SWOG | CANCER RESEARCH NETWORK

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Cancer Control in the 21st Century

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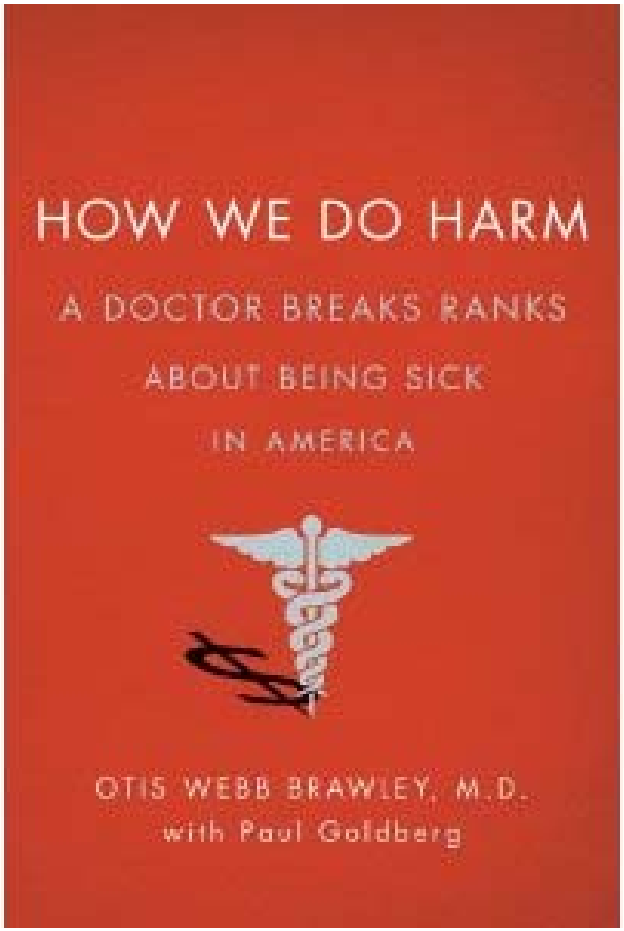
American Cancer Society®

Disclosures

- Employment:
  - American Cancer Society
  - Emory University
  - Turner Broadcasting (CNN)
- Consulting
  - National Institutes of Health
  - Centers for Disease Control
  - Department of Defense


