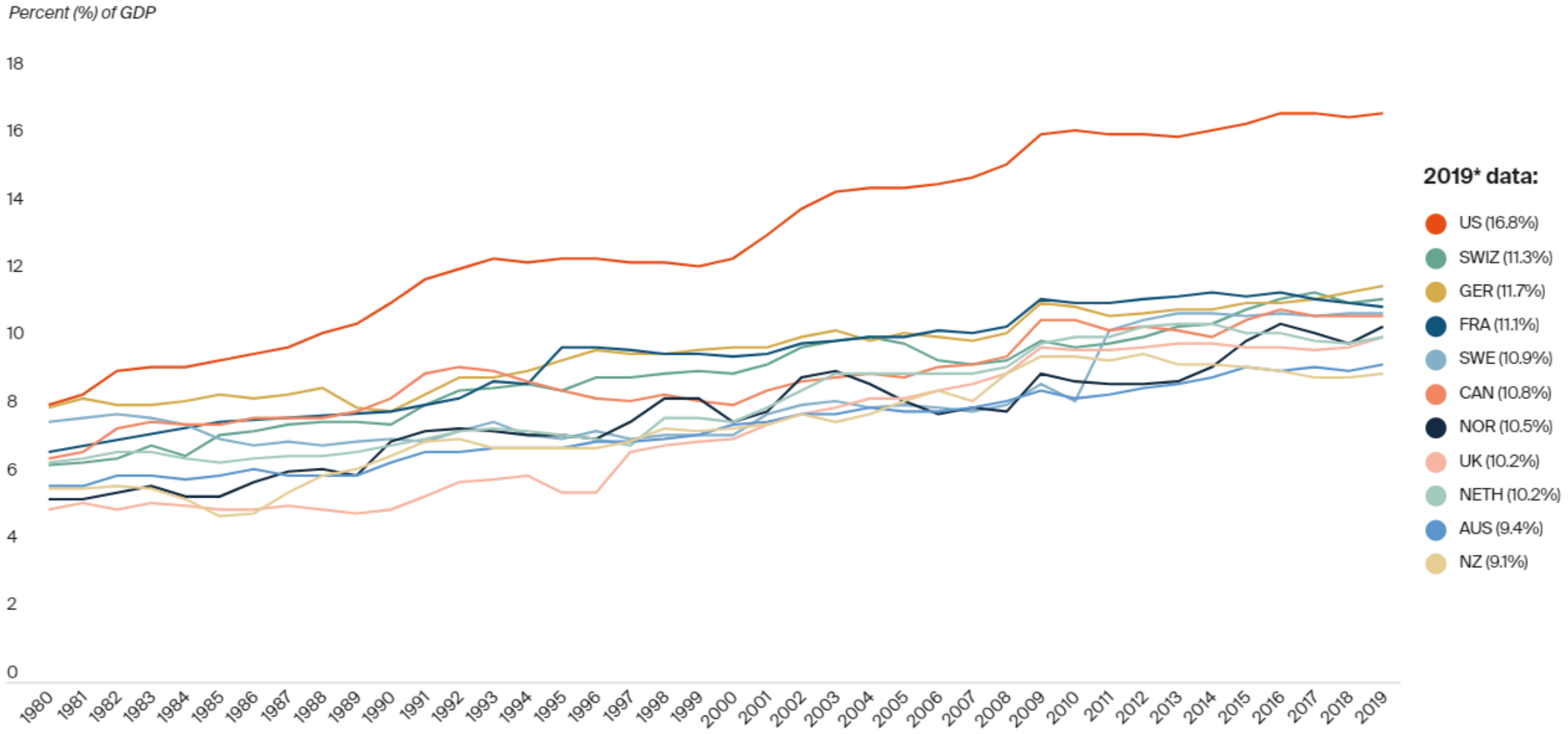


Notes: Health status: avoidable mortality. Data years are: 2009 and 2019 (Germany); * 2008 and 2018 (Australia, the Netherlands, Sweden); † 2007 and 2017 (Canada, Switzerland, US); and ‡ 2006 and 2016 (France, New Zealand, Norway, UK).

Data: Commonwealth Fund analysis of data from OECD Health Statistics, July 2021.

Source: Eric C. Schneider et al., *Mirror, Mirror 2021 — Reflecting Poorly: Health Care in the U.S. Compared to Other High-Income Countries* (Commonwealth Fund, Aug. 2021).
https://doi.org/10.26099/01DV-H208

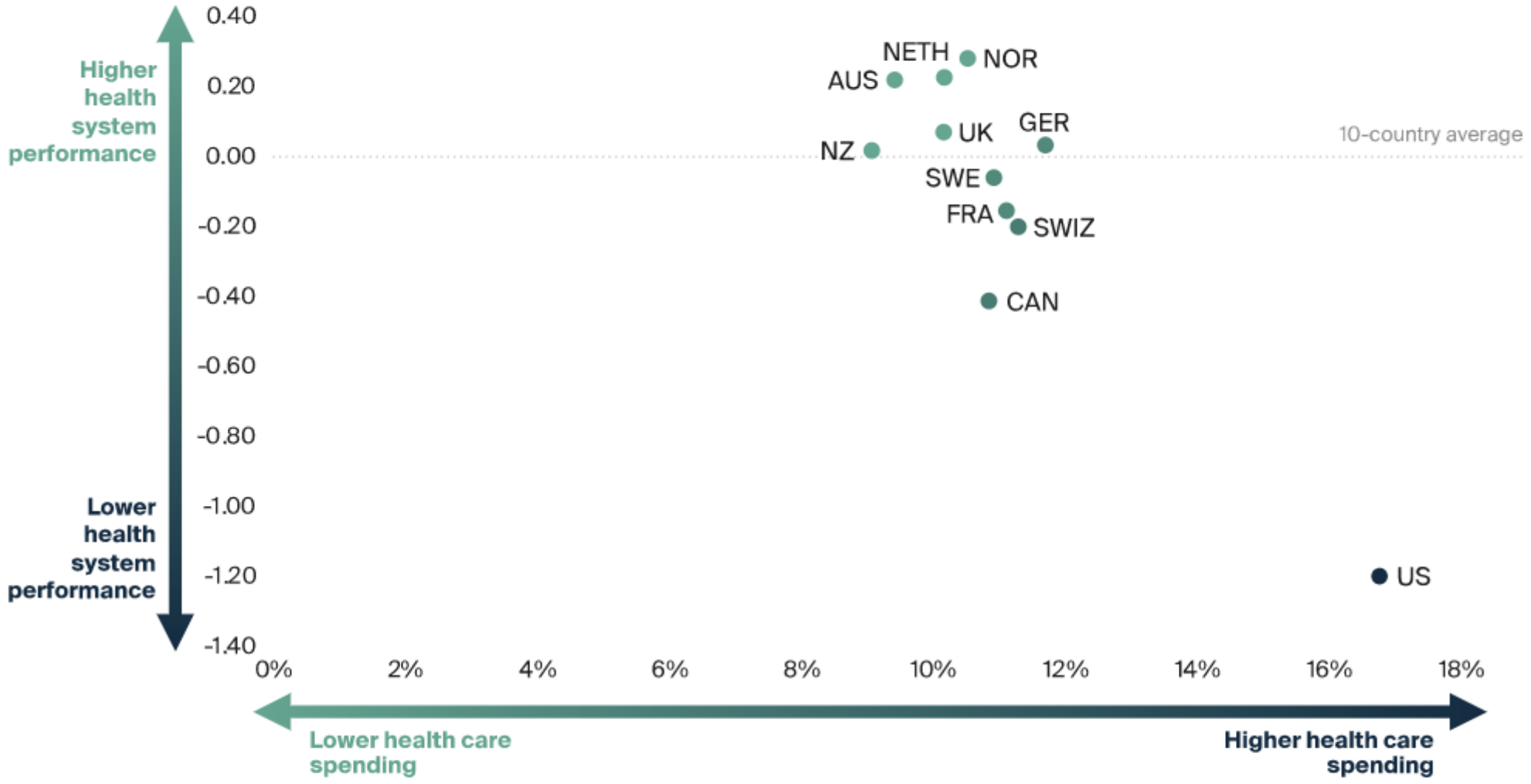
Health Care Spending as a Percentage of GDP, 1980–2019



Notes: Current expenditures on health. Based on System of Health Accounts methodology, with some differences between country methodologies. GDP refers to gross domestic product.
* 2019 data are provisional or estimated for Australia, Canada, and New Zealand.

Data: OECD Health Data, July 2021.

Health Care System Performance Compared to Spending



Note: Health care spending as a percent of GDP. Performance scores are based on standard deviation calculated from the 10-country average that excludes the US. See How We Conducted This Study for more detail.

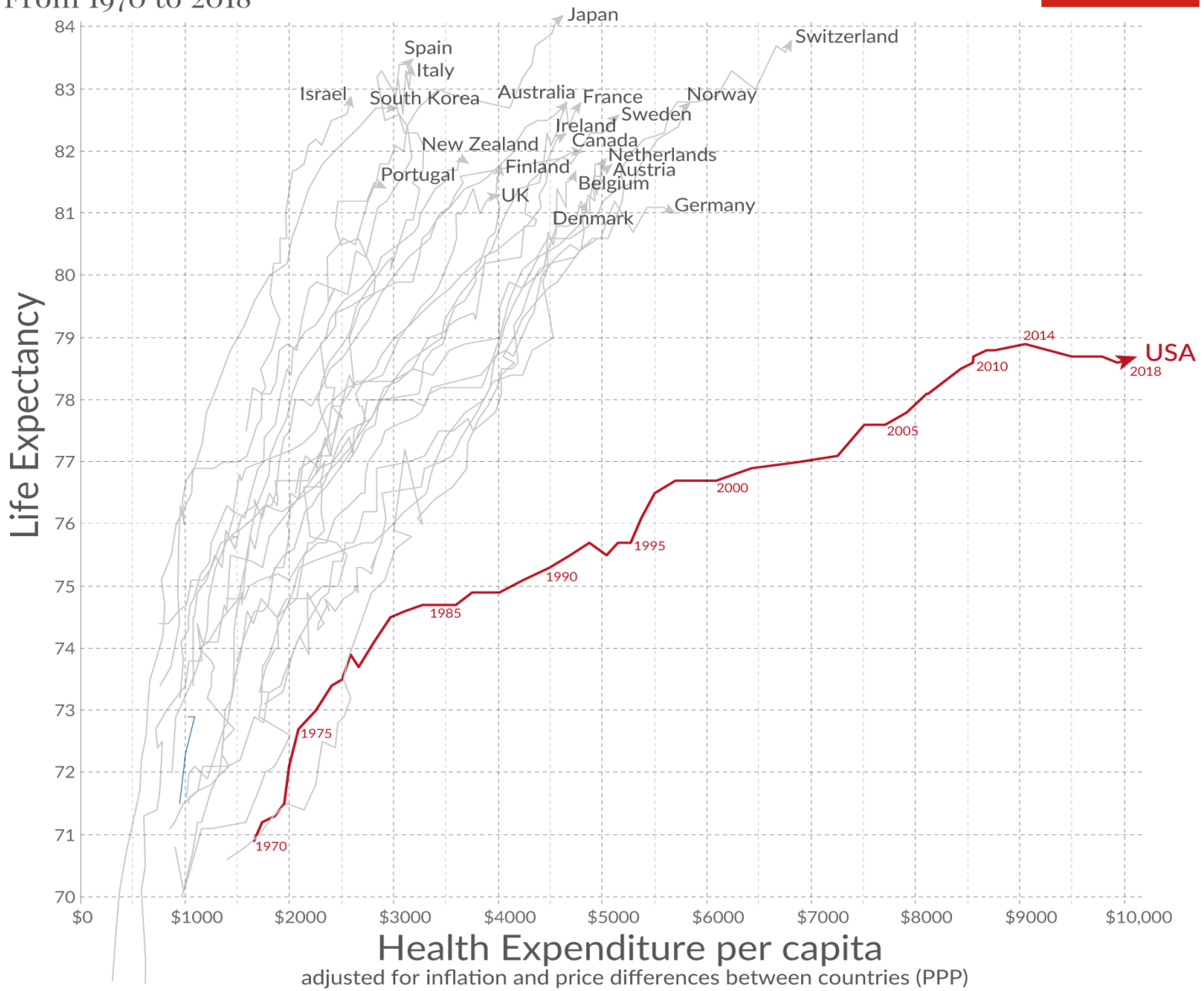
Data: Spending data are from OECD for the year 2019 (updated in July 2021).

Source: Eric C. Schneider et al., *Mirror, Mirror 2021 — Reflecting Poorly: Health Care in the U.S. Compared to Other High-Income Countries* (Commonwealth Fund, Aug. 2021). https://doi.org/10.26099/01DV-H208

Life expectancy vs. health expenditure

From 1970 to 2018

Our World in Data

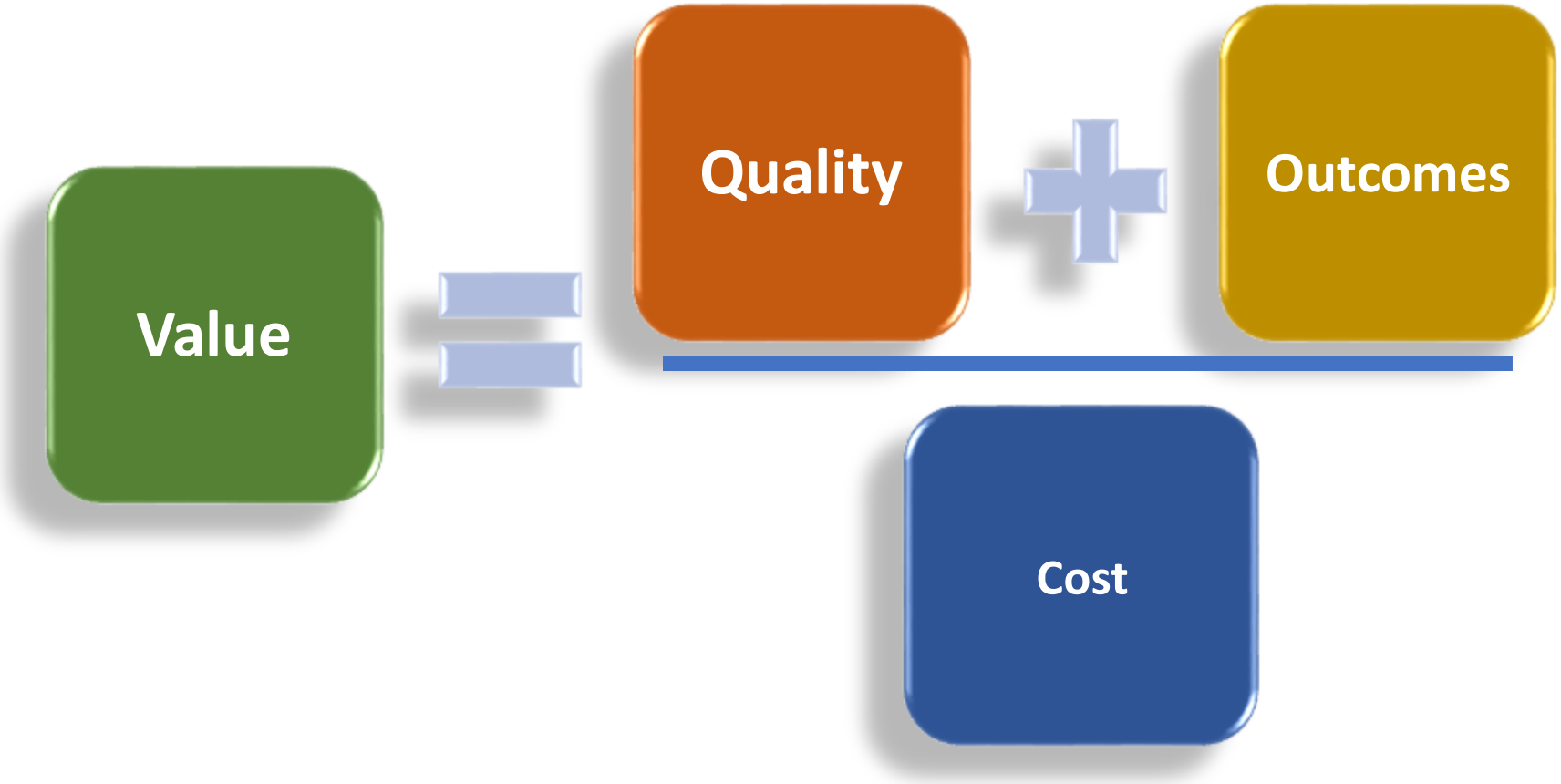


Data source: OECD — Note: Health spending measures the consumption of health care goods and services, including personal health care (curative care, rehabilitative care, long-term care, ancillary services, and medical goods) and collective services (prevention and public health services as well as health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

