Overcoming Disparities in the Cancer Control System

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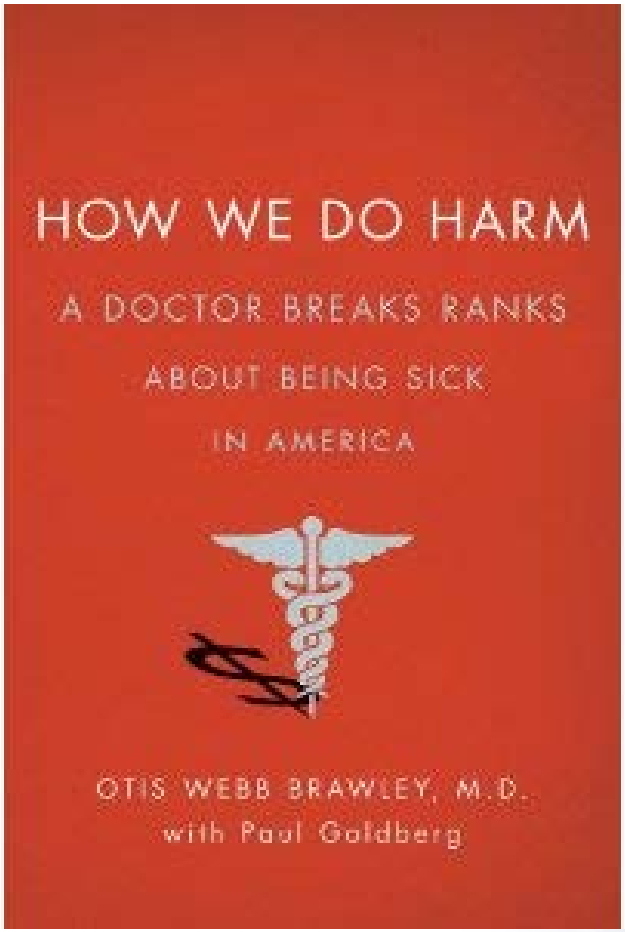
Disclosures

- Employment:
  - Johns Hopkins University
- Consulting
  - National Institutes of Health
  - Centers for Disease Control
  - Department of Defense



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Outline of Talk

Defining:

- Disparities in cancer
- The disparate population(s)
- How to overcome them

FACT

The US has seen a 26% decline in age-adjusted cancer mortality from 1991 to 2016.

Why the decline?

- Prevention (especially tobacco control)
- Wise early detection (especially colorectal, breast, cervix)
- Improvements in cancer treatment

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Disparities in Health

The National Cancer Institute (NCI) defines "cancer health disparities" as:

> Adverse differences in cancer incidence, cancer prevalence, cancer mortality, cancer survivorship, and burden of cancer or related health conditions that exist among specific population groups in the United States.

> Translated, “disparities in health” is the concept that some populations (however defined) do worse than others.

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Disparities in Health

Populations can be defined or categorized by:

- Gender
- Race
- Ethnicity and Culture
- Area of geographic origin
- Socioeconomic Status

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Race

Defined by US Office of Management and Budget every ten years.

- White
- Black
- Asian
- Pacific Islander
- Native American/Alaskan Native

OMB Directive 15

Race

Defined by US Office of Management and Budget every ten years.

- Sociopolitical and not biologic according to OMB definition
- Rejected by Anthropological community as non-scientific
- Race changes over time*

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Race Changing Over Time

- Native Hawaiians
- Indians (people born in India)
- President Obama

Ethnicity and Culture

More of a scientific categorization than race. It correlates with:

- Some environmental influences - such as diet.
- Habits, such as how we smoke or even how we have sex.

There are many ethnicities in US and understanding ethnicity and culture can be important in palliative care.

Area of Geographic Origin

Can correlate with family/genetics/tribe

–Sickle Cell Trait – Mediterranean Basin and sub-Saharan Africa

–Cystic Fibrosis – Northern Europe

–EtOH dehydrogenase deficiency – East Asia

Area of Geographic Origin and Genetics

- 12% of the Thai population and a smaller portion of the Malaysian population have a genomic predisposition to Stevens-Johnson Syndrome

- Identifying these people can save lives by preventing use of drugs known to cause Stevens-Johnson Syndrome

Area of Geographic Origin and Genetics

- Benevolent Population Profiling!!!
- Ancestry.com has shown that categorization by genetic area of origin is difficult due to admixture.

Population Science

Genomics

- May define populations at risk of disease or at risk of bad outcomes
- A more scientific/objective way of defining or categorizing populations

Socioeconomic Status

Correlates with:

- Where we live.
- Birthing habits
- Education
- Diet

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Percent of Americans Living Under the Poverty Line by Race (2017)

- Total 20%
- White 13%*
- Black 35%
- Hispanic 33%
- Other 23%

*The absolute number of Whites is larger than Blacks and Hispanics combined.

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Potentials for Cancer Prevention

Cause	% cancer caused	Deaths in United States†	Magnitude of possible reduction (%)	Period of time (years)	Evidence example
Smoking	33%	188,744	75%	10–20	Utah vs Kentucky
Overweight/obesity	20%	114,390	50%	2–20	Bariatric surgery
Hereditary factors (*)	16%	91,520	50%	2–10	Oophorectomy; MRI: Tamoxifen; Colonoscopy
Diet	5%	28,600	50%	5–20	Folate , colorectal cancer
Lack of exercise	5%	28,600	85%	5–20	Adolescent activity
Occupation	5%	28,600	50%	20–40	Asbestos
Viruses	5%	28,600	100%	20–40	Liver cancer, HPV vaccine
Alcohol	3%	17,200	50%	5–20	Regulation
UV and ionizing radiation	2%	11,400	50%	5–40	Medical exposures
Prescription drugs	1%	5,720	50%	2–10	Hormone therapy
Reproductive factors	3%	17,200	0	N/A	N/A
Pollution	2%	11,400	0	N/A	N/A

We could reduce cancer deaths 60% by paying attention to known risk factors

Modified from Colditz, *Sci Trans Med* 4:127,2012

(*) JNCI 89:287,1997
JAMA 2016 315:68-76

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Causes of Cancer Mortality Increases

Tobacco is still the leading cause of cancer in the US.