HOW WE DO HARM
A DOCTOR BREAKS RANKS
ABOUT BEING SICK
IN AMERICA
OTIS WEBB BRAWLEY, M.D.
with Paul Goldberg

Harry Hynes, MD, PhD

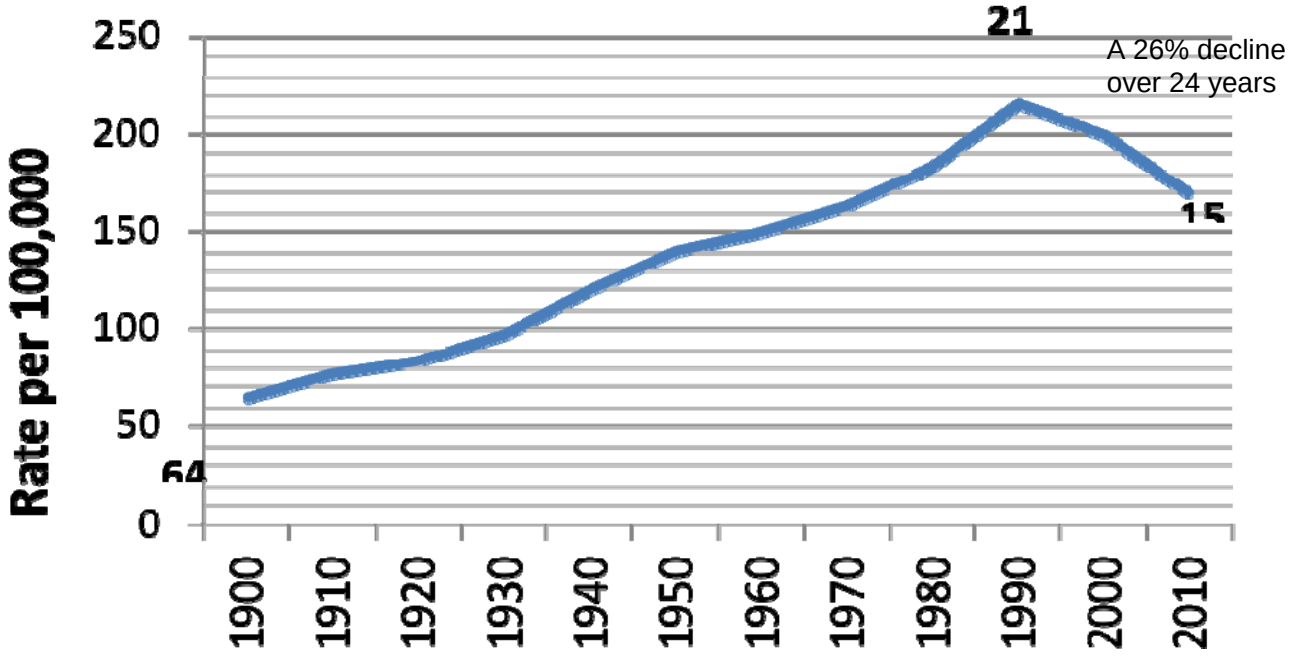
1930-2000

Cancer Center of Kansas

Wichita Community Clincical Oncology Program

US Cancer Death Rate

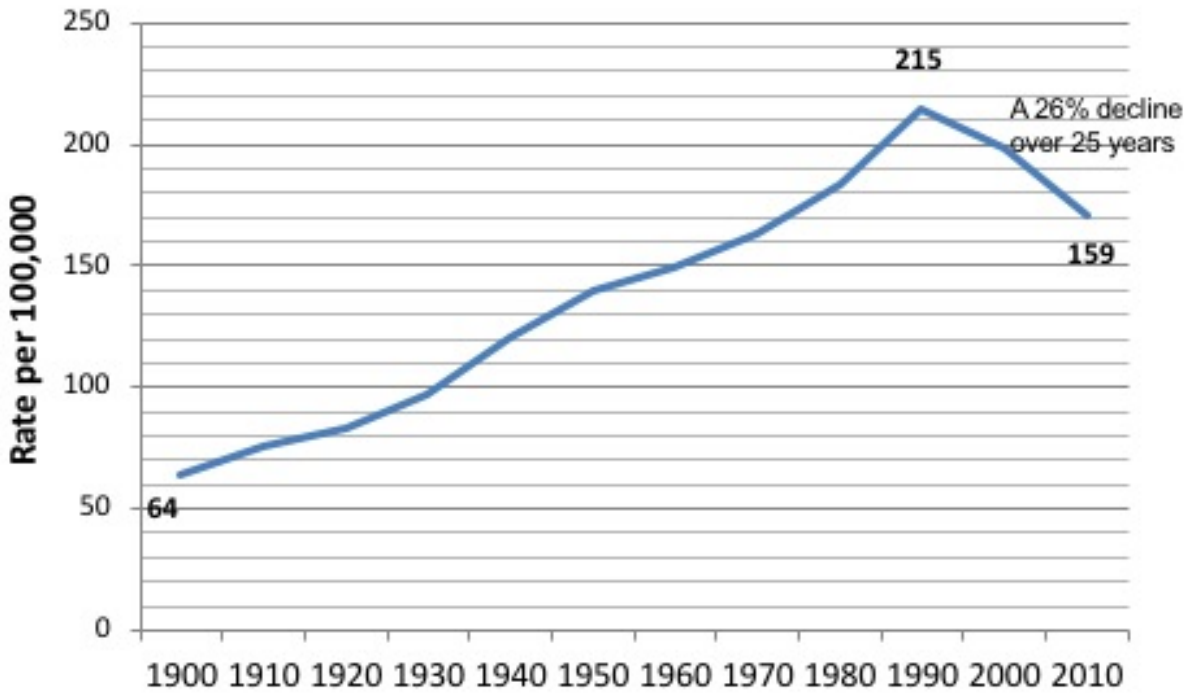
1900 to 2015



1900-1970, US Public Health Service, Vital Statistics of the US, Vol. 1 and Vol 2;
1971-2010, US National Center for Health Statistics, Vital Statistics of the U.S

US Cancer Death Rate

1900 to 2014



1900-1970, US Public Health Service, Vital Statistics of the US, Vol. 1 and Vol 2;
1971-2010, US National Center for Health Statistics, Vital Statistics of the U.S

ACS Cancer Statistics, 2017

A 26% decline in age-adjusted mortality rate over 23 years.