Value and Variability

- Waste
- Patient safety
- Patient experience

Defining Value



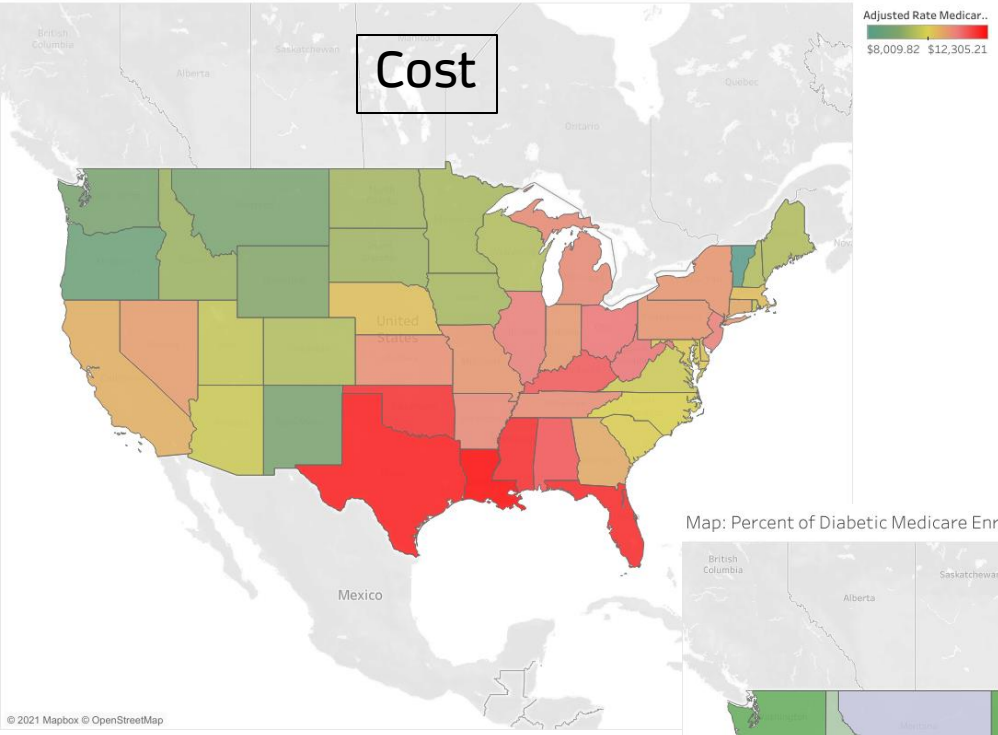
Defining the Components of Value: (Quality + Outcomes)/Cost

- Quality: "doing the right thing"
  - Preop antibiotics given within 1 hour of incision
  - Number of postop days before a urinary catheter was removed
  - Percentage of patients who received smoking cessation education

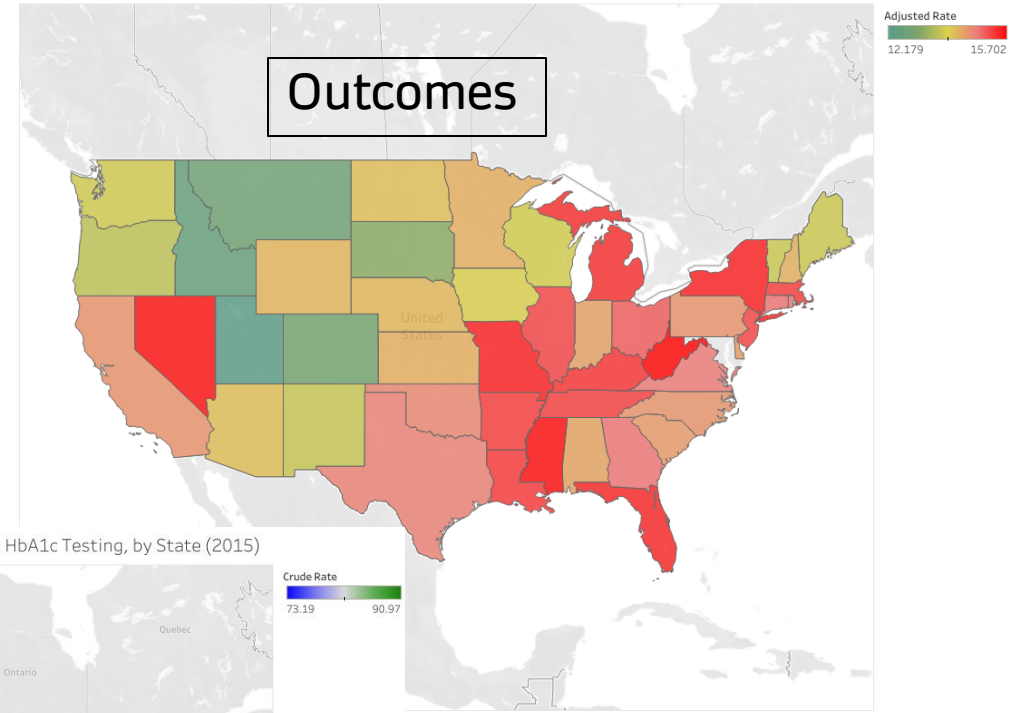
- Outcomes: "how things turned out"
  - Rate of surgical site infections
  - Urinary tract infection rate
  - Amount of pain medications used by the patient
  - Rate of unexpected readmissions

- Cost: Total cost of care
  - Supplies, lab, pharmacy, R&B, OR time, etc.
  - Must consider pre- and post-acute costs
  - What is the cost of quality?

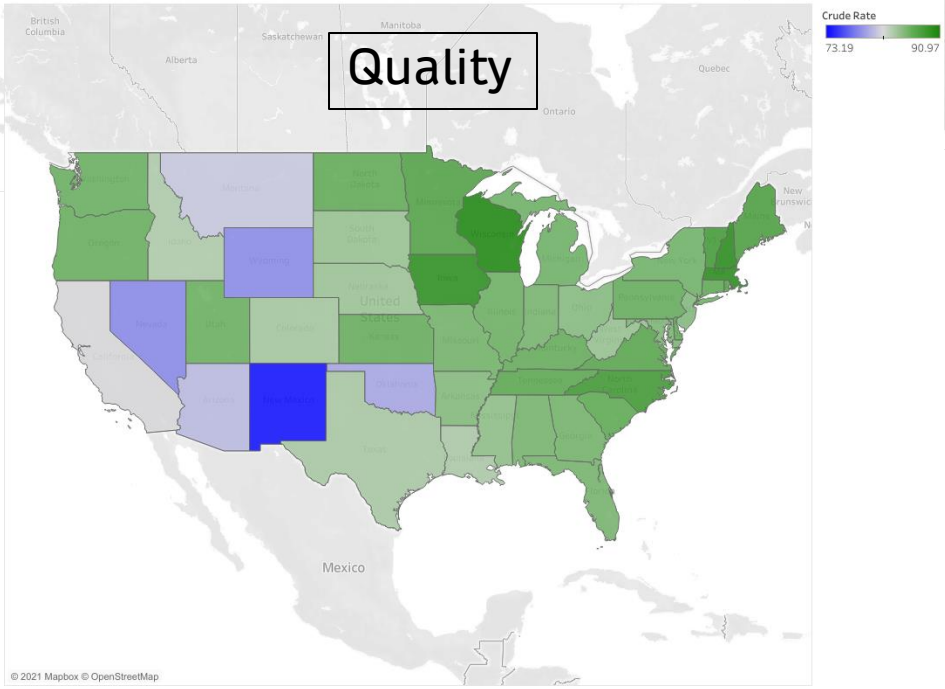
Map: Price-Adjusted Total Medicare Reimbursements per Enrollee (Parts A and B), by State (2018)
(Price, Age, Sex, and Race adjusted)

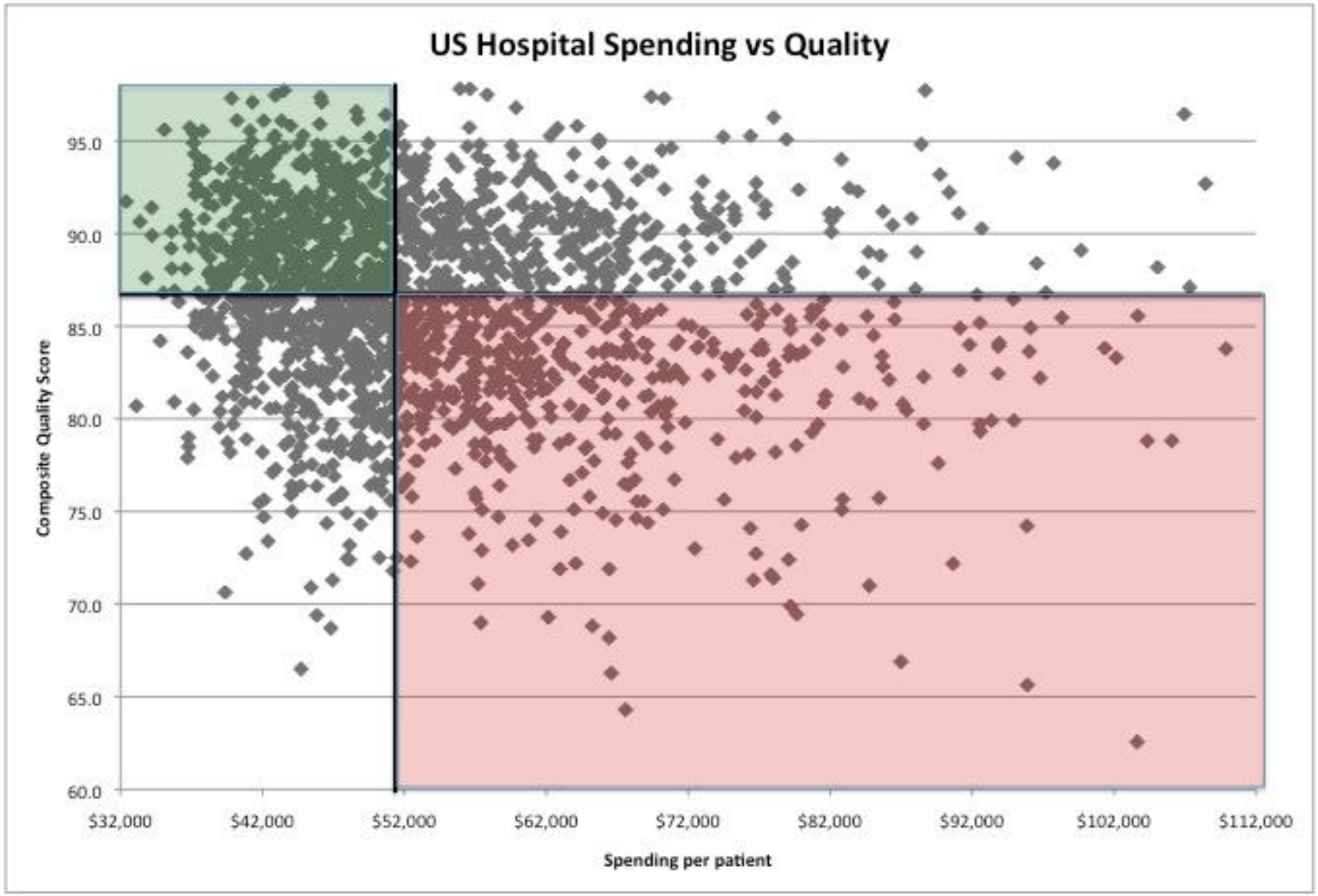


Map: Percent of Patients Readmitted within 30 Days of Discharge following Medical Admission (2015)



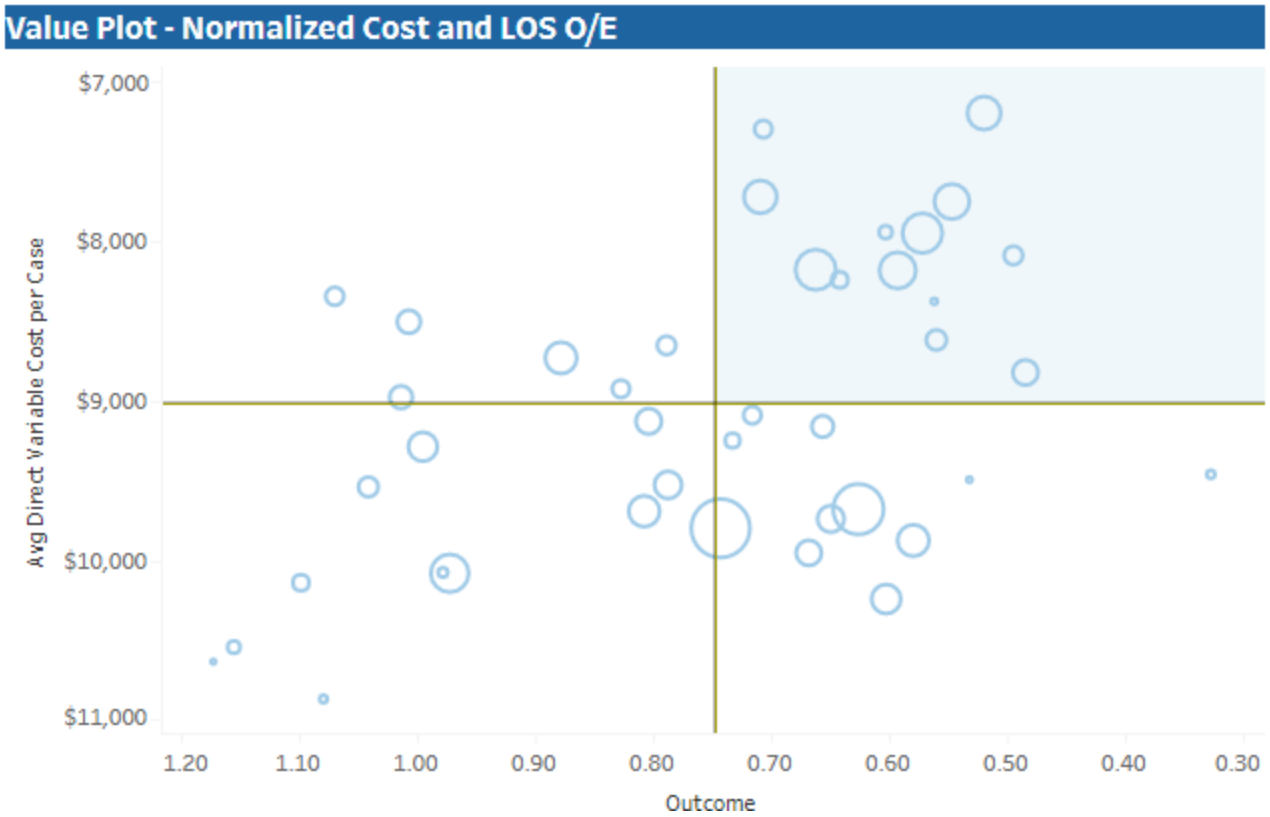
Map: Percent of Diabetic Medicare Enrollees Age 65-75 Receiving HbA1c Testing, by State (2015)