Cancers due to tobacco use (other than bladder) are declining significantly more so in men than women.

Weir HK, Thompson TD, Soman A, Møller B, Leadbetter S, White MC. Meeting the Healthy People 2020 objectives to reduce cancer mortality. *Preventing Chronic Disease* 2015;12:140482.
Weir HK, Thompson TD, Soman A, Møller B, Leadbetter S. The past, present, and future of cancer incidence in the United States: 1975 through 2020.External *Cancer* 2015;121(11):1827–1837.

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Smoking Prevalence by Race 2017

	Female	Male
NH White	16.0%	17.3%
Black	13.5%	20.9%
Native American	24.0%	19.0%
Asian Pacific Islanders	2.6%	12.0%
Hispanic	7.1%	13.1%

CDC, MMWR 2018

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Causes of Cancer Mortality Increases

Energy balance (overweight, obesity, too many calories, lack of exercise)

- 2/3 of adults and 1/3 of children are overweight or obese
- Weight related cancers are expected to increase 30 to 40% by 2030

Prevention of cancer is clearly a need in the future!

Weir HK, Thompson TD, Soman A, Møller B, Leadbetter S, White MC. Meeting the Healthy People 2020 objectives to reduce cancer mortality. *Preventing Chronic Disease* 2015;12:140482.
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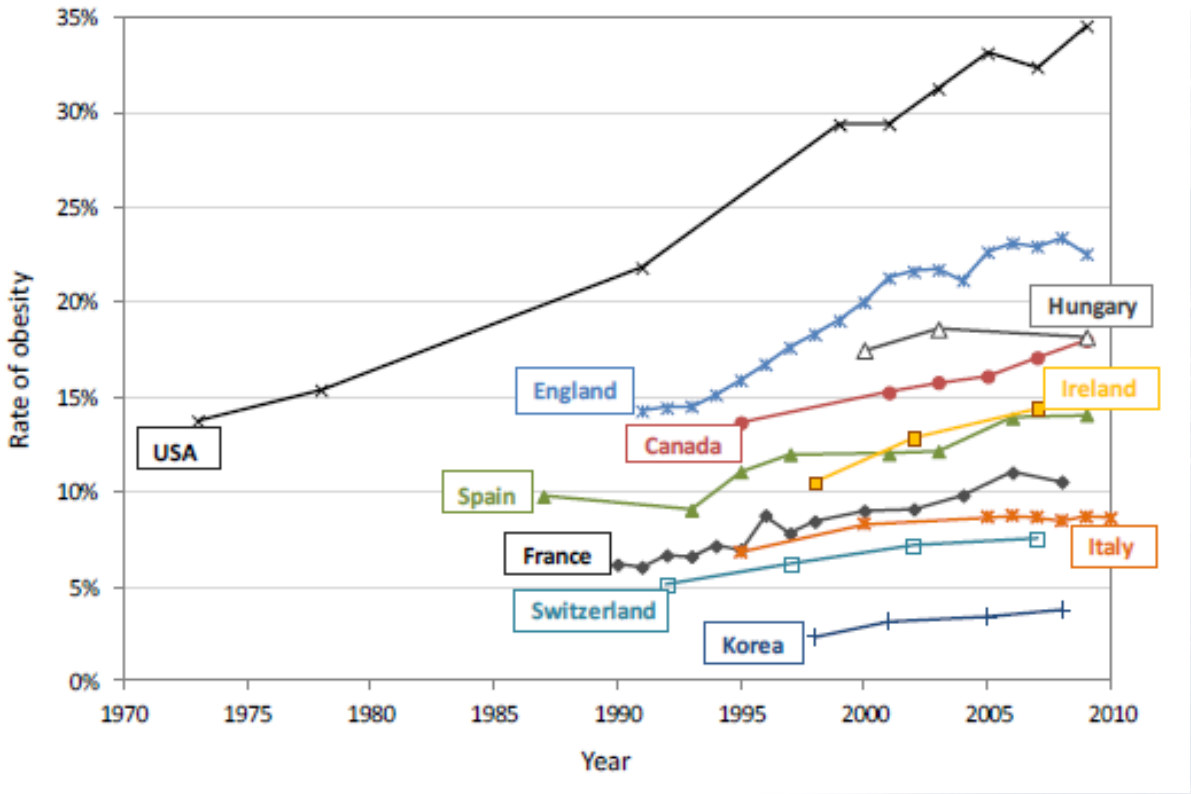
US Continues to Lead the World in Obesity Rates



OECD Obesity Update 2012

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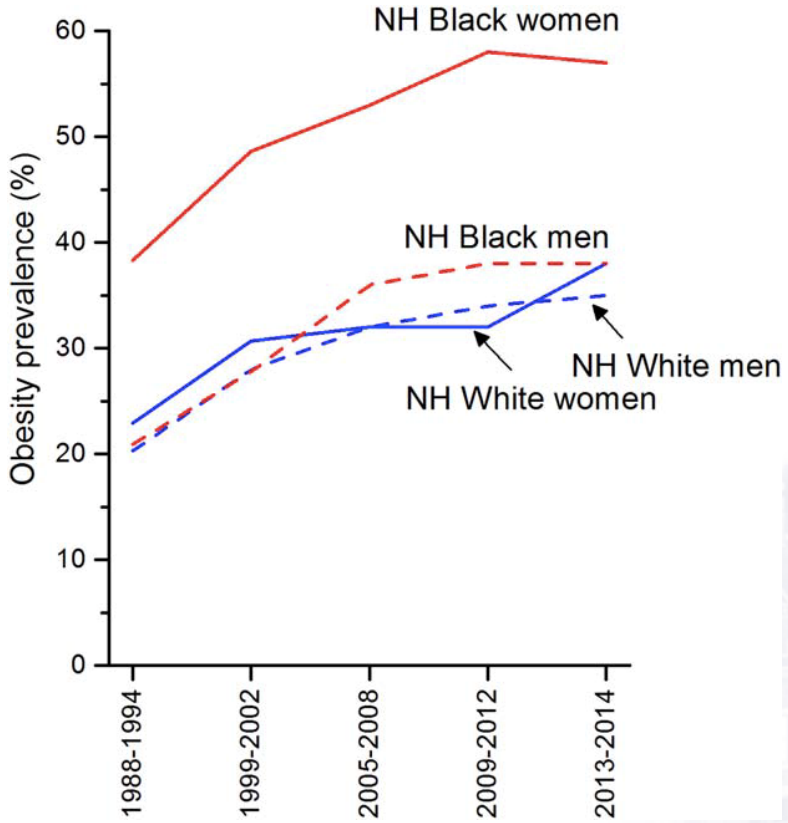