2.3 million Americans did not die a cancer death!

Unfortunate Fact

The US was the 31st country to have a 25% decline in cancer mortality!!!

•Healthcare in many countries aims more at preventing illness.

•Healthcare in many countries has less disparities.

•Compared to other countries, healthcare in the U.S. heavily focuses on screening for, diagnosing and treating illness.

Why the Decline?

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

The Effects of a High Performing Cancer Control Program.

Can we quantify the possibilities?

How many lives can we positively affect, if we had a high performing health system?

ACS Estimates for 2018

- 1.6 million Americans will be diagnosed with cancer this year.
- 610,000 will die of cancer this year.

Fact:

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

- If all Americans had the risk of death of a college educated American, 140,000 people would not die this year?

A Brief History of Health Disparities

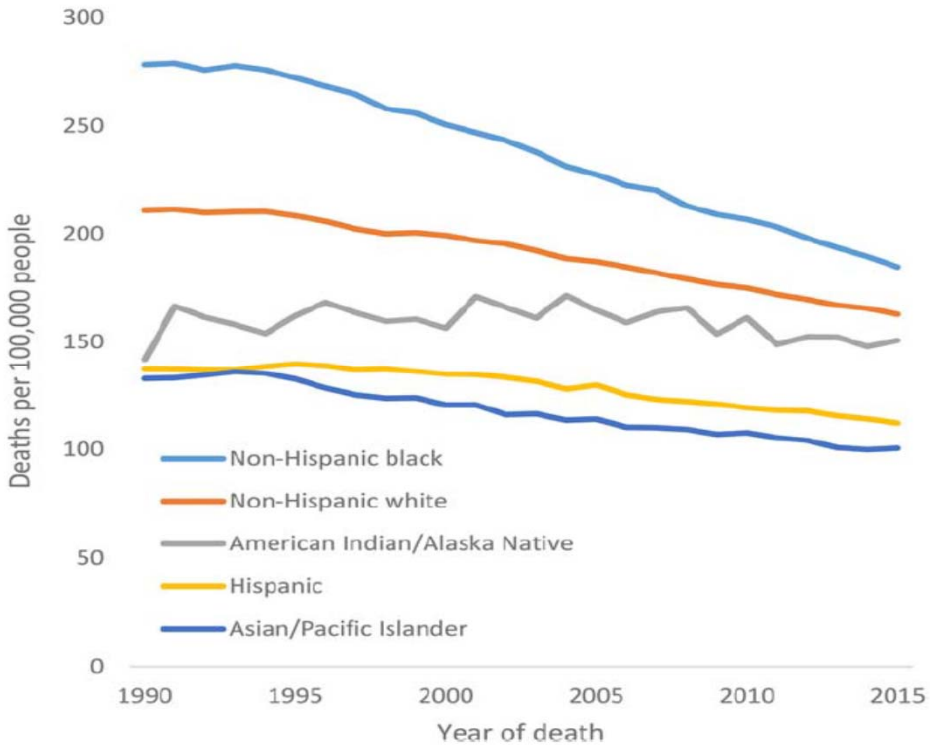
State by State Disparities

- Age Adjusted Death Rate 2015
  - Utah 125 per 100,000
  - Kentucky 195 per 100,000

Notes:

- Race is a sociopolitical category and is not a scientific category
- Black-White Cancer data is available from 1972
- Data is available in the early 1990's onward for Asian/Pacific Islanders, Native Americans and Alaskan Natives, Hispanics, NH Blacks and NH Whites.
- Some of these groups are very heterogenous.
- Data is not available other minority groups.