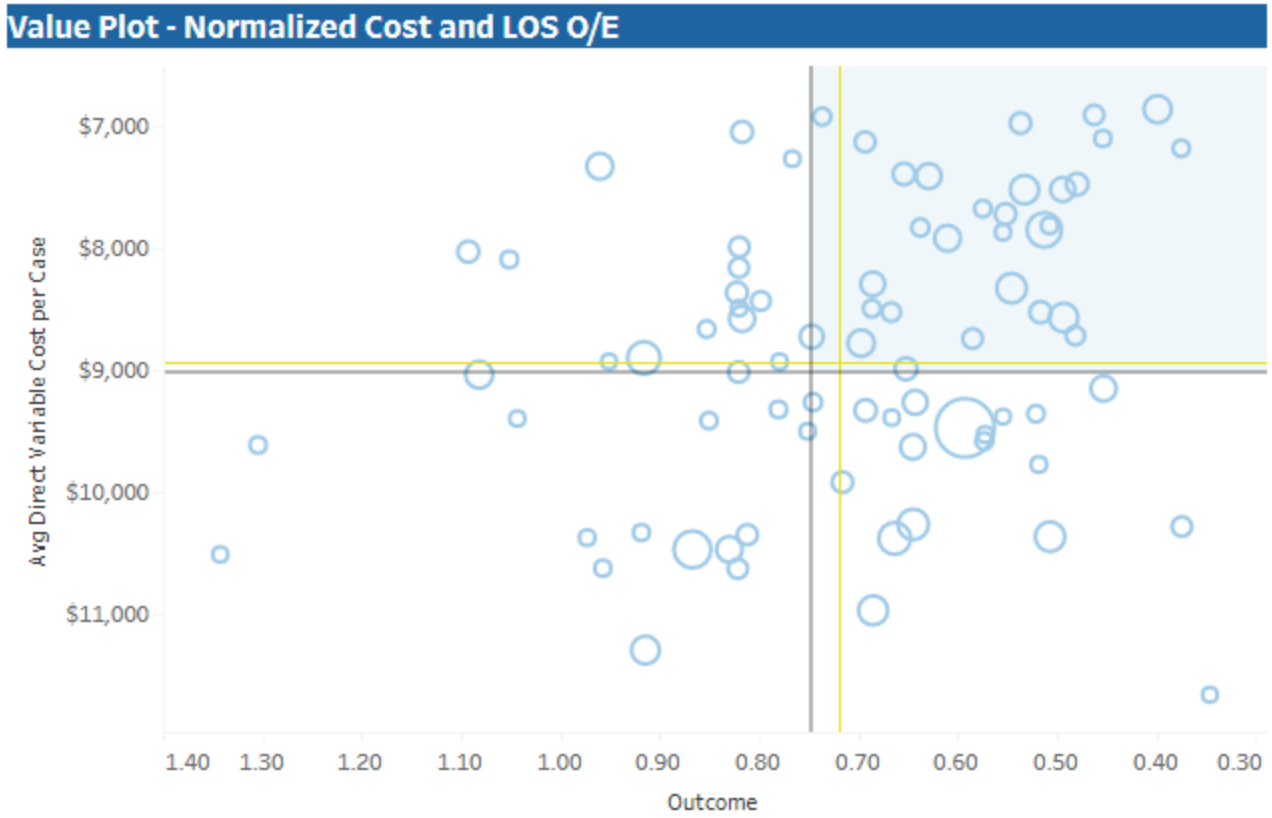


Medicinethink.com 2009

TKA* value by hospital



TKA value by Surgeon (>50 cases/yr)



*Total Knee Arthroplasty

The Cost of Variability

$935 billion: cost of waste in the US health care system (JAMA Oct. 2019)

$25.4 billion: Annual hospital supply chain savings opportunity. Hospitals can save average of 18% by performing at 75%ile without impacting quality (Navigant, Oct 2018)

30%: Average hospital supply expenses. Physician Preference Items ("PPIs") account for 40-60% of supply costs (Navigant, Oct 2018)

$968: cost of open but unused items per neurosurgical case. About 13% of total OR supply cost, Range: 1.9% to 23.6% variation by surgeon (J Neurosurg, Feb 2017)

Current state: barriers and challenges driving unnecessary variability

- Fee for service (volume driven)
- Hospital tolerance for unnecessary variation
- No standardized patient experience data (outcomes, PROs, etc.)
- Supplier drivers: profit motived
- Old myths (e.g. doctors don’t like change)

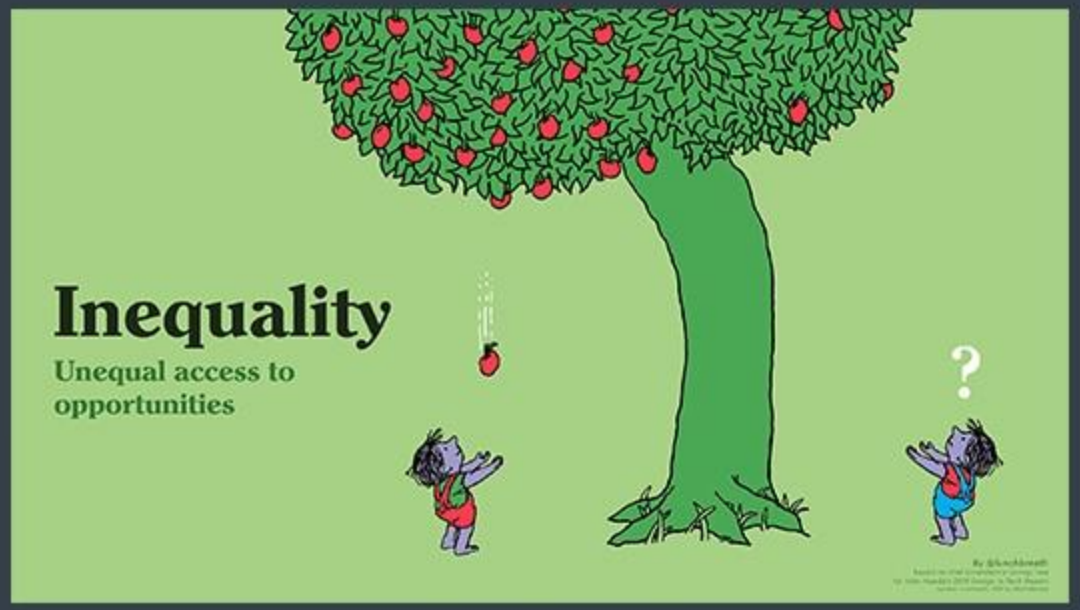
Why focus on variability?

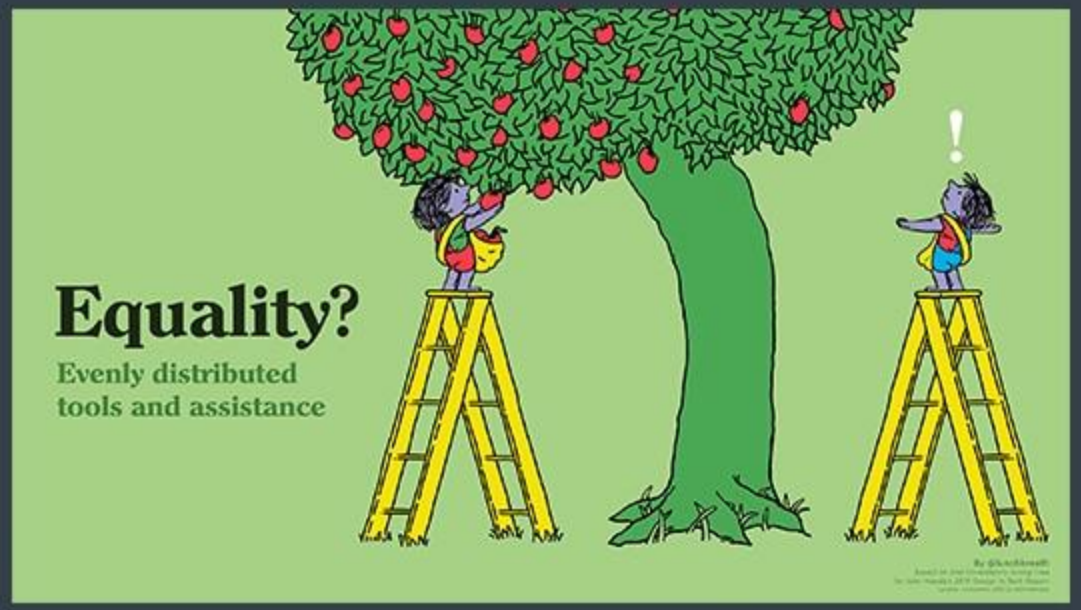
- The value-based health system has very little tolerance for waste
- All health care organizations must have a strategy to reduce variability
- Variability also negatively affects customer experience
- Variability creates health inequity
- Variability does not occur randomly….

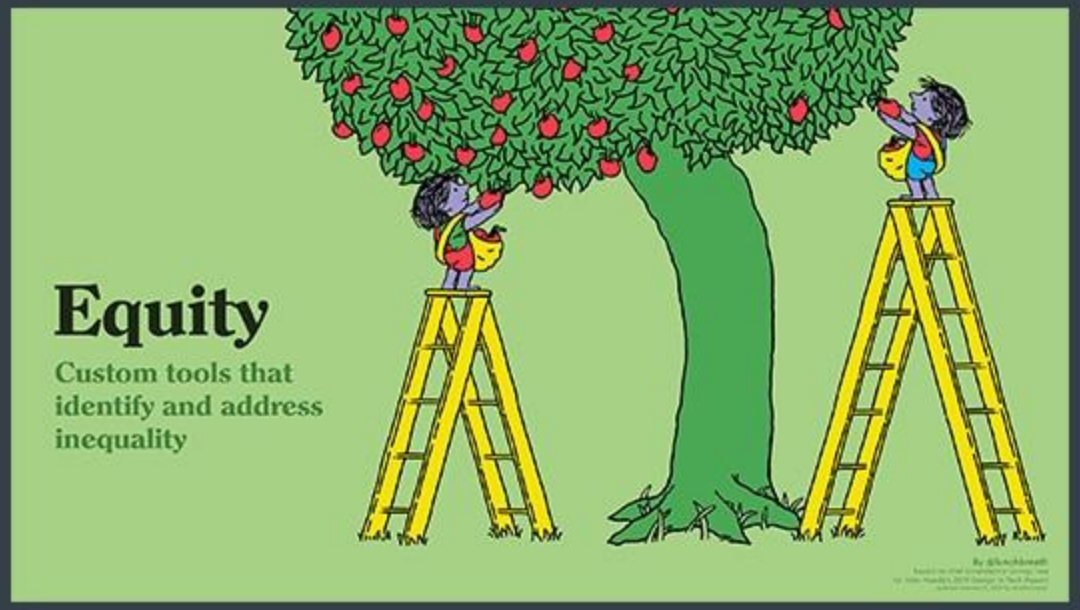
What is health inequity?

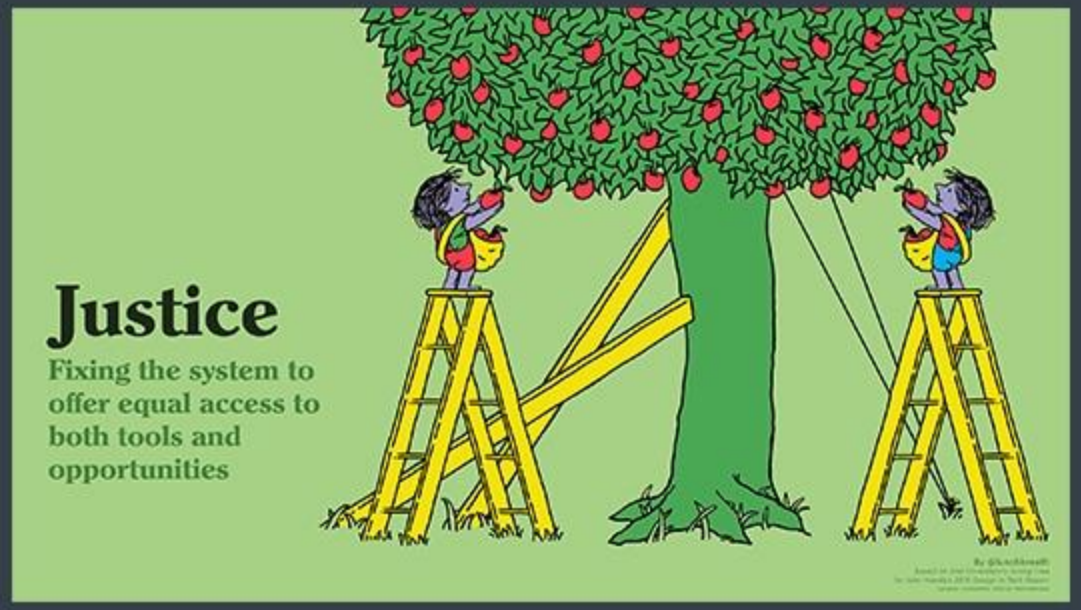
Health inequities are differences in health status or in the distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work and age. (WHO)

…caused by variability in access, availability, quality, outcomes, and cost of factors that determine the health of peoples based on geographic, racial, or socioeconomic demographics that may be naturally or artificially defined but nonetheless could be controlled.


Inequality
Unequal access to opportunities
?


Equality?
Evenly distributed tools and assistance
!