Trends in Adult Obesity (Body Mass Index 30 kg/m2) Prevalence (%) by Sex and Race/Ethnicity, United States, 1988 to 2014.

NH indicates non-Hispanic.

Sources: 1988-2012: Health, United States, 2014: With Special Feature on Adults Ages 55-64. 2013-2014: Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey, 2014. Public use data file.

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Causes of Cancer Mortality Increases

Cancers caused by infection

- Liver cancer deaths expected to go up 50% due to HCV and HBV.
- Head and neck cancer deaths increasing by 30% due to HPV.

Prevention of cancer is clearly a need in the future!

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BREAST CANCER

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Breast Cancer

In 2019,

269,000 Diagnosed and 42,300 Deaths

There has been a 40% decline in age-adjusted female mortality from 1990 to 2016

Screening is attributed with 40% to 50% of the decline.

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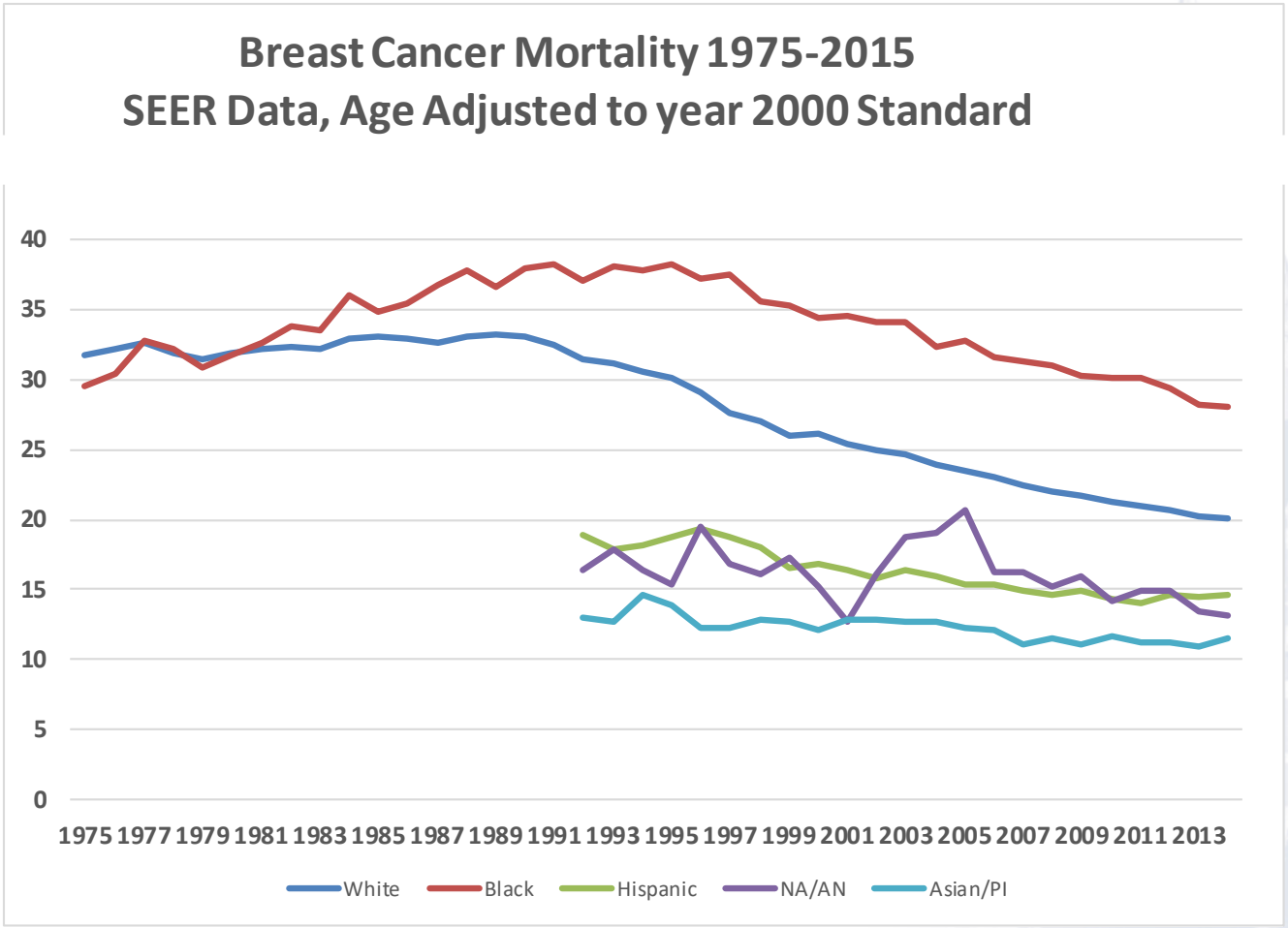