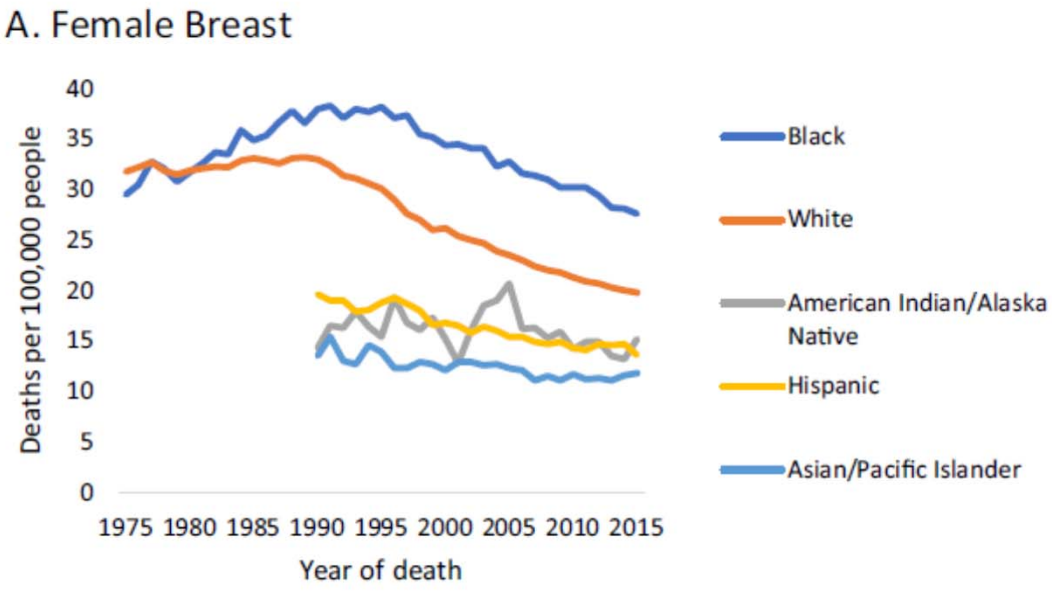
Cancer Mortality by Race/Ethnicity
1990 to 2015



Breast Cancer

39% decline in Death Rate since 1988

Age Standardized Cancer Death Rates 1975 to 2015



Among women with stage I to III breast cancer, under age 65, diagnosed 2004 to 2013. The Median age was 51 for blacks vs 53 for whites

Blacks were more likely to be:

- Uninsured or on Medicaid 22.7% vs. 8.4%
- Have triple negative disease 35.2% vs. 19.3%
- Have larger tumors 16.4% vs 9.8%
- Have higher grade disease 54.4% vs 35.5%
- Being stage II or III 64.2% vs 50.6%

Jemal et al. JCO in press Oct 2017
Source: NCDB

Among women with hormone receptor positive disease, A greater proportion of whites:

- Received surgery 98.8% vs 97%
- Radiation therapy 64.9% vs 63.2%
- Hormone therapy 78.4% vs 70.5%

Jemal et al. JCO in press Oct 2017
Source: NCDB

Among women with hormone receptor positive disease Blacks had 105.1% increased risk of death.

The excess in risk of death attribution:

- 37% insurance
- 23.2% tumor characteristics
- 11.3% comorbidities
- 4.8% treatment differences

Jemal et al. JCO in press Oct 2017

Source: NCDB

Among women with hormone receptor negative disease Blacks had 49.5% increased risk of death.

The excess in risk of death attribution:

- 34.1% insurance
- 22.0% tumor characteristics
- 3.8% comorbidities
- 3.6% treatment differences