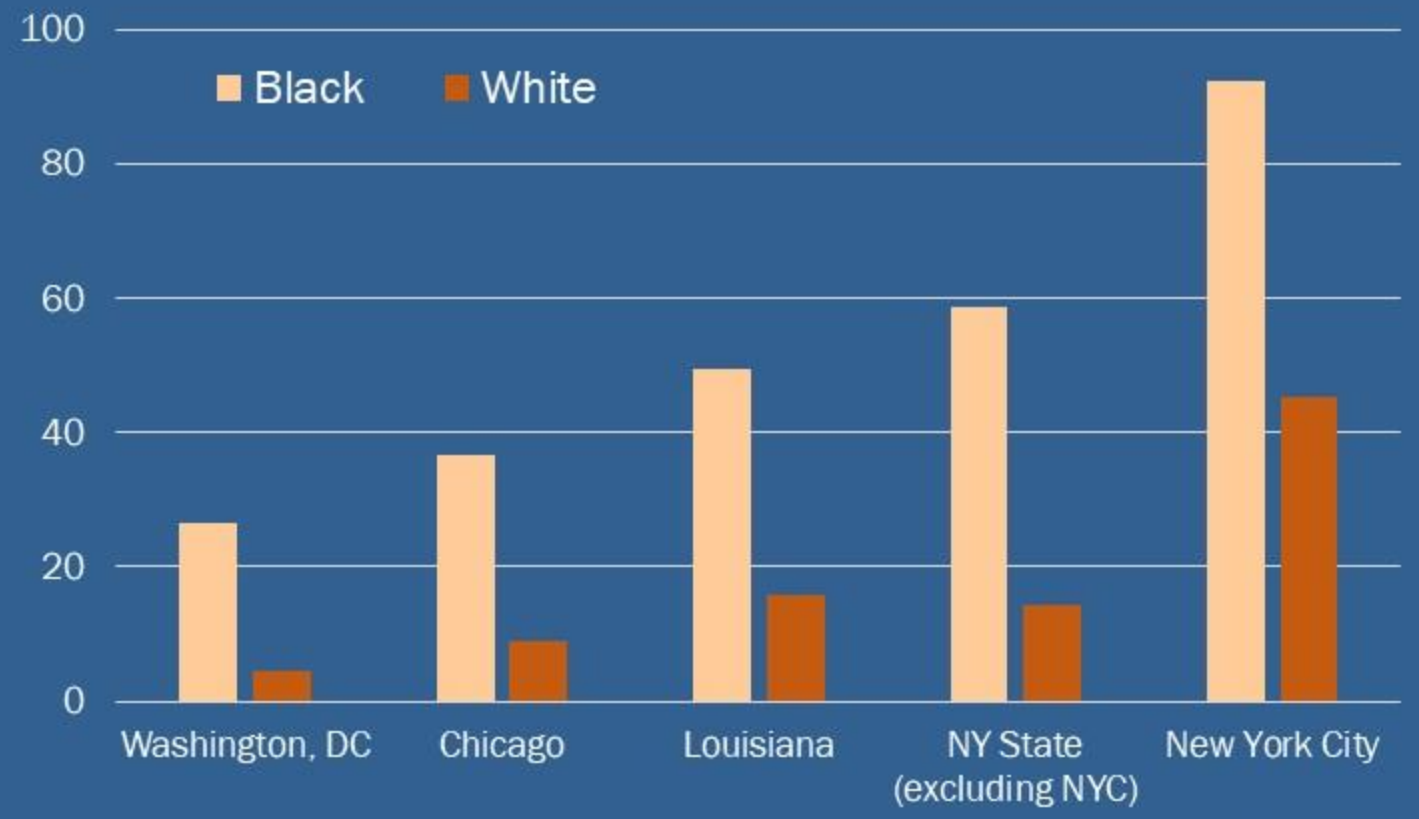

Equity
Custom tools that identify and address inequality


Justice
Fixing the system to offer equal access to both tools and opportunities

COVID-19 and health inequity

Disparate Black impact

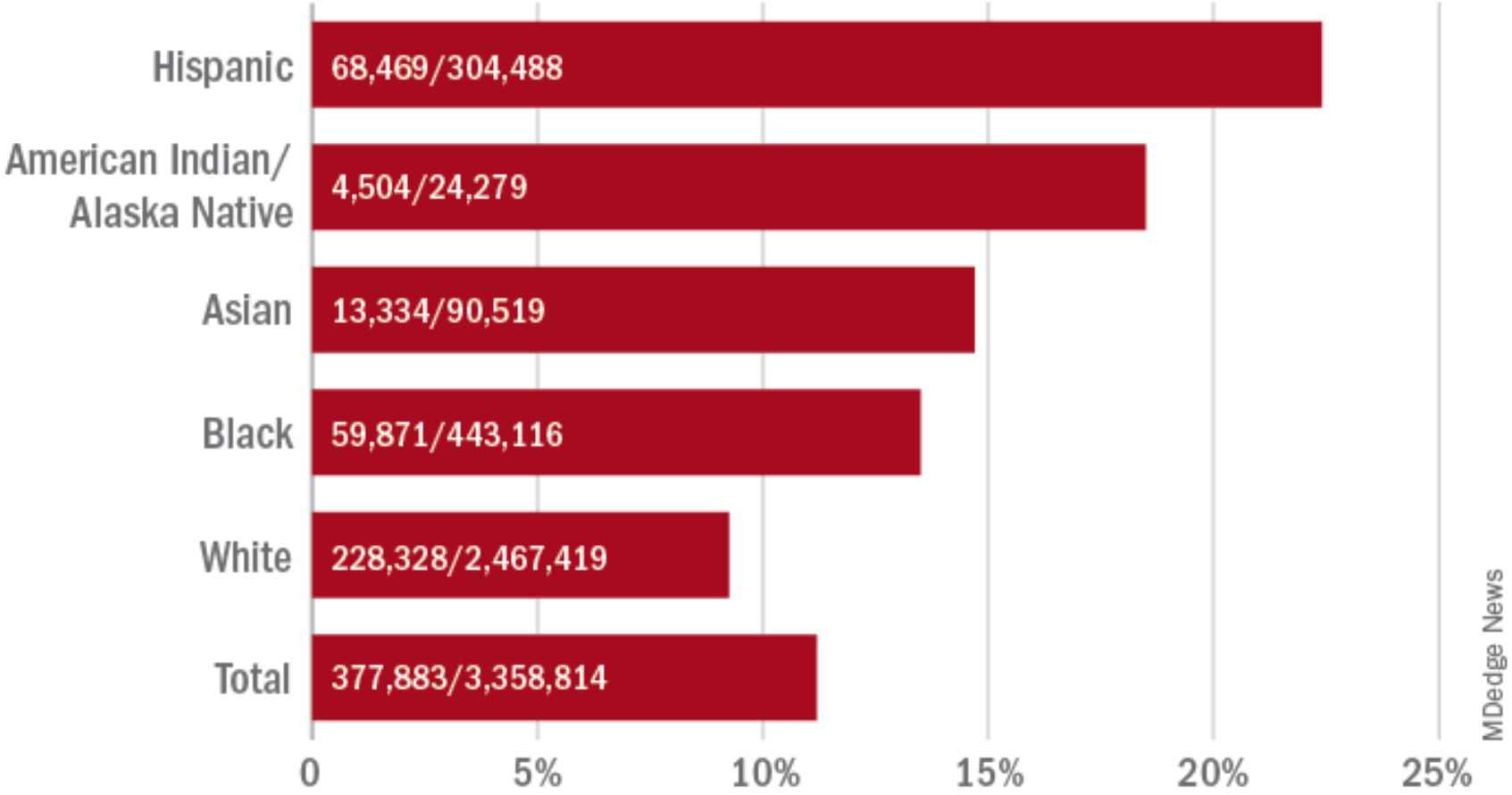
COVID-19 deaths per 100,000 population



Local health departments.

Wherever we have data on deaths by race, Blacks have lost their lives at much higher rates than Whites have.

Ratio of COVID-19 deaths to all deaths by race/ethnicity, 2020

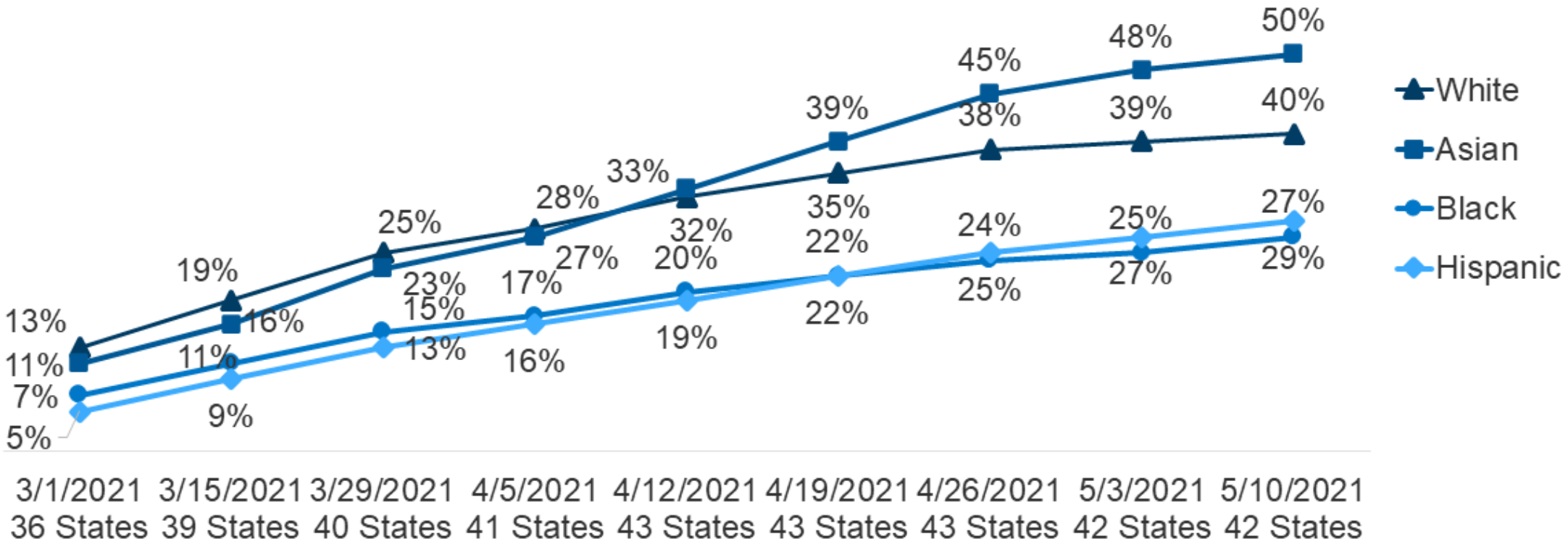


Note: Based on provisional National Vital Statistics System death certificate data.

Source: MMWR. 2021 Mar 31;70[early release]:1-4

Although vaccination rates are increasing across groups, Black and Hispanic people face persistent gaps.

Percent of Total Population that Has Received a COVID-19 Vaccine by Race/Ethnicity, March 1 to May 10, 2021



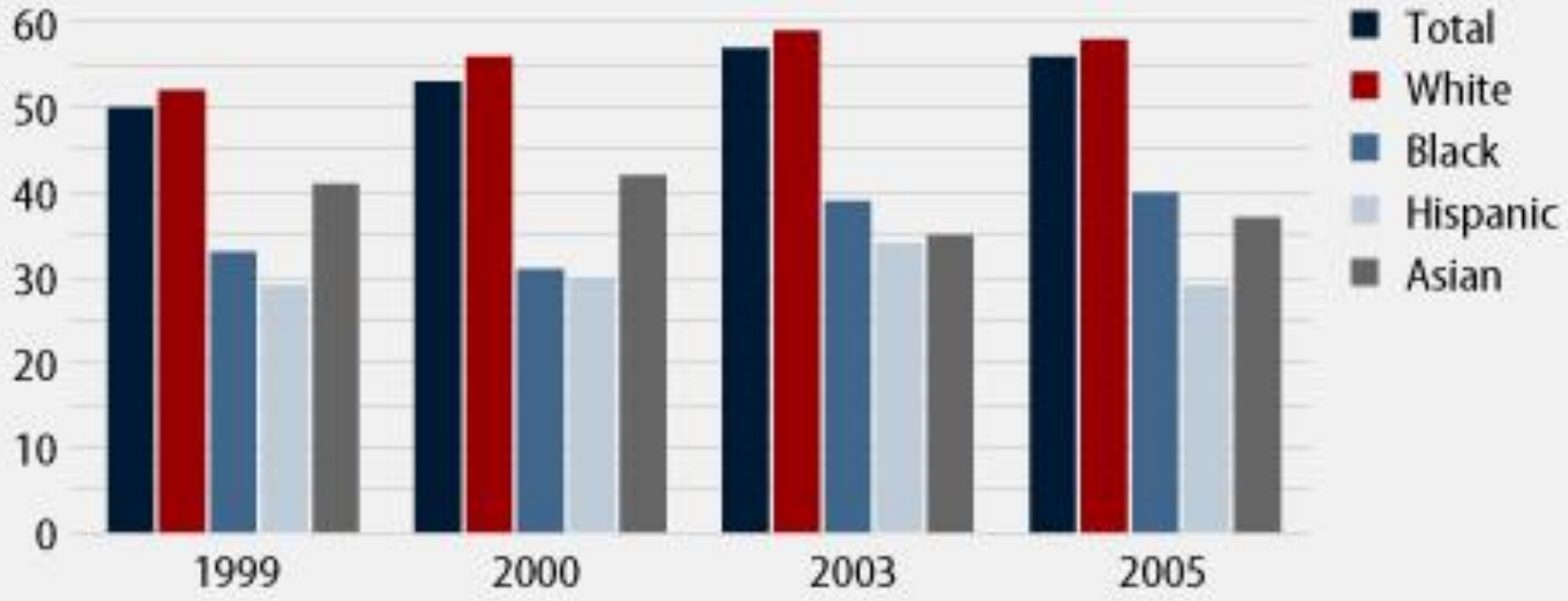
SOURCE: Vaccination data based on KFF analysis of publicly available data on state websites; total population data used to calculate rates based on KFF analysis of 2019 American Community Survey data.

KFF

Source: KFF.org

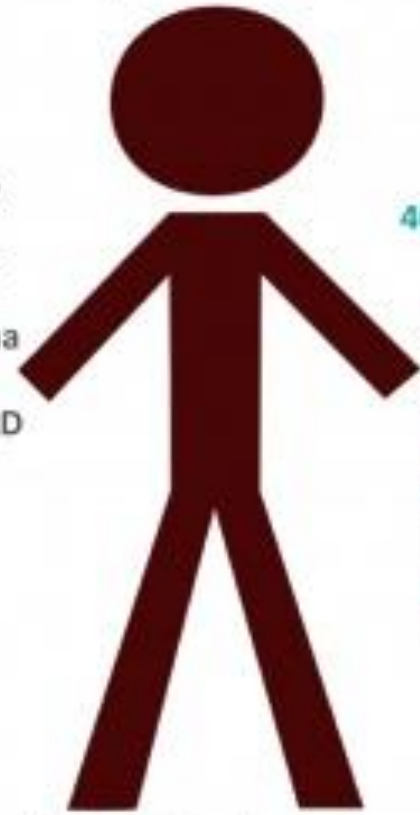
FIGURE 5

Percentage of noninstitutionalized adults aged 65+ who received pneumococcal vaccination, by race and ethnicity



https://www.americanprogress.org/issues/race/news/2010/01/15/7195/racial-health-disparities-by-the-numbers/