Siegel, et al. CA 2018;68:329-3

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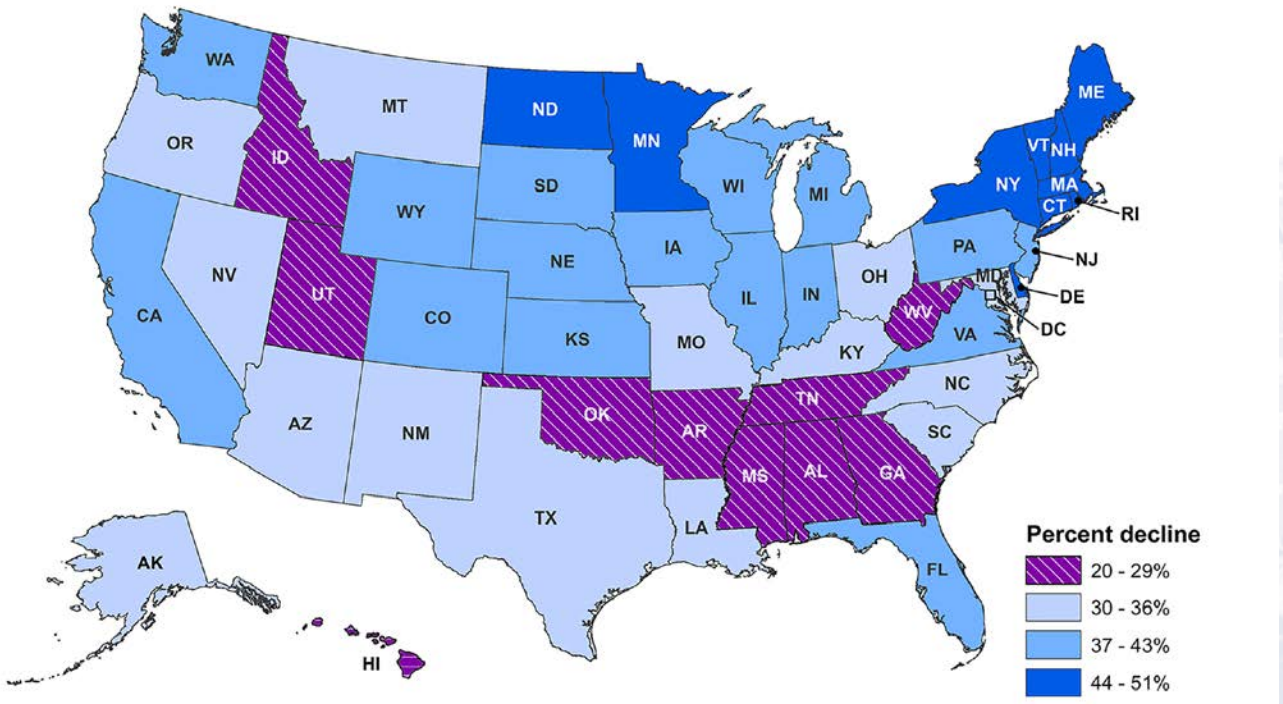
Breast Cancer
The Reality

There are seven states where B-W mortality differences are no longer statistically significant.

DeSantis et al, CA, 2017

Breast Cancer Mortality Decline from 1988-90 to 2013-2015 by State



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Breast Cancer

Strategies to Reduce Cancer Mortality

CISNET Modeling of outcomes from 2013 to 2025

- With current breast cancer screening and treatment patterns, there will be 50,100 to 57,400 deaths in 2025
- With guideline appropriate screening of all women 40 and above and current treatment patterns there will be 5100 to 6100 fewer deaths
- With all women receiving appropriate therapy and no change in screening rates there would be 11,400 to 14,500 fewer deaths
- If all women received appropriate screening and treatment there would be 18,100 to 20,400 fewer deaths

Mandelblatt et al, Cancer, 2013

COLON CANCER

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Colon and Rectal Cancer

In 2019,

- Diagnosed: 101,400 colonic and 44,200 rectal
- 51,000 Americans will die of colon and rectal cancer.
- Among US Population as a whole, there has been a 50% decline in age-adjusted death rate since 1980.
- Screening is attributed with about 2/3 of the decline.

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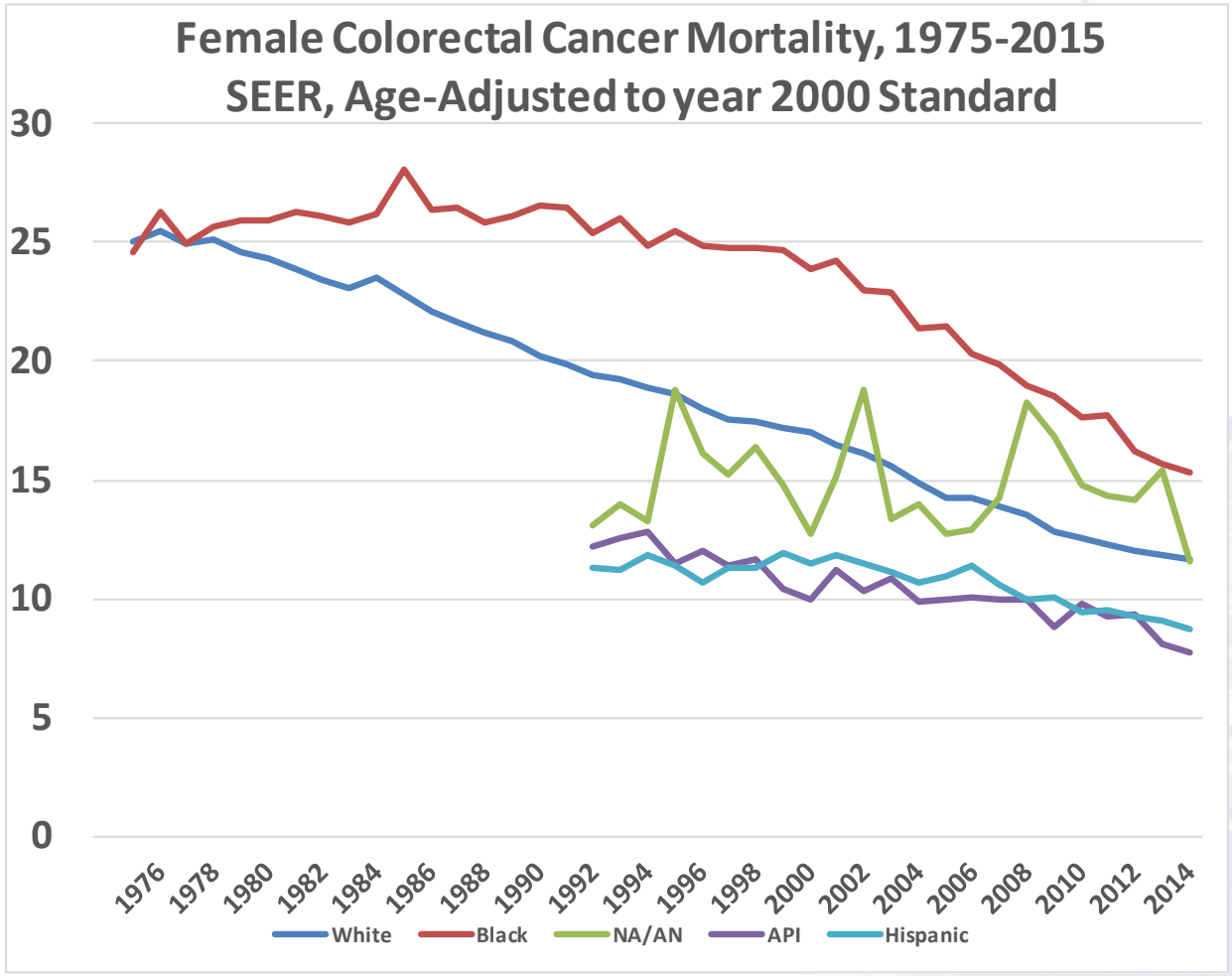