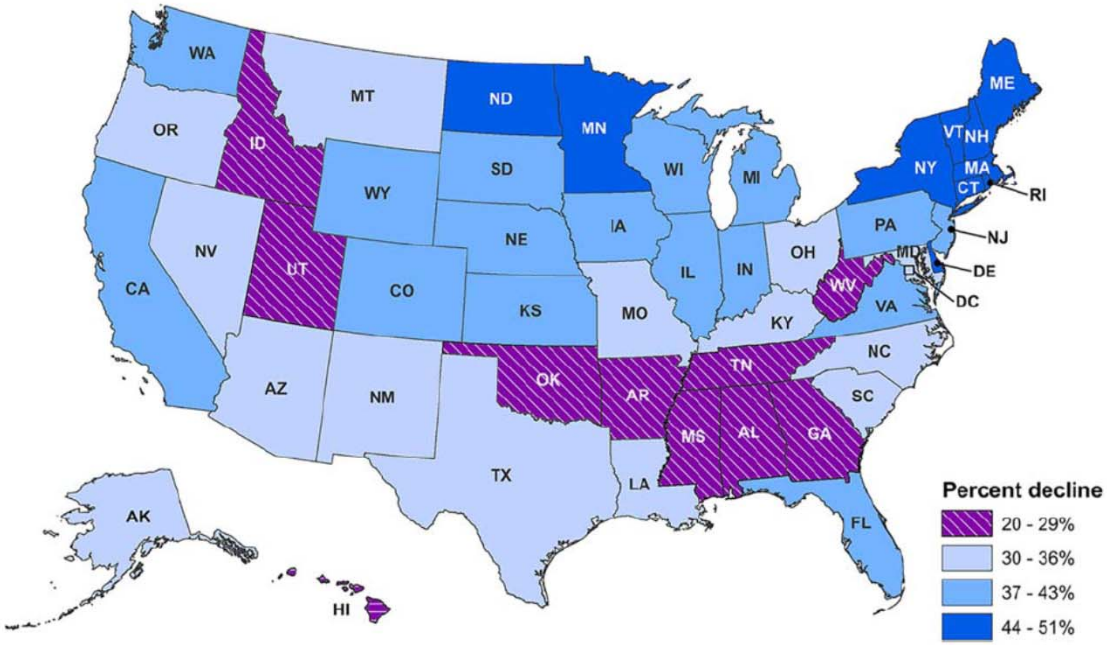
Jemal et al. JCO in press Oct 2017

Source: NCDB

Breast Cancer

39% decline in Death Rate since 1988

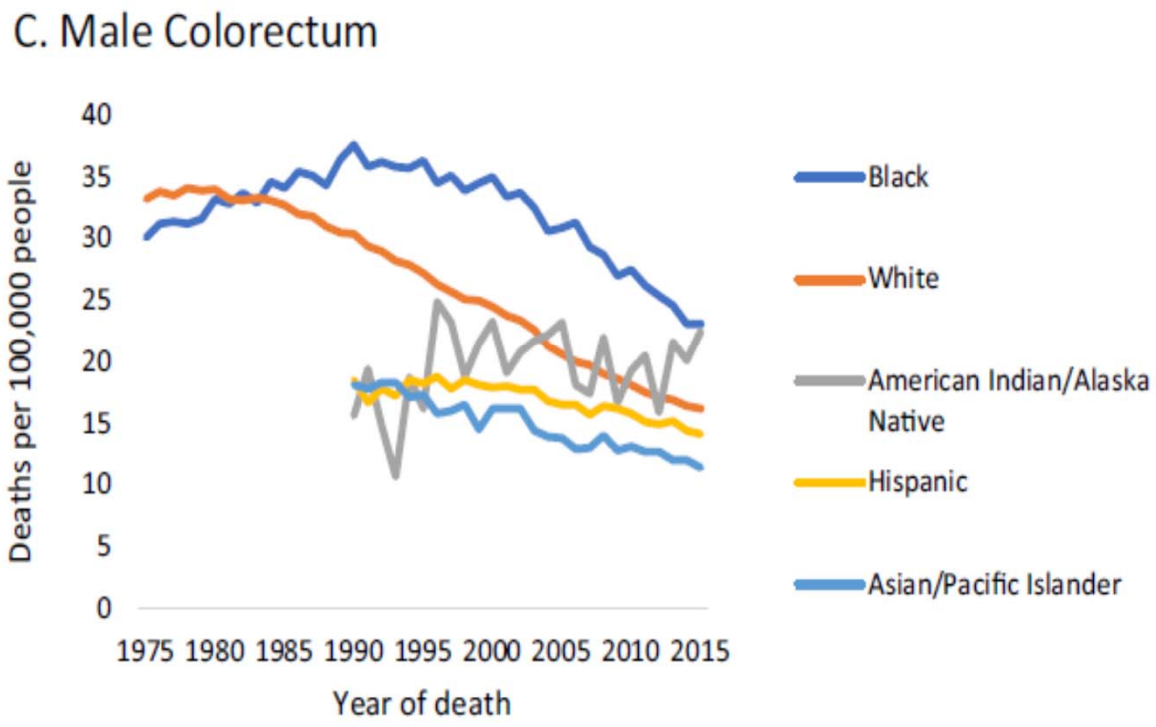
Decline in Breast Cancer Mortality Rate From 1988–90 to 2013–15 by State