The Health Disparities Pandemic



Black Americans

30% more likely to die of **CVD**

2X as likely to die as an **infant**

2X more likely to die of **asthma**

3X more likely to develop **ESRD**

2X as more to die from **prostate cancer**

2X more likely to die from **cervical cancer**

3x more likely to die during **pregnancy**

Latinx Americans

40% more likely to die from **CVA**

2X more likely to die of **liver cancer**

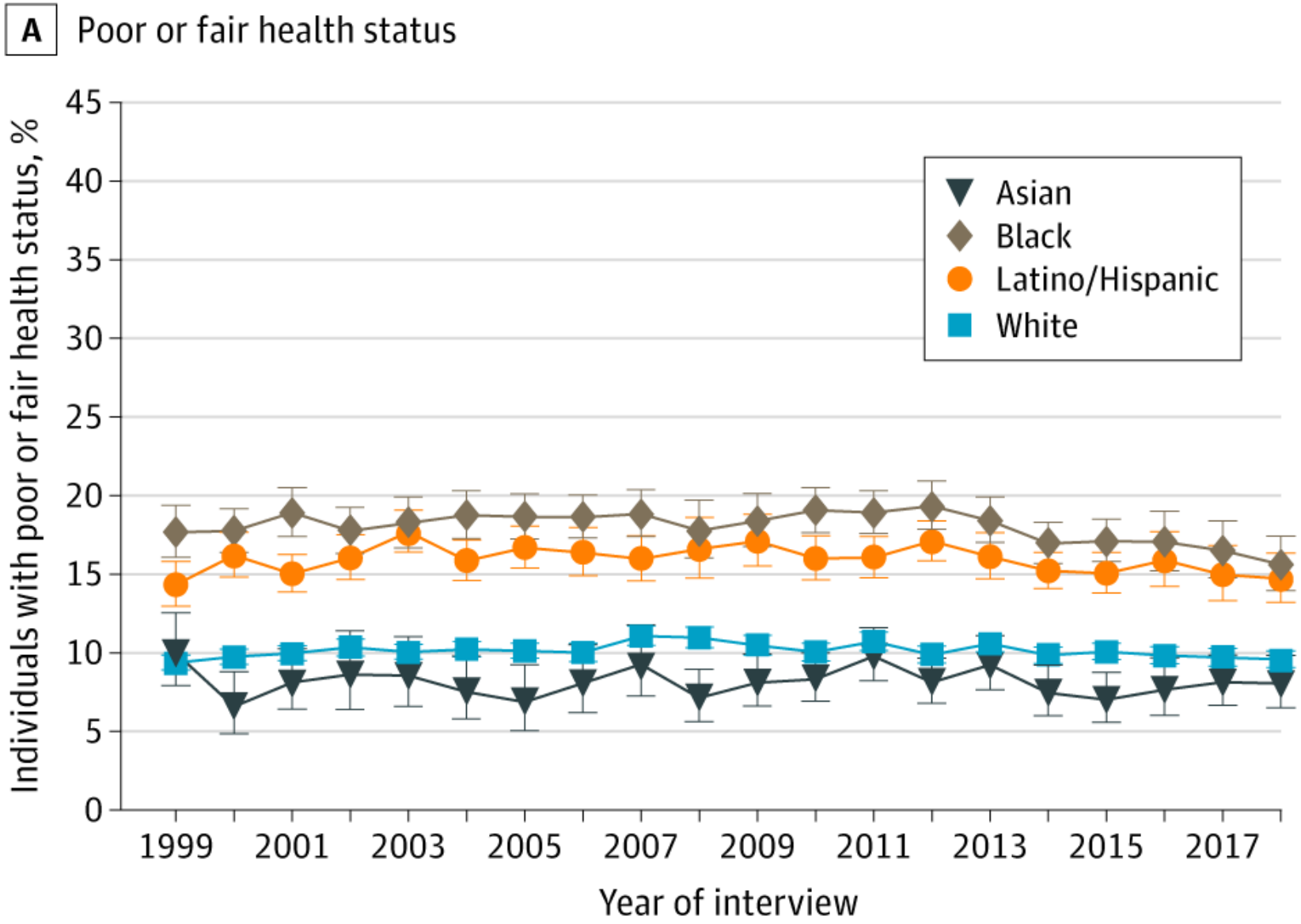
2X more likely to die of **asthma**

1.7X more likely to have diabetes

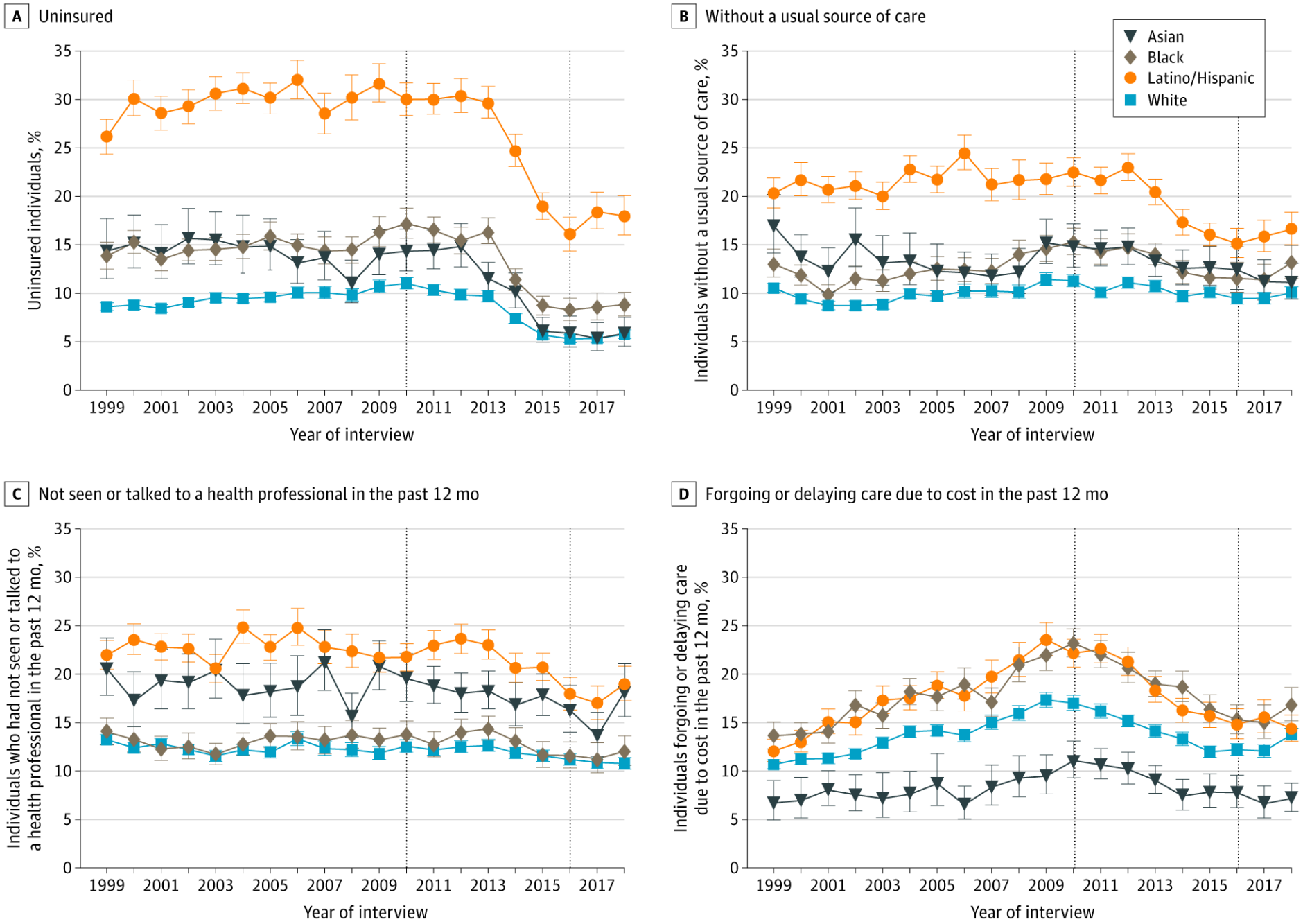
2.5X more likely to die of **HIV/AIDs**

https://familiesusa.org/resources/racial-and-ethnic-health-inequities-among-communities-of-color-compared-to-non-hispanic-whites/

https://medschool.duke.edu/about-us/news-and-communications/med-school-blog/%E2%80%98-call-action%E2%80%99-duke-researchers-durham-community-leaders-confront-covid-19-health-disparities-north



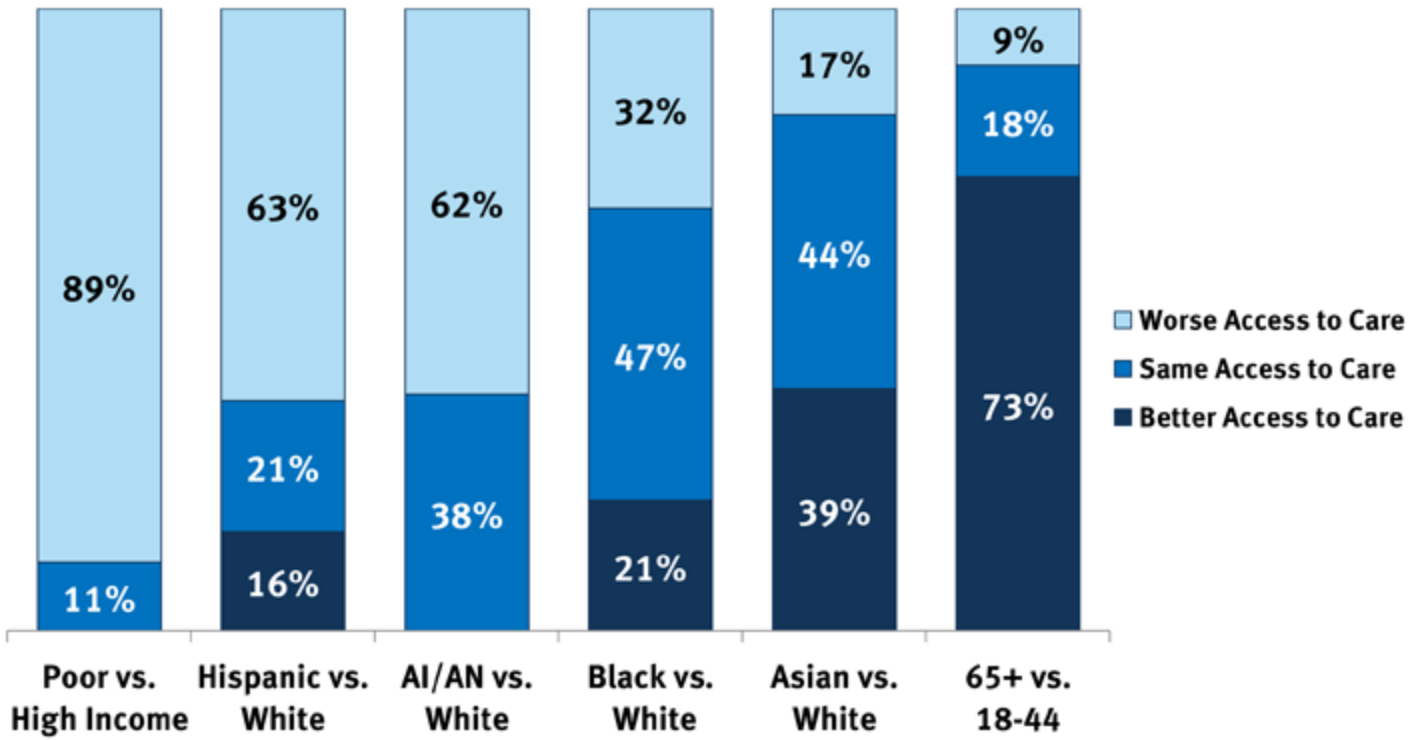
Trends in Differences in Health Status and Health Care Access
and Affordability by Race and Ethnicity in the United States, 1999-2018, JAMA. 2021;326(7):637-648. doi:10.1001/jama.2021.9907



Trends in Differences in Health Status and Health Care Access and Affordability by Race and Ethnicity in the United States, 1999-2018, JAMA. 2021;326(7):637-648. doi:10.1001/jama.2021.9907

Disparities in Access to Care for Selected Groups

Percent of access measures for which groups experienced worse, same, or better access to care:



AI/AN = American Indian or Alaska Native.
SOURCE: AHRQ, "National Healthcare Disparities Report, 2011, http://www.ahrq.gov/qual/qrdr11.htm

THE HENRY J. KAISER FAMILY FOUNDATION

HEALTHY FOOD AMERICA | INFOGRAPHIC

healthyfoodamerica.org

Racial/Ethnic Health Disparities

In Diseases Associated with Sugary Drinks

Health disparities are differences in rates of disease across racial, ethnic, income, and other social groups. They are a result of obstacles to health including systemic racism, poverty, and lack of access to healthy food, stable housing, employment, and healthcare.

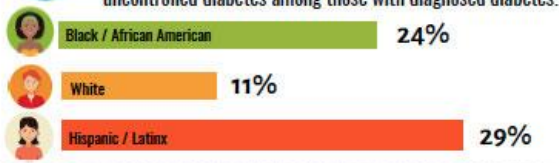
DIABETES

Prevalence In Adults

1 in 6 Black/African American adults have diabetes compared to 1 in 10 White adults

Uncontrolled Diabetes

3X Hispanic/Latinx have three times the rate of uncontrolled diabetes (A1C >9%) than Whites. Below shows percent of uncontrolled diabetes among those with diagnosed diabetes.

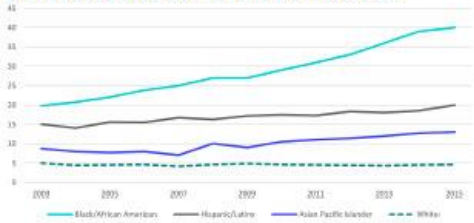


What about children?

Type 2 diabetes among children ages 10-19 has risen dramatically for Black/African American children compared to all other groups.

Type 2 Diabetes Incidence Among Children

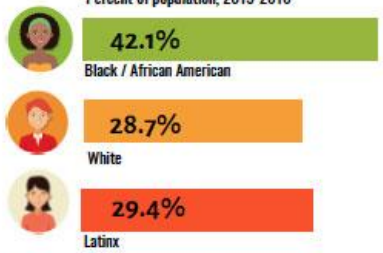
Per 100,000 children ages 10-19 between 2003-2015



HEART DISEASE

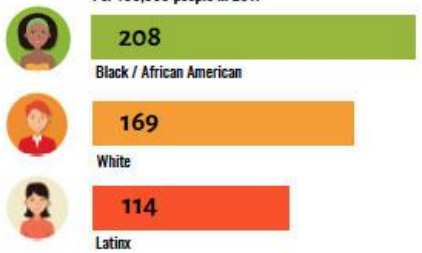
High Blood Pressure

Percent of population, 2015-2016



Death From Heart Disease

Per 100,000 people in 2017



SOURCES:

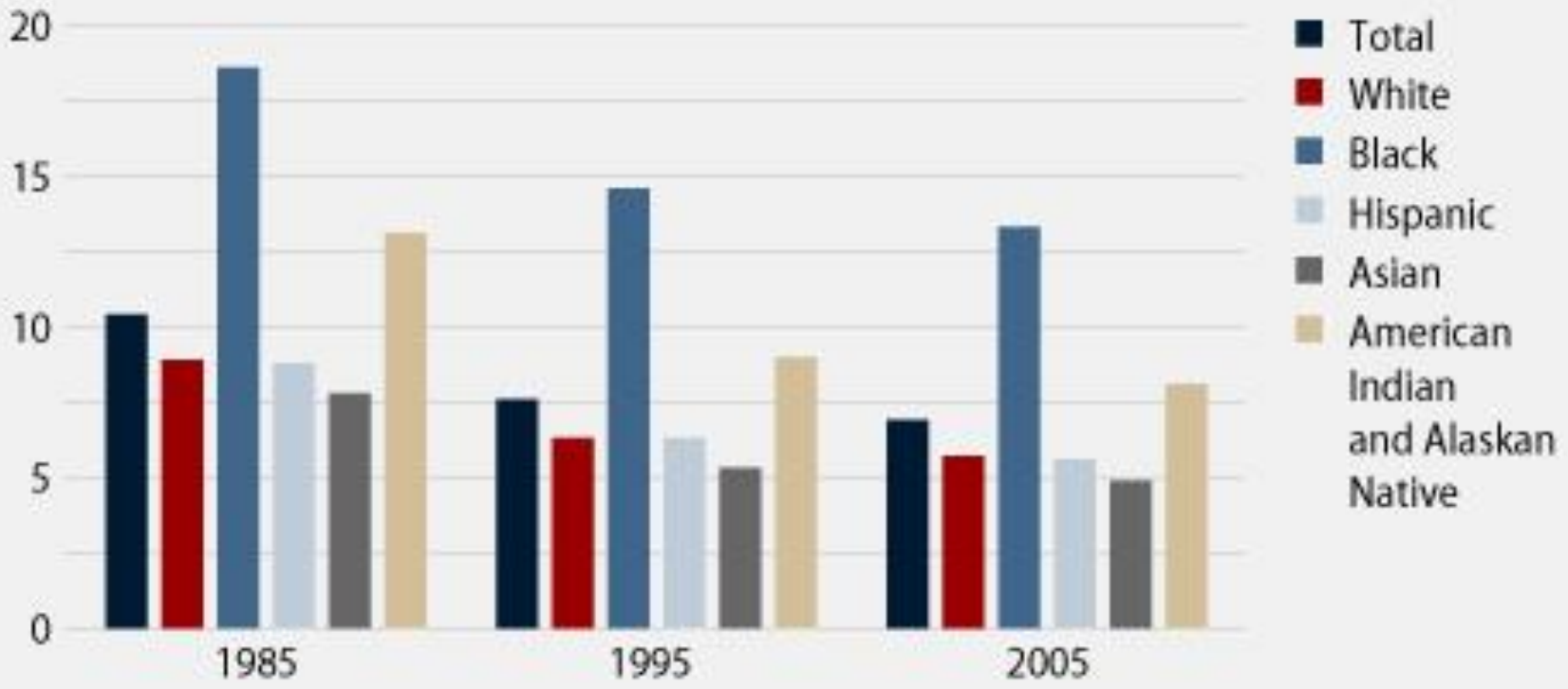
CDC National Diabetes Statistic Report 2020. https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf

Healthy People 2020 Disparity Data, 2015-2016. https://www.healthypeople.gov/2020/data/disparities/detail/Chart/12/5/5/2016

CDC Heart Disease Spotlight 2019. https://www.cdc.gov/nchs/nvss/deaths.htm

FIGURE 3

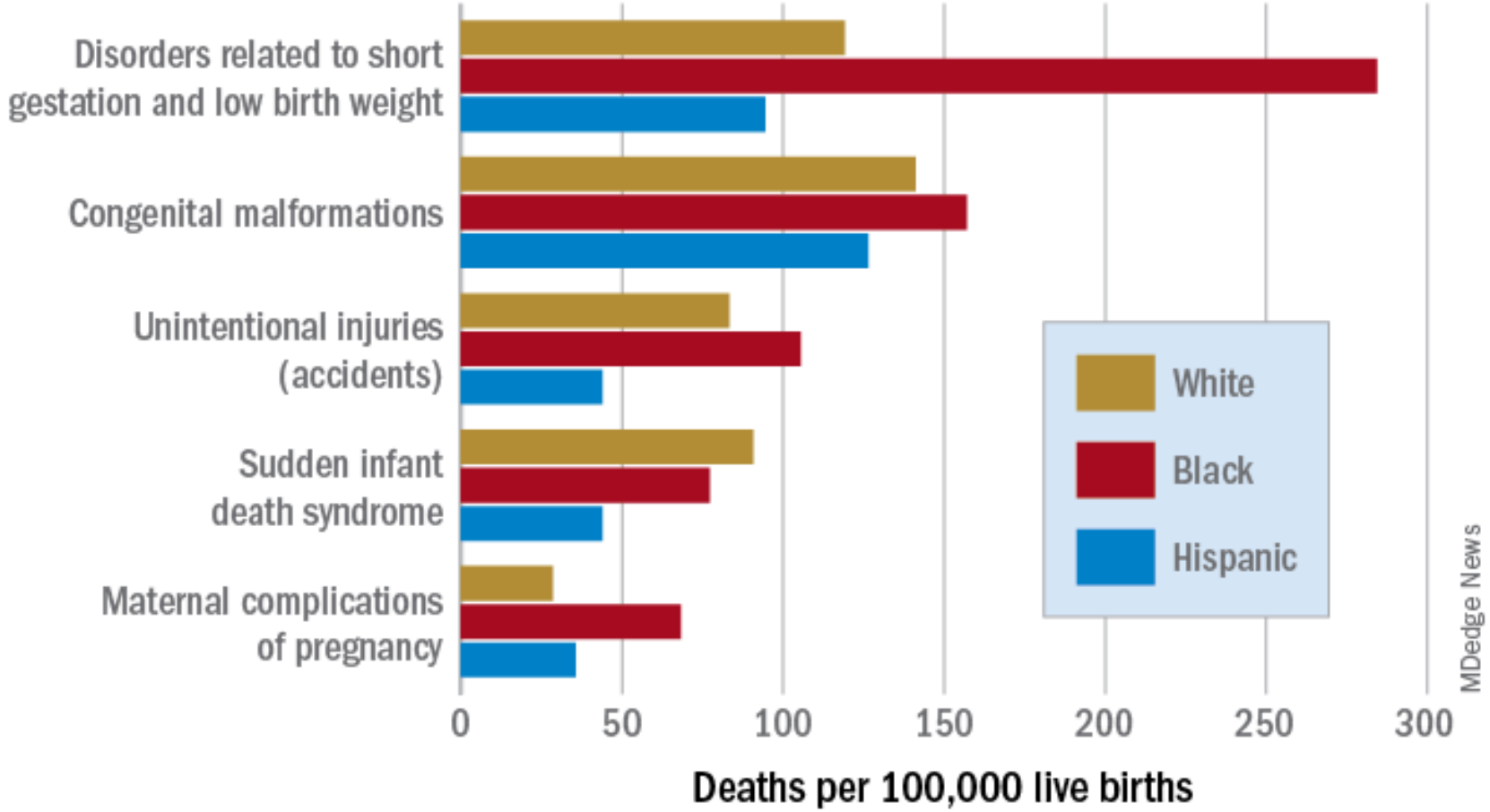
Infant mortality rate: deaths per 1,000 live births, by race and ethnicity



https://www.americanprogress.org/issues/race/news/2010/01/15/7195/racial-health-disparities-by-the-numbers/