Siegel, et al. CA 2018;68:329-33

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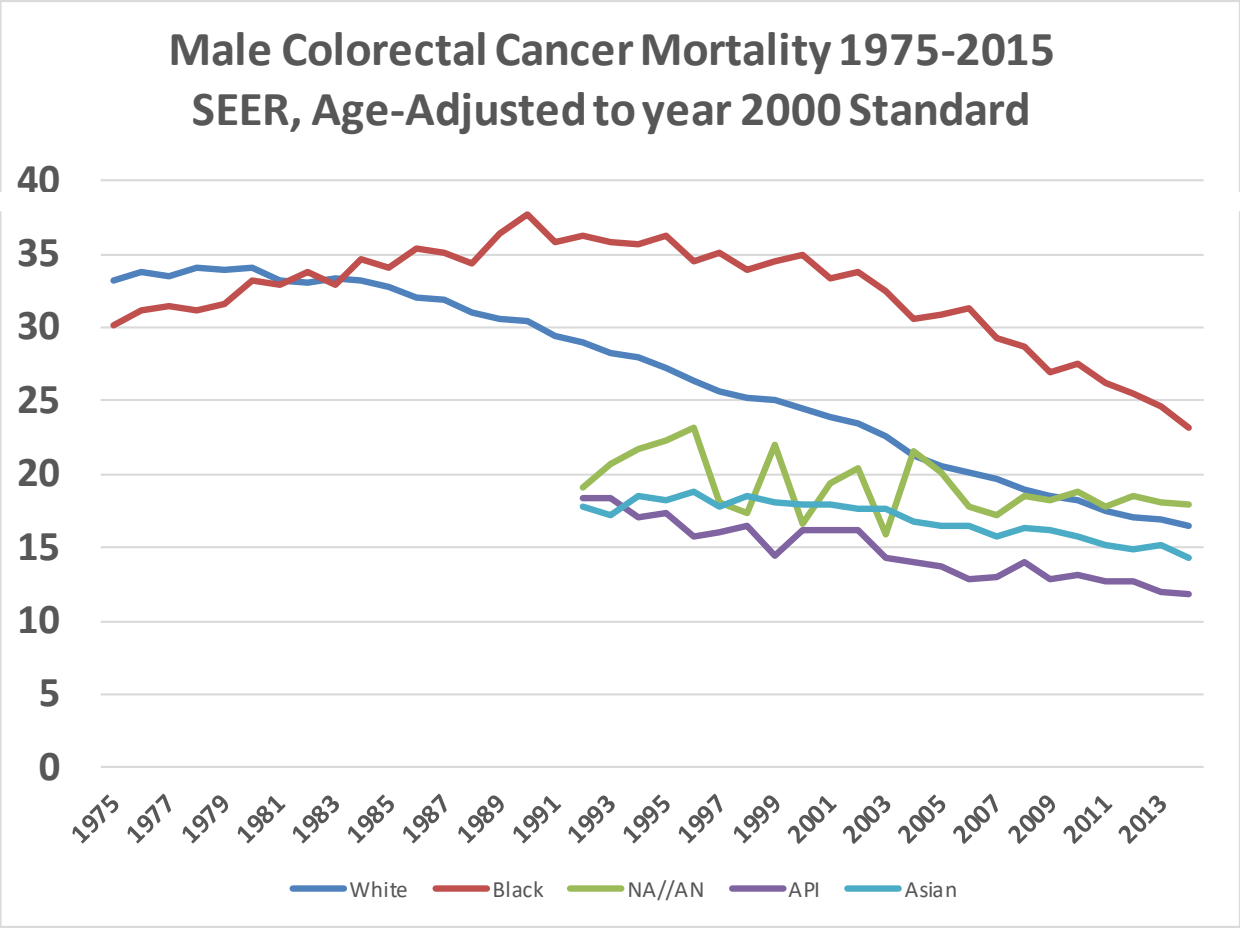