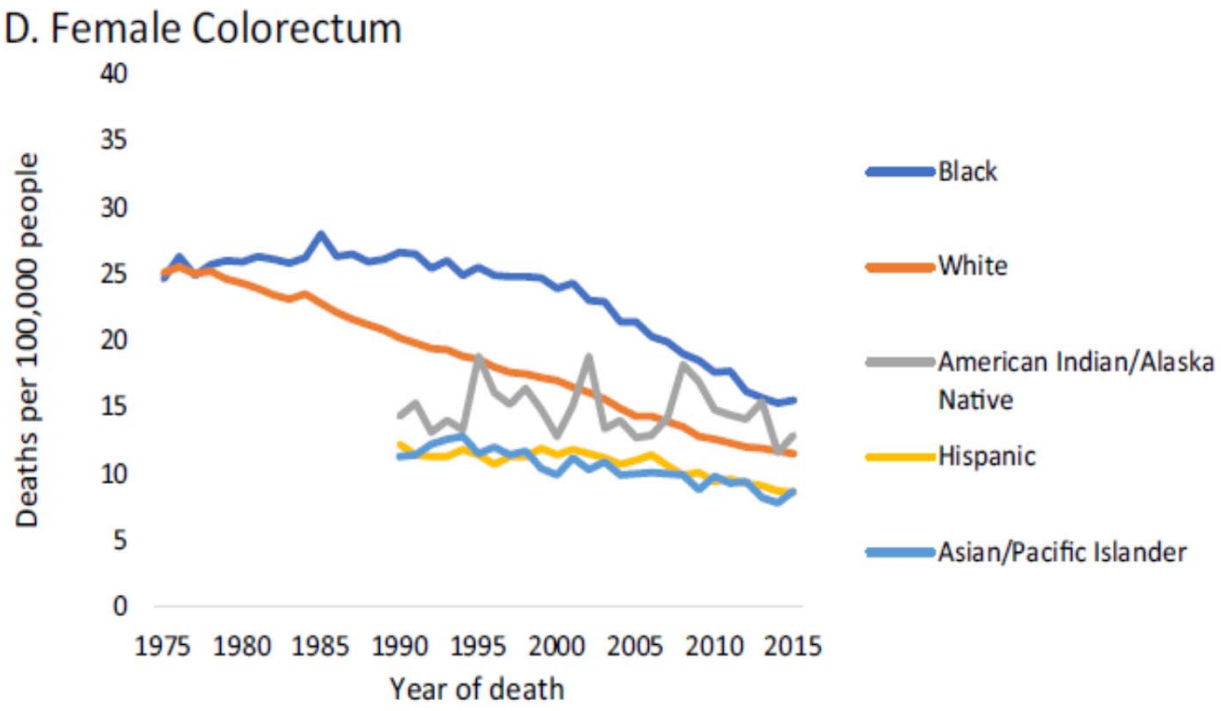
Colorectal Cancer

>52% decline in Death Rate since 1969
51% in men since 1980
56% in women since 1969

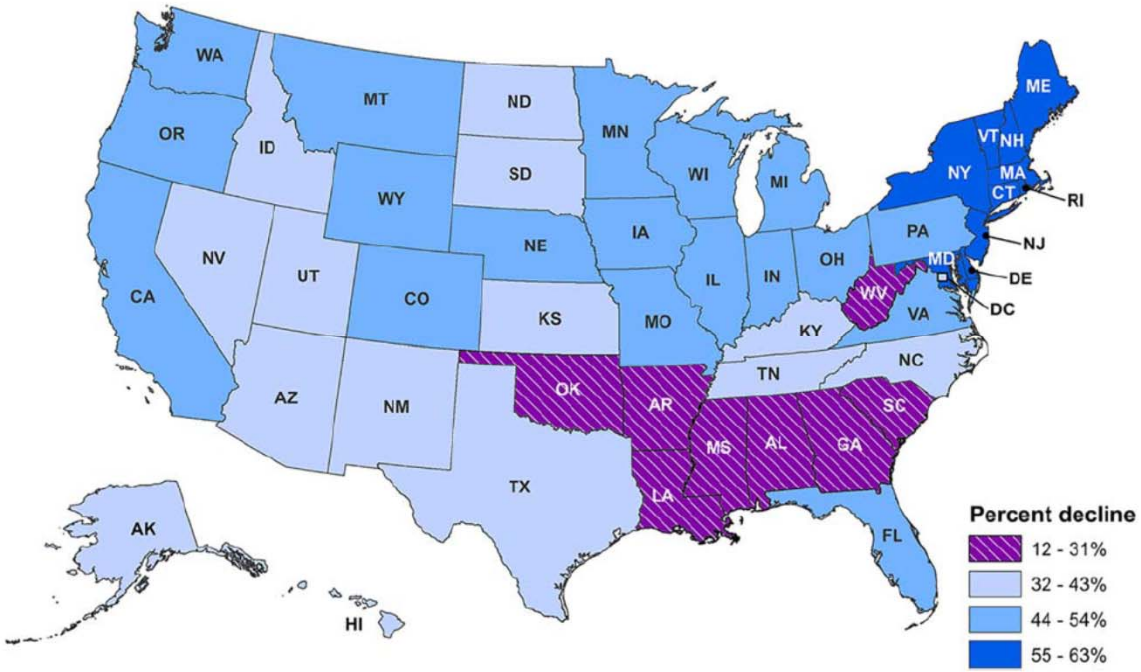
Age Standardized Cancer Death Rates 1975 to 2015