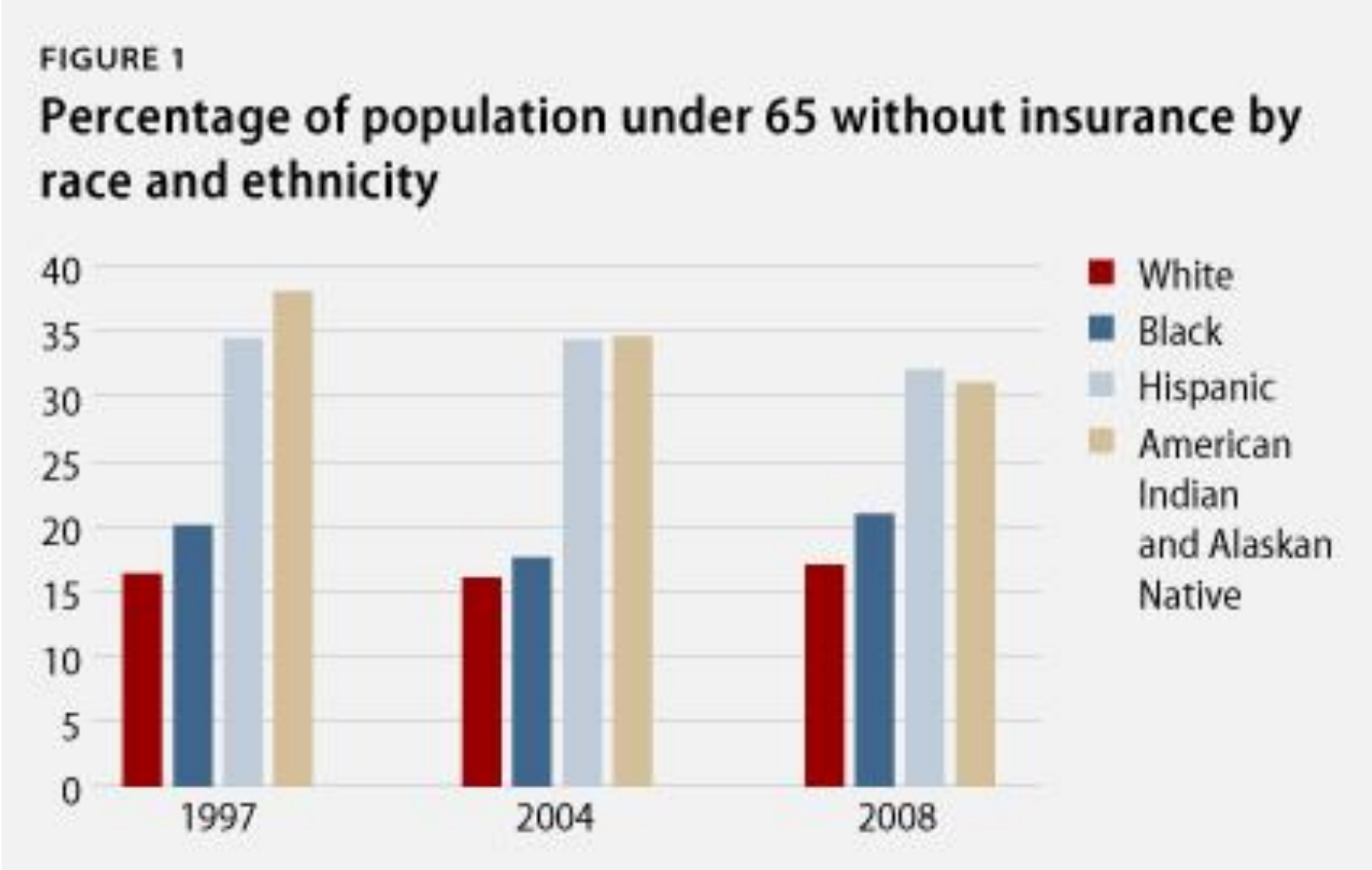
INFANTS BORN TO MOTHERS AGED 15-19 YEARS

Leading causes of mortality by race/ethnicity, 2017-2018



Note: Based on data from the National Vital Statistics system, linked birth/infant death file.

Source: National Center for Health Statistics

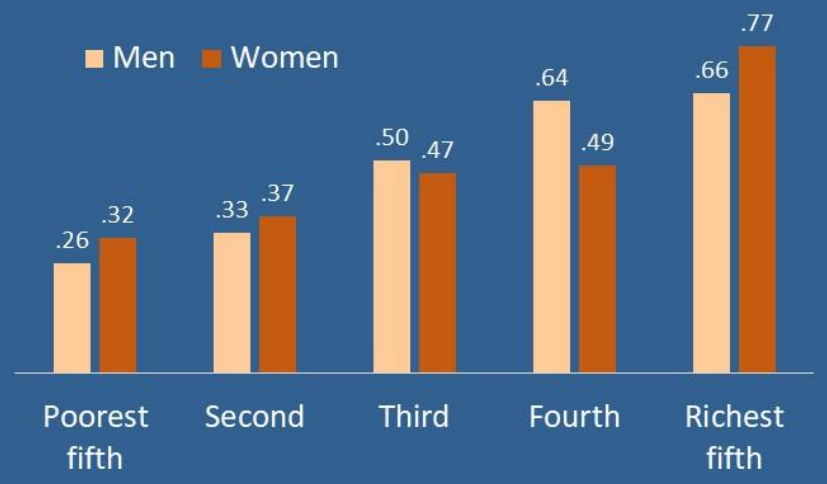


https://www.americanprogress.org/issues/race/news/2010/01/15/7195/racial-health-disparities-by-the-numbers/

Not just race…

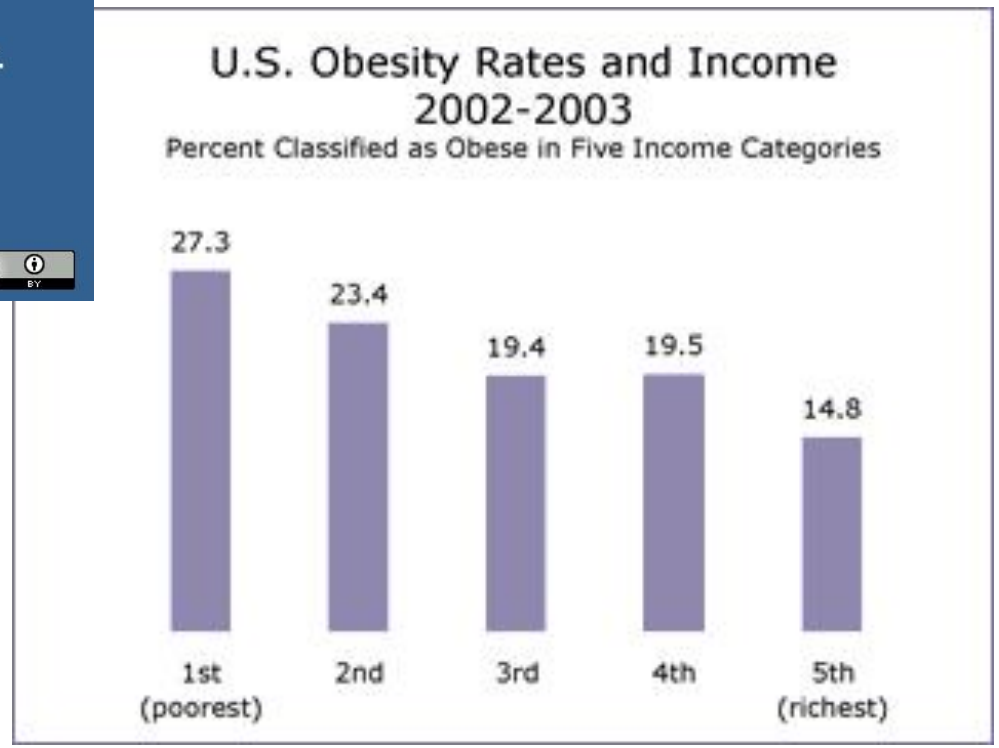
Life expectancy and income

Probability of surviving from age 50 to 85 by income



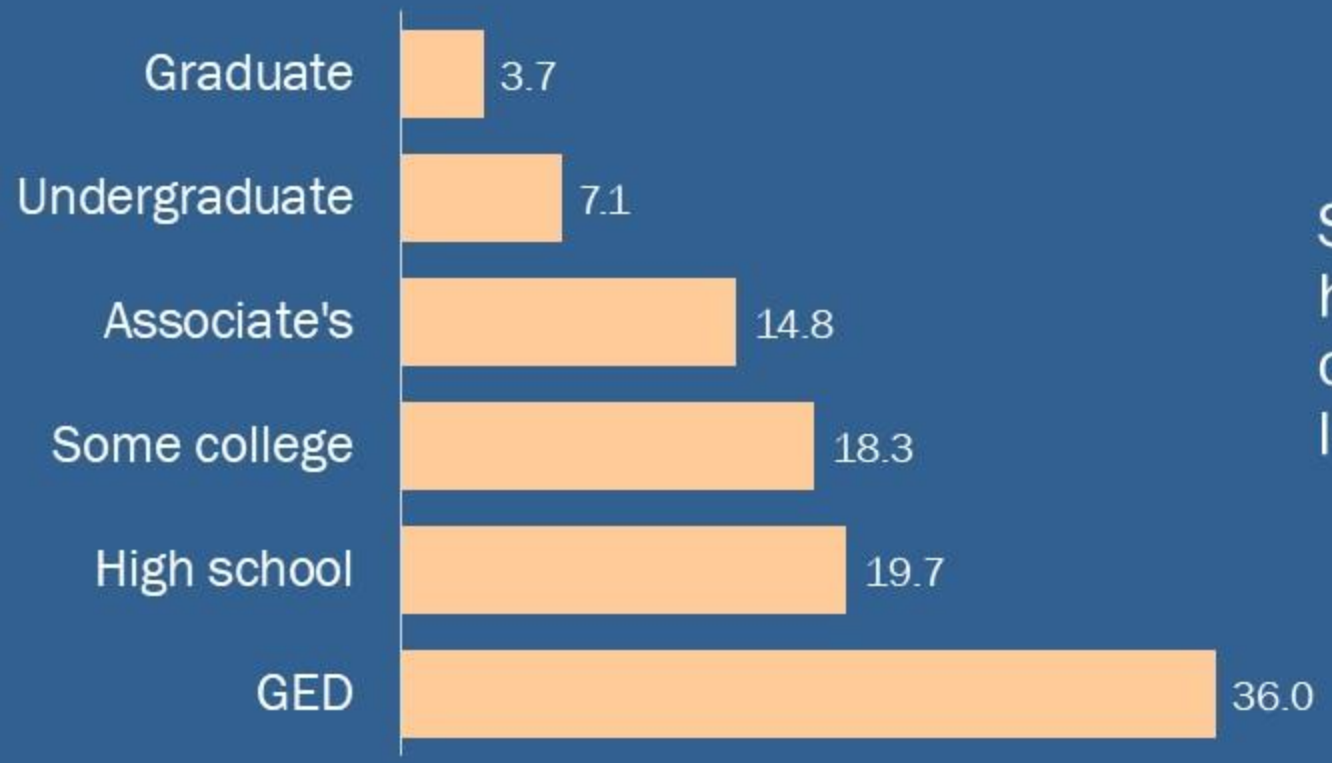
Estimates for people born in 1960.

People with higher family incomes live longer, because of better living conditions, healthcare, and health behavior.



Smoking and education

Percent who are current smokers
by education level



* Have smoked at least 100 cigarettes and currently smoke every day or some days. Source: Centers for Disease Control.

Smoking and other harmful health behaviors are more common among people with lower levels of education.