Siegel, et al. CA 2018;68:329-339

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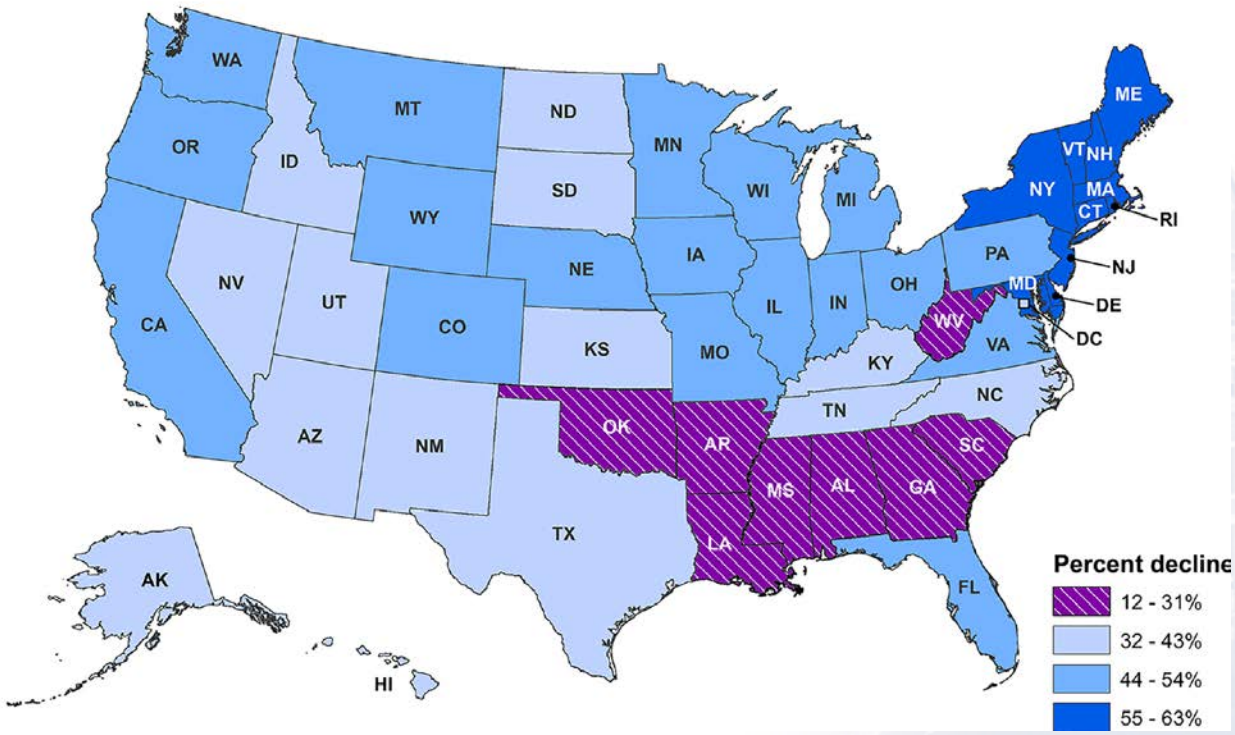
Colorectal Cancer Mortality Decline from 1980-82 to 2013-2015 by State



Siegel, et al. CA 2018;68:329-339

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Colon Cancer Quality of Surgery

A minimum of 12 lymph node should be examined in an adequate colorectal cancer pathology specimen

-About half of all colorectal cancer patients have 12 or more LN examined.

-Hispanics, Blacks and the poor have higher odds of receiving an inadequate dissection.

-Inadequate examination is associated with hospital where care was received.

-Inadequate staging leads to some of the talk that colorectal cancer is more aggressive among Blacks!!!

– Rhoads et al, Cancer 2012 Jan 15;118(2):469-77

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Causes of Colorectal Cancer Disparities

Differences in:

- Prevalence of screening
- In quality of screening
- In proportion treated
- Quality of treatment

- Differences by:
  - Race
  - Socioeconomic Status
  - Region of Residence

LUNG CANCER

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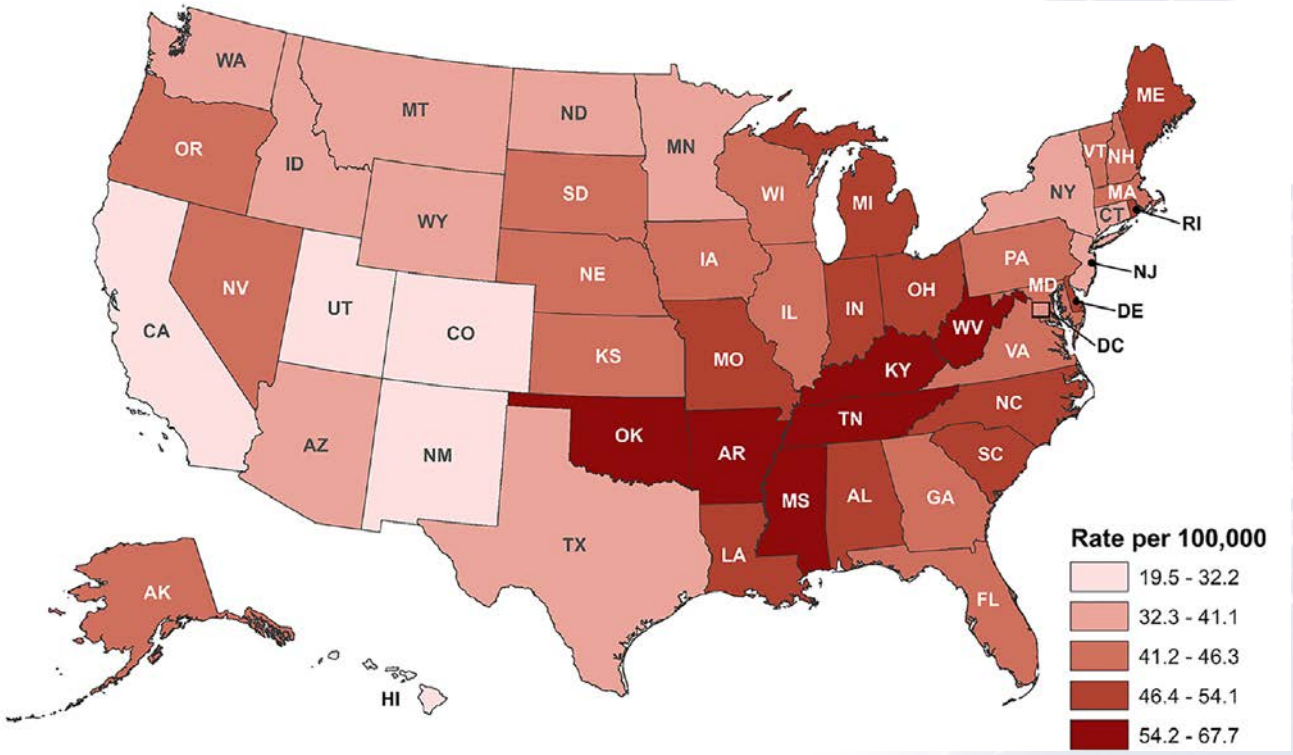
The American Cancer Society estimates that in 2019:

About 234,000 Americans will be diagnosed with lung cancer (121,680 in men and 112,350 in women)

There will be about 154,050 deaths from lung cancer (83,550 in men and 70,500 in women)

Lung Cancer Mortality Rates 2011 to 2015 by State



Data source: Smoking: Behavioral Risk Factor Surveillance System (BRFSS), Centers for Disease Control and Prevention Mortality: National Center for Health Statistics.

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The National Lung Screening Trial

- **Nearly 54,000 at high risk enrolled in the trial**
  - age 55 and above
  - 30 pack year or greater history of smoking; if quit, did so less than 15 years prior to trial entry
  - Reasonable health

- **Subjects prospectively randomized to chest X-ray (sham) or low dose spiral CT (LDCT) yearly for three years**
  - Done at 30 sites with lung cancer expertise
  - Analysis 10 years from start of screening showed LDCT associated with a 20% reduction in relative risk of death

CT: computed tomography
N Engl J Med. 2011 Aug 4;364(22):2148-54.

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The National Lung Screening Trial: A Closer Look

- **In this high risk group, the benefit/risk ratio of 5.4 lives saved for:**
  - Every 2 people with a complication due to an invasive procedure
  - Every 1 life lost prematurely due to diagnostic procedures
- This study was done in 30 of the best hospitals in the country
  - Results may differ as LDCT screening is adopted at other facilities.
  - The benefit-risk ratio may decrease

LDCT: low dose spiral CT

N Engl J Med. 2011 Aug 4;364(22):2148-54.

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An Efficient Screening Program

- Approximately 160,000 Americans currently die of lung cancer every year.
- A screening program has potential of preventing 8,000 to 10,000 deaths per year!!!
- If done well screening would lead to 1,500 to 1,850 deaths secondary to diagnostic interventions (bronchoscopy, biopsy, etc.).

Lung Cancer Screening Recommendations

Six Respected Groups Recommend the Doctor "Consider" spiral CT for those:

- –Healthy aged 55 years and above,
- –H/0 30 pack years of smoking or more,
- –If quit smoking did so less than 15 years ago,
- –Who understand that there are risks of unnecessary diagnostic procedures and even death associated with screening.

Wender et al, CA Cancer J Clin 2013

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The Most Important Question in Cancer Control

- How Can We Provide Adequate High Quality Care (to Include Preventive Services) to Populations That So Often Do Not Receive It?
  - Unnecessary care interferes with institutional abilities to provide necessary care.
  - Complex resource intensive care (such as lung cancer screening) can divert or take away from other vital care.
  - State by state disparities are increasing with the Affordable Care Act!!

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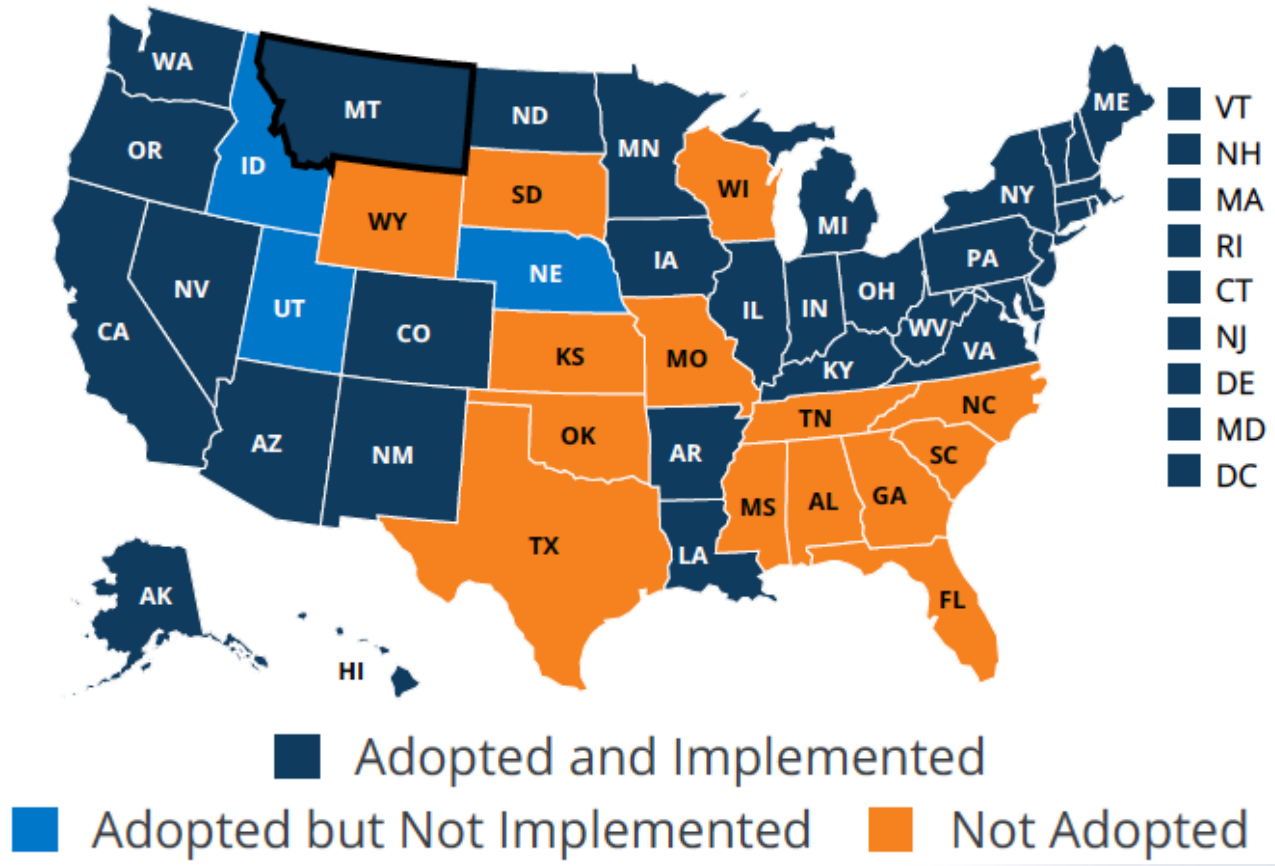
State Medicaid Expansion Plans as of mid 2019