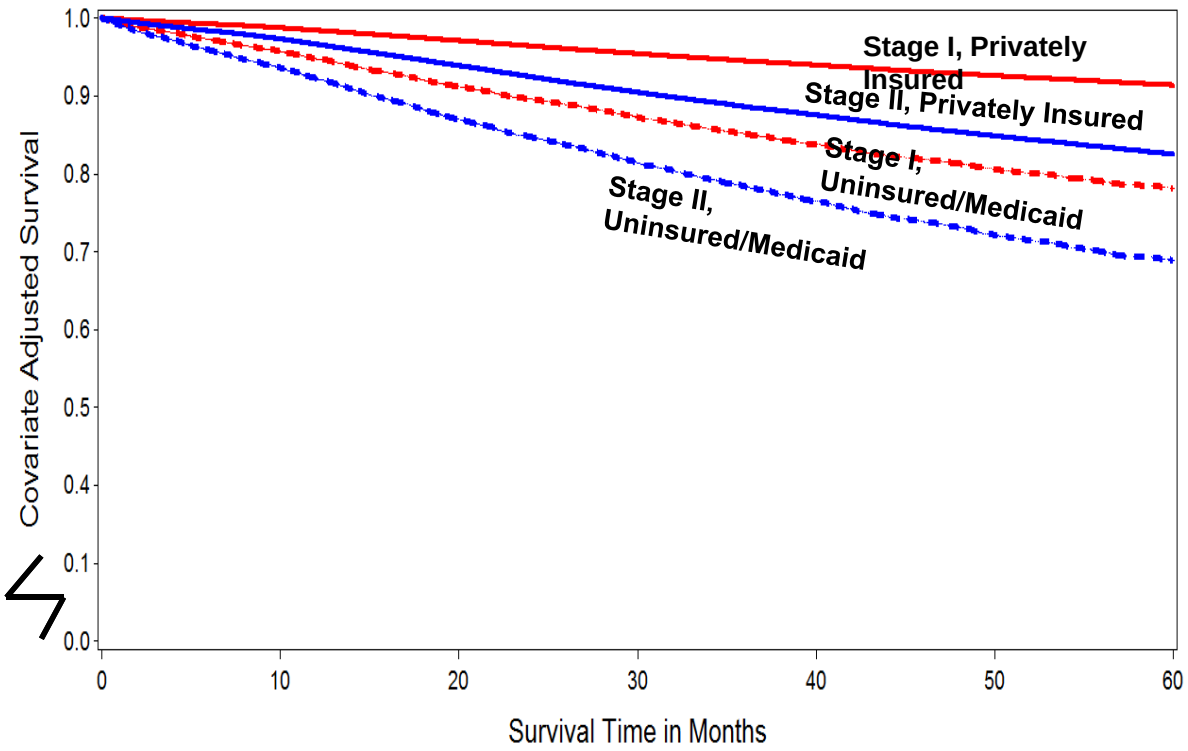
Age Standardized Cancer Death Rates 1975 to 2015



Decline in Colorectal Cancer Mortality Rate From 1980–82 to 2013–15 by State



Adjusted Colorectal Cancer Survival by Stage and Insurance Status, among White Patients 18-64 years Diagnosed from 1999-2000, NCDB