DISPARITIES IN HEALTH OUTCOMES

Diabetes

Heart Disease

Cancer Outcomes

Malnutrition

Infant Mortality

Smoking

Obesity

Substance Abuse

ROOTS OF INEQUITIES

Environmental Toxins/Hazards

Poor Quality of Care

Discrimination

Housing Poverty Uninsured Racism Food

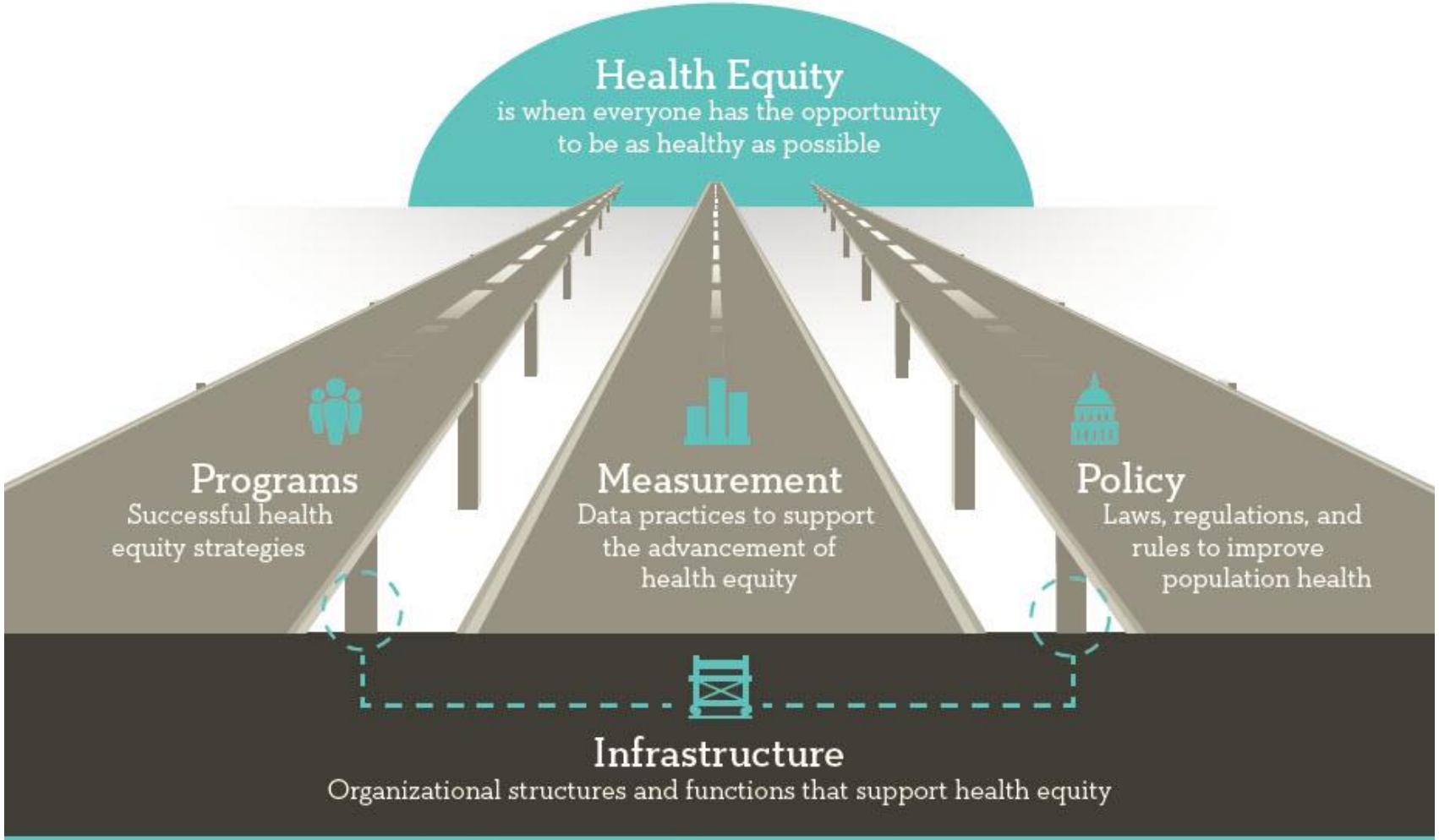
Provider Implicit/Explicit Biases

Poor Quality of Schools

Unemployment

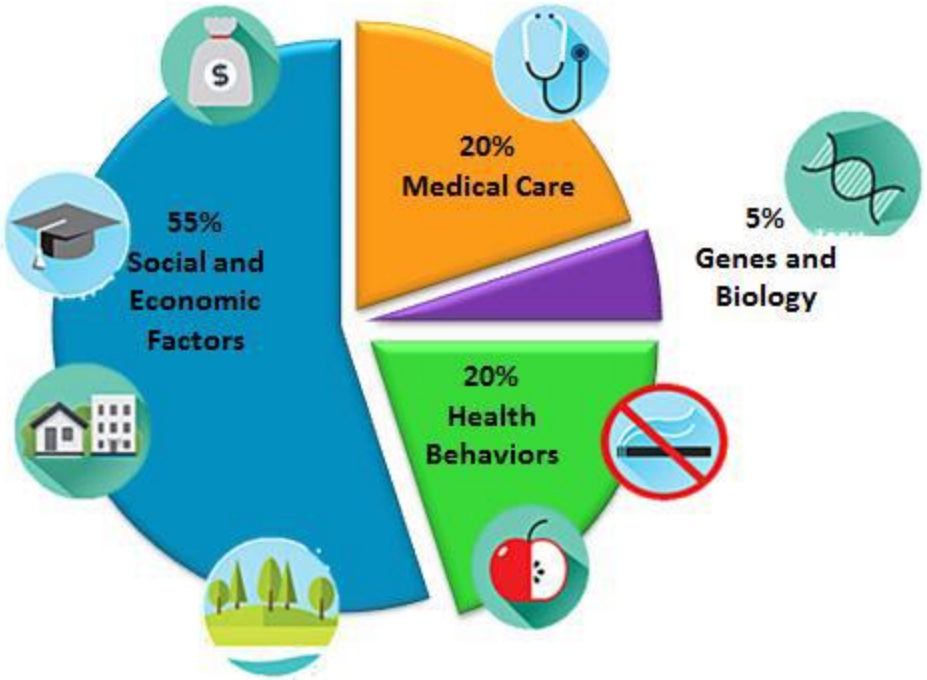
Department of Radiology
VANDERBILT UNIVERSITY
MEDICAL CENTER

PAVING THE ROAD TO HEALTH EQUITY

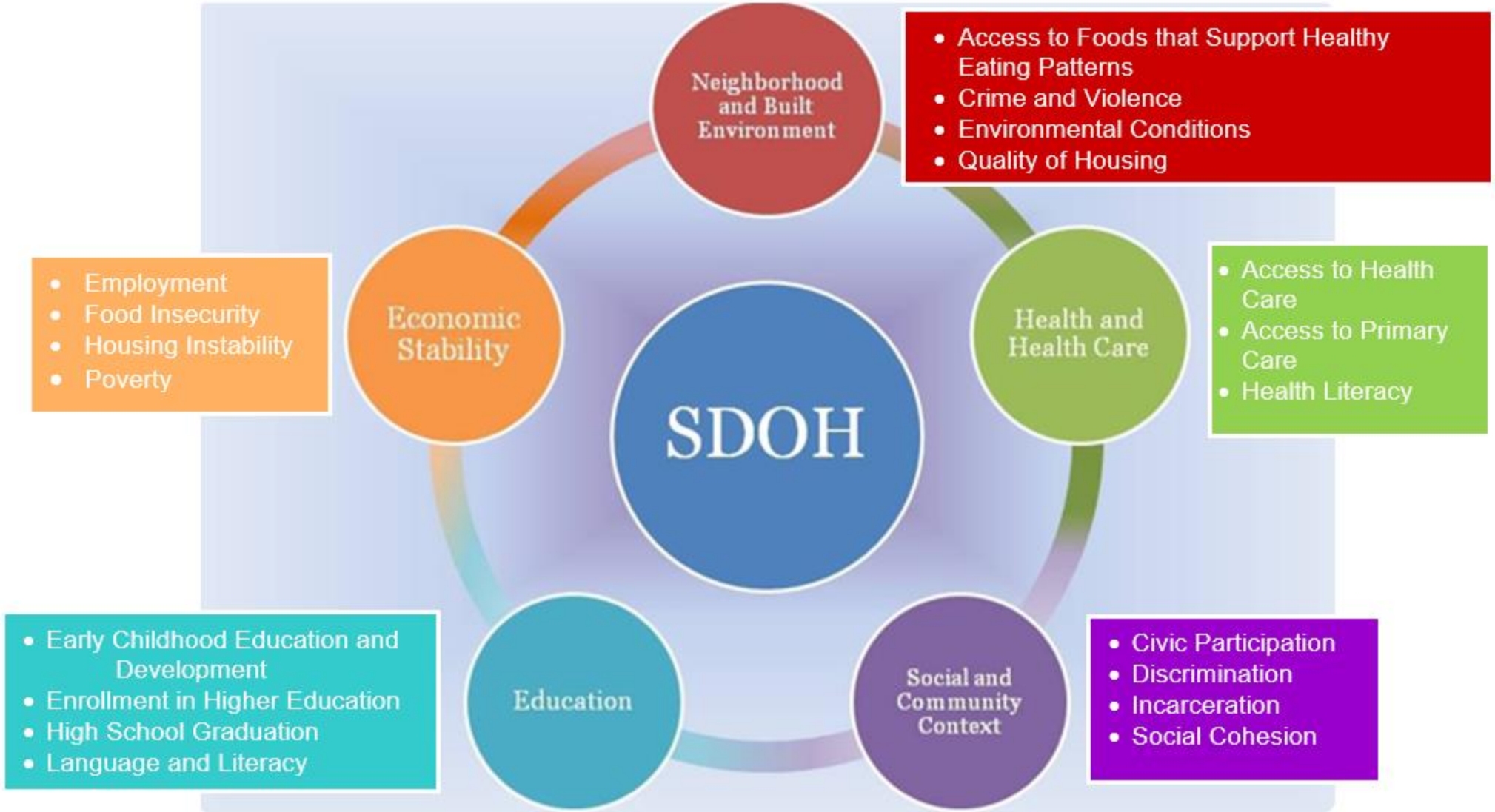


U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

What Makes Us Healthy?



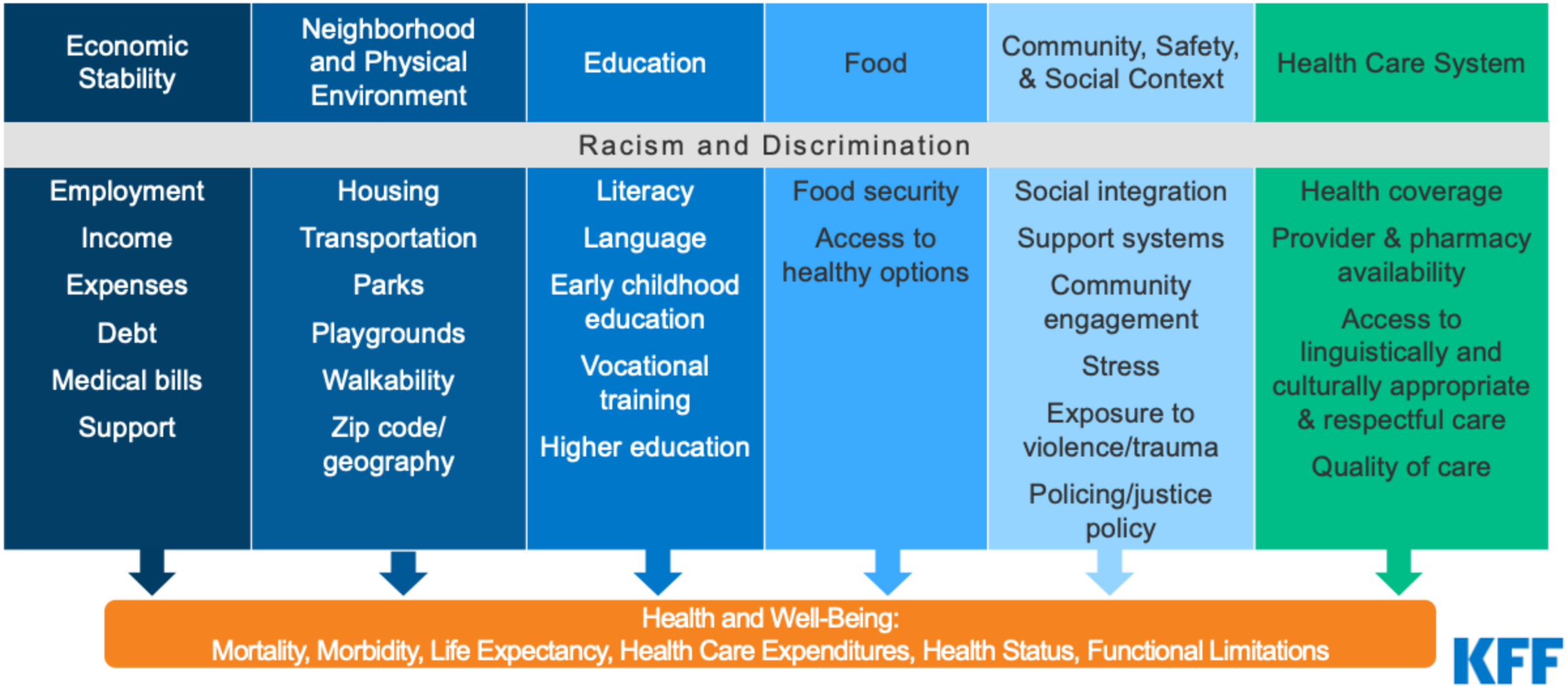
(CDC, 2014)



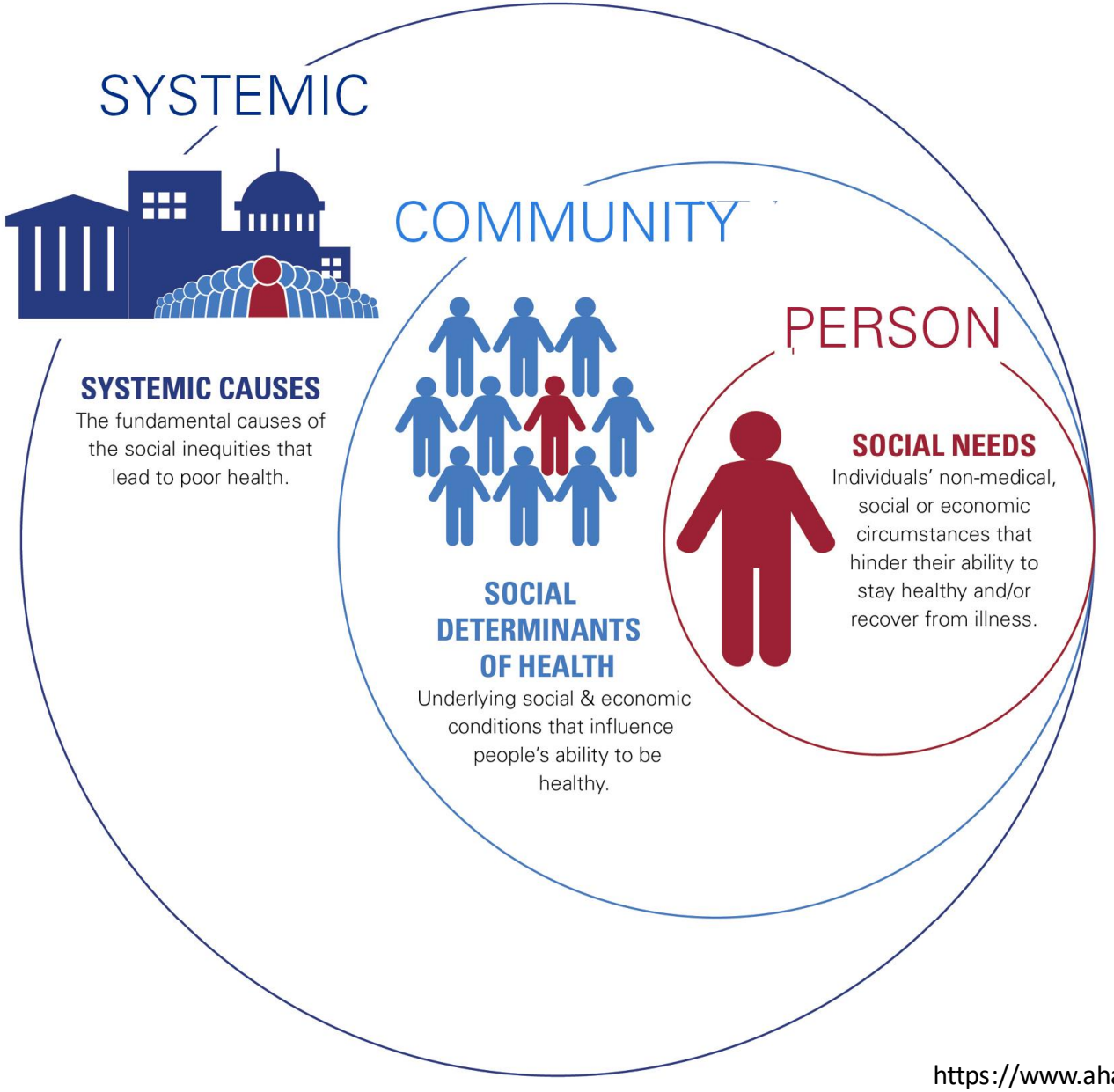
Source: HealthyPeople2020.gov

Figure 1

Health Disparities are Driven by Social and Economic Inequities



Societal Factors That Influence Health: A Framework for Hospitals



American Hospital Association™

Advancing Health in America

https://www.aha.org/societalfactors

Social responsibility of supply chain

- SDOH (food security, transportation, education, etc.)
- Health care equity (racial and gender disparities, access to care, etc.)
- Environmental stewardship
- DEI
- Supplier diversity
- Economic inclusion

The COVID-19 Pandemic and physician leadership in supply chain

- The pandemic highlighted the importance of physician leaders in supply chain
- Hospitals needed physicians to validate clinical use and allocation for mundane commodities such as masks and gowns during a severe shortage of supplies
- Physician leaders were needed to communicate effectively to the medical staff

Survey of Vizient's Large IDN Supply Network members

- Vizient's LISN SCPC group surveyed 24 IDNs (approx. 500 hospitals) during COVID crisi
- Survey #1: May 2020
  - PPE use and conservation strategies during the spring 2020 surge
- Survey #2: June 2020
  - Importance and role of physician leadership in supply chain
  - Responses were compiled and analyzed regarding the culture and perceived importance of CI and physician leadership in supply chain.