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Applying Known Science (Prevention and Treatment)

Fact:

College educated Americans have a much lower risk of cancer death compared to non college educated.

This is true among all races and ethnicities.

Siegel, et al. CA 2018;68:329-339

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Applying Known Science (Prevention and Treatment)

- It is estimated that 607,000 Americans will die of cancer this year.
- If all Americans had the cancer death rate of college educated Americans, the number would be 455,000.
- Nearly one-fourth of cancer deaths (152,000 Americans) would not occur!

Siegel, et al. CA 2018;68:329-339

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Applying Known Science (Prevention and Treatment)

- At least 152,000 deaths per year are preventable if all Americans received known medical prevention and treatment.
- The majority of those preventable deaths are in white Americans.
- The issue of disparities in health are not just a racial minority health issue.

Siegel, et al. CA 2018;68:329-339

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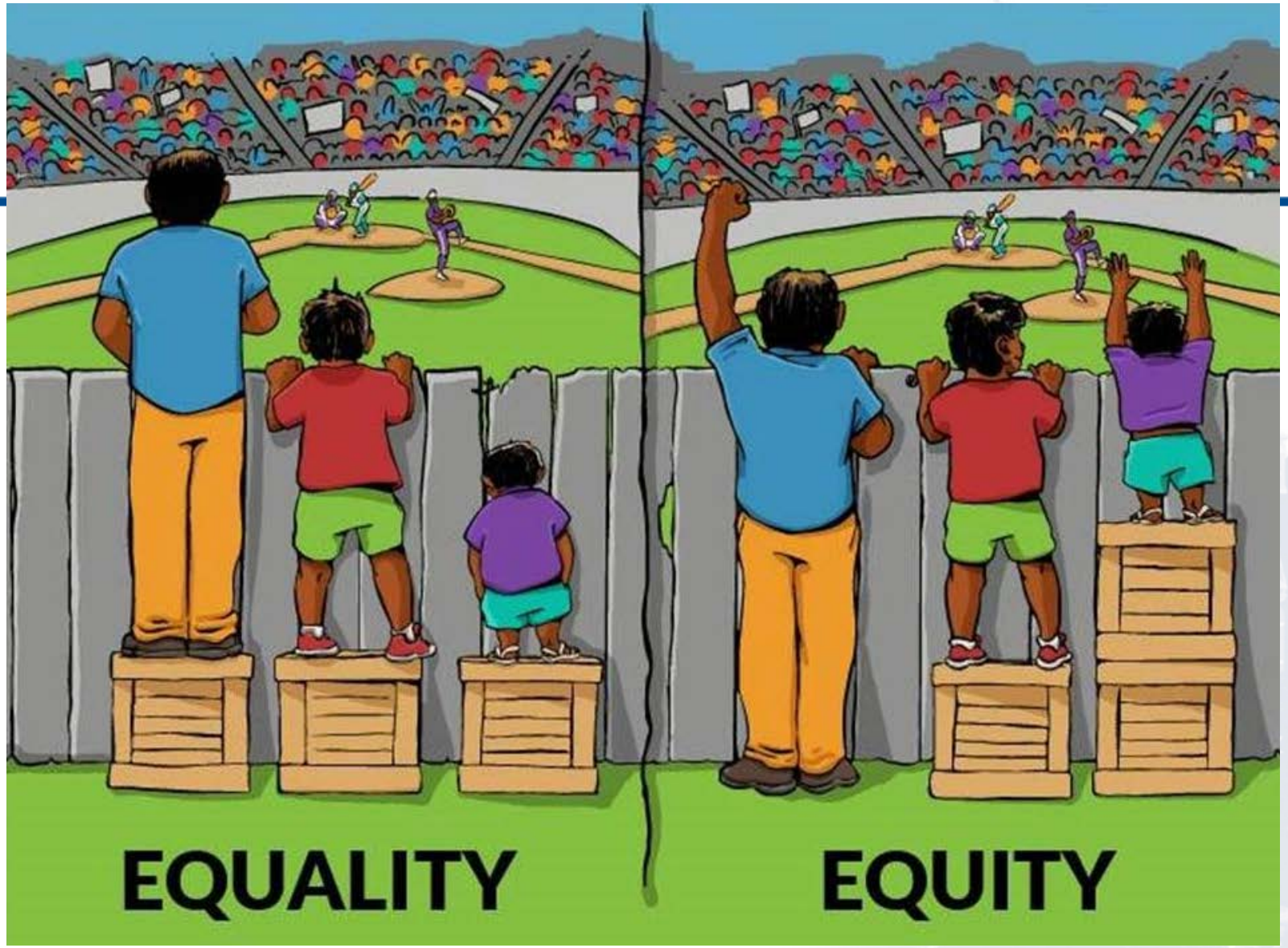
Scientific Progress

Population disparities always increase when there is scientific progress in medicine.

- This was seen when there were improvements in screening and treatment of breast and colorectal cancer
- It is occurring as we move into the era of precision medicine and immunotherapy
- New preventive interventions are less likely to cause significant disparate outcome.



The Johns Hopkins Medical Institutions