LISN Survey: Physician Leadership in Supply Chain

Now More Important than Ever

- PPE use increased by 1000% during peak Covid-19 crisis
  - N95 masks (870%)
  - Face shields (1,055%)
  - Goggles (1,168%)
- High variability in PPE conservation practices
- COVID-19 positive ICU admissions: 15% - 35% (mean 28%)
- Most IDNs formed multidisciplinary teams including physician leaders

Brethauer, et al. "Physician Leadership in Supply Chain: Now More Important Than Ever" https://www.jhconline.com/physician-leadership-in-supply-chain.html, June 2021

LISN Survey: Physician Leadership in Supply Chain

Now More Important than Ever

- Role of physician leaders during crisis
  - Policy development
  - COVID-19 projections
  - Average daily PPE use
  - Current PPE inventory
  - Changes in practice
  - Extended use or reuse of PPE (contingency or crisis standards)
  - Applicability and safety of using substitutes

Brethauer, et al. "Physician Leadership in Supply Chain: Now More Important Than Ever"
https://www.jhconline.com/physician-leadership-in-supply-chain.html, June 2021

LISN Survey: Physician Leadership in Supply Chain

Now More Important than Ever

- Most common roles for physician supply chain leaders:
  - Resource for clinical issues related to COVID-19 (77%)
  - Disseminating supply-chain information to the faculty and clinical leadership. (59%)
- How valuable was physician leadership? 88% of supply chain leaders and 82% of executive leaders = Very or Extremely Valuable
- Physician supply-chain leaders were also perceived to be accessible: 71% of facilities utilized the physician leader 12 or more times per month.

Brethauer, et al. "Physician Leadership in Supply Chain: Now More Important Than Ever"
https://www.jhconline.com/physician-leadership-in-supply-chain.html, June 2021

LISN Survey: Physician Leadership in Supply Chain

Now More Important than Ever

- One third of survey respondents had assigned a role of Medical Director of Supply Chain
- 52.9% of the respondents have a physician with another administrative title responsible for supply-chain activities.
- 64.7% held their supply-chain role for over three years
- 65% received salary support for their work in the supply chain

Brethauer, et al. "Physician Leadership in Supply Chain: Now More Important Than Ever" https://www.jhconline.com/physician-leadership-in-supply-chain.html, June 2021

LISN Survey: Physician Leadership in Supply Chain

Now More Important than Ever

- Conclusion: hospital support for a physician leader in the supply chain is "critical to developing a culture of clinical integration and resource stewardship in times of crisis."
- The COVID-19 crisis strengthened the clinical integration culture in these hospital systems and established a precedent for multidisciplinary teams working together to deliver high-value health care.

Brethauer, et al. "Physician Leadership in Supply Chain: Now More Important Than Ever" https://www.jhconline.com/physician-leadership-in-supply-chain.html, June 2021

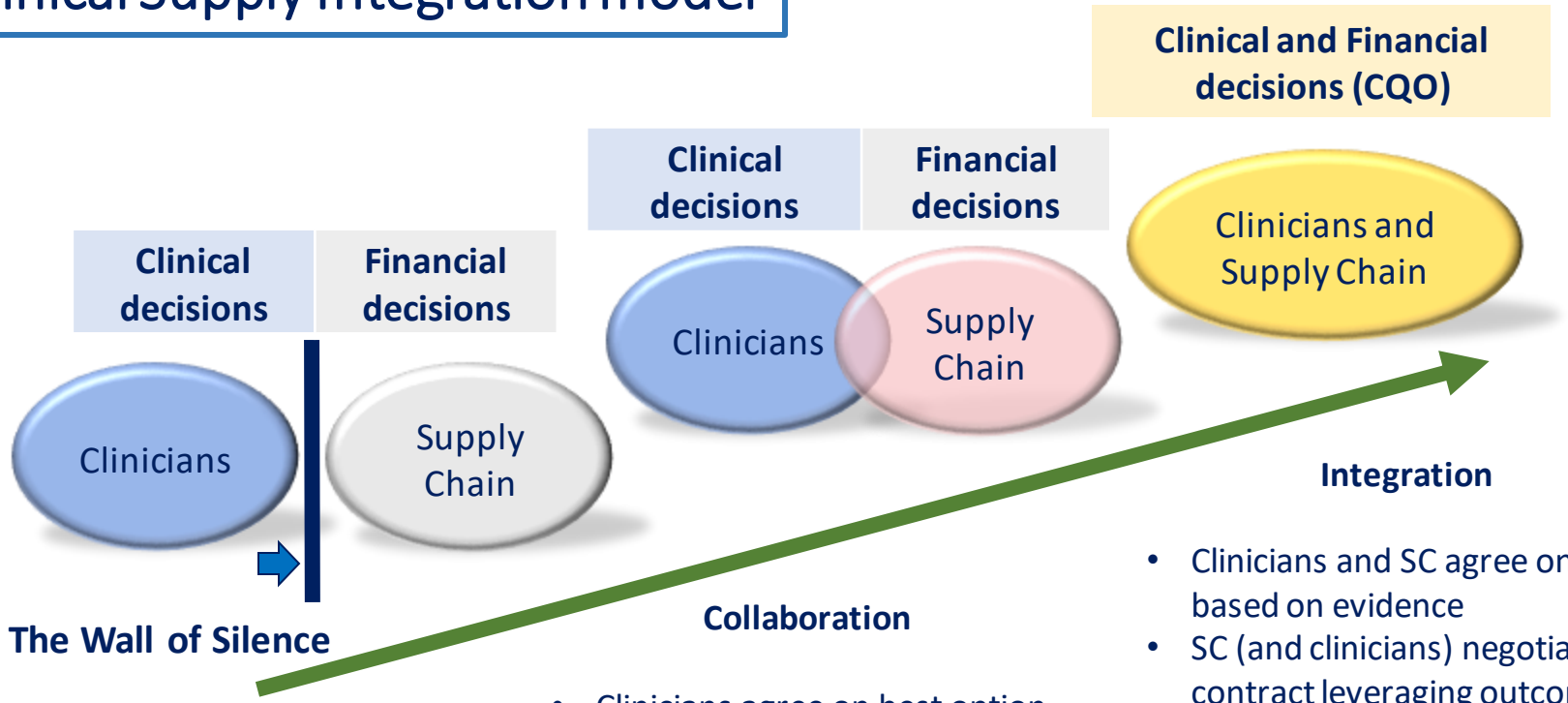
Lessons Learned

- The clinically integrated supply chain is the new standard in a Value-Based healthcare system
- The role of physician leaders in supply chain is critical for the clinically integrated supply chain, and COVID-19 pandemic helped accelerate and expand their scope
- There are still great opportunities for hospitals to develop supply chain leadership roles for physicians
- The migration to Value-Based care is both a catalyst and asset for physician leadership in supply chain

How physicians can lead to achieve highest value of care experienced by the patient

Standardize care to best practice (e.g. right diagnosis, right care delivery)
Standardize procedure/technique (e.g. right procedure for the right patient)
Product choice standardization (e.g. packs, preference cards)
Appropriate product utilization (e.g. right product for the patient)
Standardize vendor selection process with clinical input (clinically integrated supply chain)
Contract compliance (with appropriate exceptions/carve outs)
Savings within contracts (best use of products available)
New product value assessment using evidence and expert consensus
Standardize performance and outcomes metrics and data definitions

Clinical Supply Integration model



Silos

- Clinician wants product
- Speaks to department director
- SC finds best price

Collaboration

- Clinicians agree on best option
- SC negotiates contract
- SC tracks contract compliance
- Clinicians track utilization (maybe)

Integration

- Clinicians and SC agree on best value based on evidence
- SC (and clinicians) negotiates contract leveraging outcomes
- Joint accountability for compliance AND appropriate utilization
- Outcomes drive choice
- Transparent data analysis

Clinical supply chain integration examples during COVID-19 crisis

- PPE use/reuse standardization
- Supplier vetting and clinical validation
- Perioperative protocols for caregiver protection
- Standardization of anesthesia and ventilator circuits
- Procurement of appropriate ventilator devices
- Conversion of anesthesia machines to ventilators
- Conversion of ORs to ICUs
- Hospital at home
- Preop testing standardization and access
- Preop kit standardization and delivery to patients
- Reprocessing of single use products during shortage
- Vaccine procurement, logistics, and administration

Tangibles for supply chain professionals

- Reach out to local suppliers for potential opportunities
- Collaborate with others to create a local supplier network
- Create a supplier scorecard that includes diversity score
- Create an environmental score for value analysis
- Develop a position (JV) for supply chain medical director
- Partner with finance team to gain visibility into total cost of care
- Connect with your local health equity leader

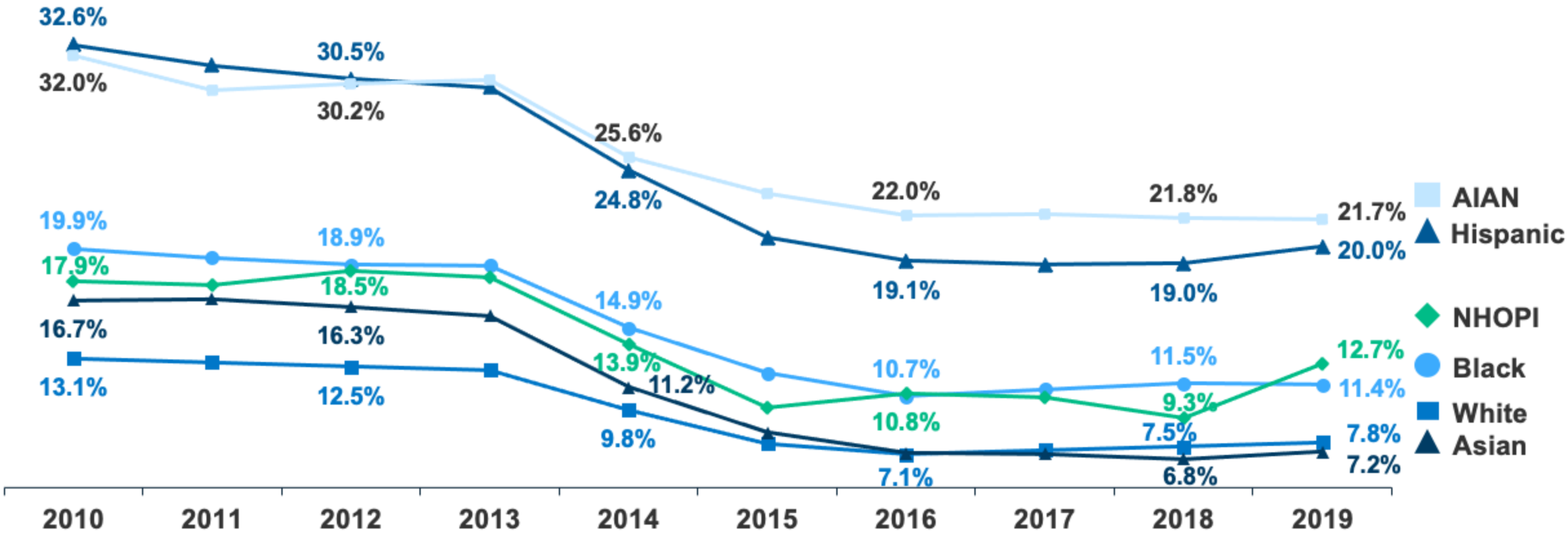
Key Takeaways

- COVID-19 has forever changed the healthcare system, but it is not over yet
- There is no return to normal, and there is no new normal
- Supply chain needs to evolve to accommodate value-based care
- Variability in cost, quality and outcomes contributes to inequities and waste and reduces value of care
- Clinical integration allows supply chain and clinicians to co-own variability
- Health systems should leverage their COVID-19 experience to enable and accelerate physician engagement with supply chain NOW
- The clinically integrated supply chain should include not just patient outcomes but community health

Extra slides

Figure 1

Uninsured Rates for the Nonelderly Population by Race and Ethnicity, 2010-2019

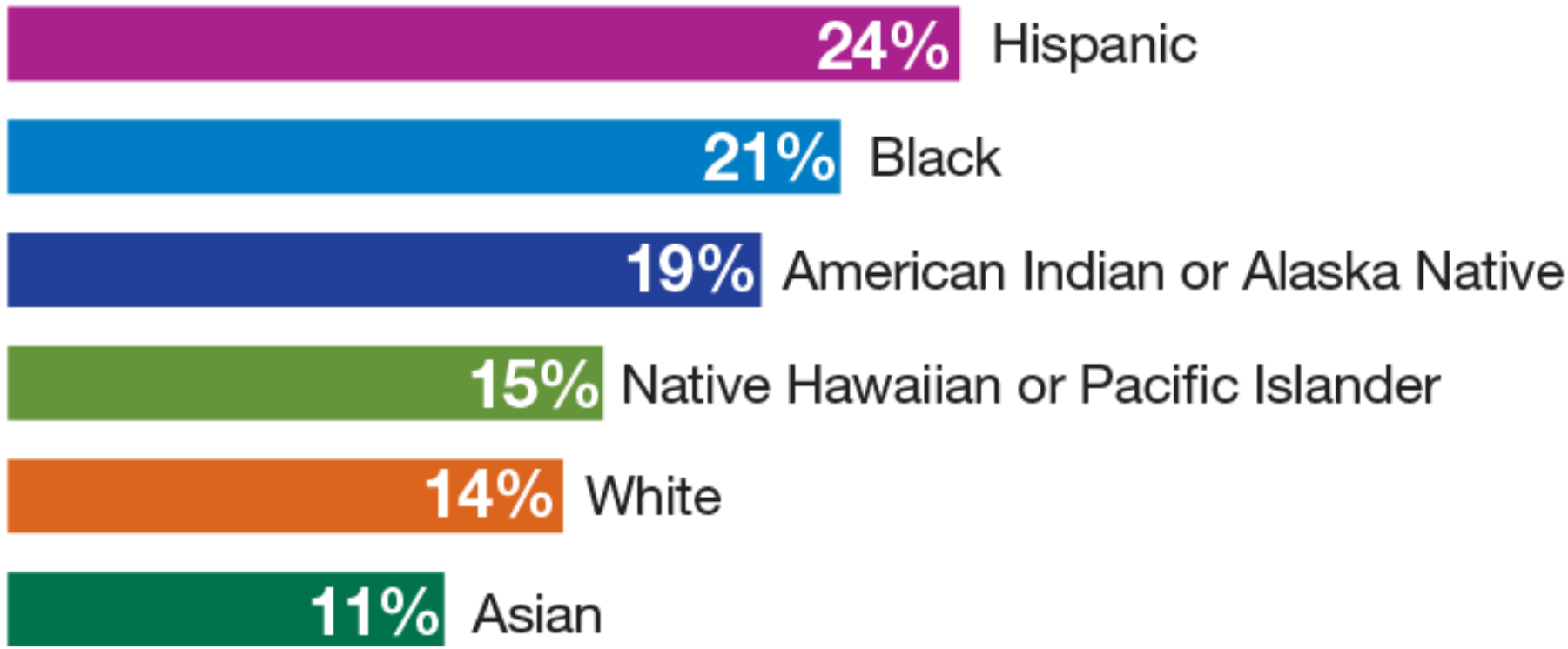


NOTE: Includes individuals ages 0 to 64. AIAN refers to American Indians and Alaska Natives, NHOPI refers to Native Hawaiians and Other Pacific Islanders. Persons of Hispanic origin may be of any race but are categorized as Hispanic for this analysis; other groups are non-Hispanic

SOURCE: KFF analysis of the 2010-2019 American Community Survey.

KFF

Percentage of non-elderly adults who did not see a doctor for care because of cost (2018)



—*Kaiser Family Foundation*

Leverage common drivers for alignment

- Consumer expectations changing
- Value-based payment models
- Site shifting/shift to outpatient/virtual/Hospital at Home program
- Social responsibility
  - SDOH (food security, transportation, education, etc.)
  - Health care equity (racial and gender disparities, access to care, etc.)
  - Environmental stewardship
  - DEI
- Need for actionable clinical data
- Shared and cascaded outcome metrics
- The whole team huddles and lines up

Clinical Integration in Supply Chain

Clinical integration with respect to healthcare supply chain is an interdisciplinary partnership to deliver patient care with the highest value (high quality, best outcomes, and minimal waste resulting in the lowest total cost of care); this is achieved through assimilation and coordination of clinical and supply chain knowledge, data, and leadership across the care continuum to deliver care that is safe, timely, evidence-based, efficient, equitable and patient-focused.

--AHRMM Clinical Integration Taskforce

Surgical Services Value Drivers

Value adding	Value reducing
• Defining best practice • Standard techniques and equipment • Appropriate use of products • Minimize vendor selection • Contract compliance • Opting for lowest cost items • Standardized preference cards • Efficient operations • Strong leadership • Reliable data	• Leading with physician preference • “Nice to have” • Culture of favoritism • Tolerance for variation • Lack of leadership and accountability • Lack of transparency • Poor vendor management • Poor preference card management • Late starts/long turnovers • Case length discrepancy