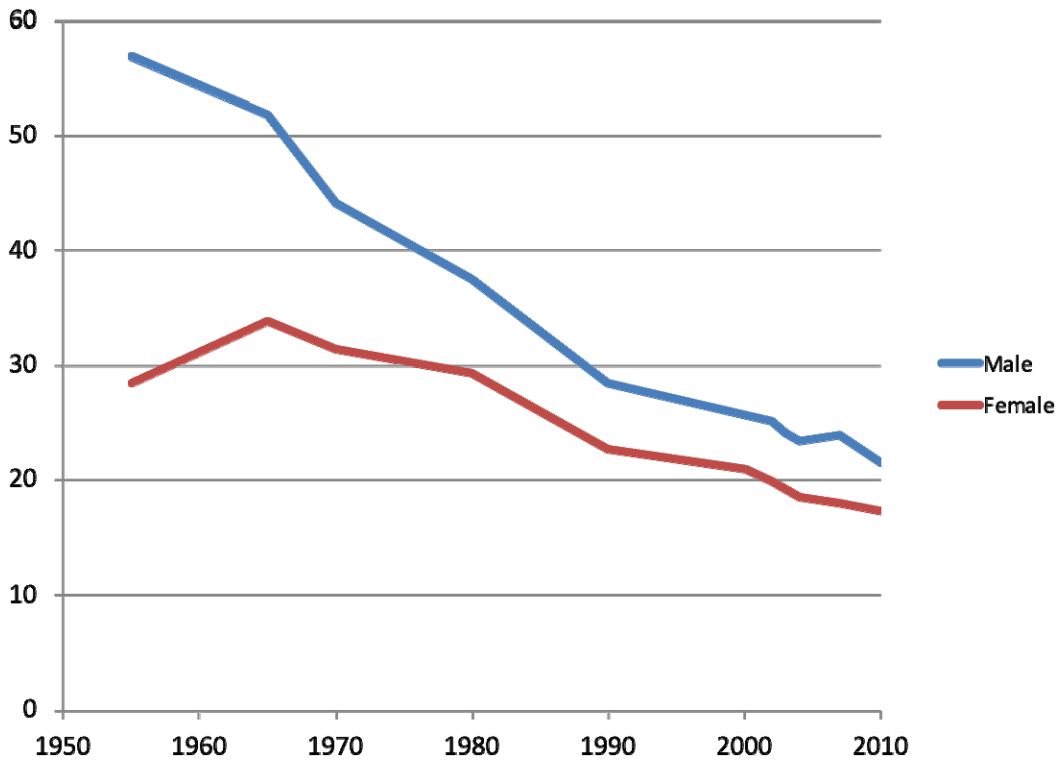


Lung Cancer

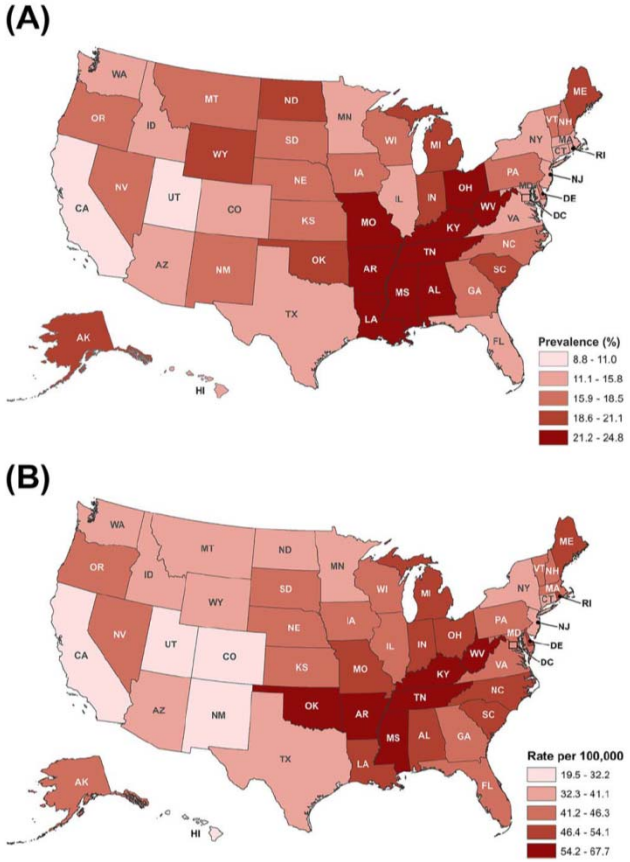
31% decline in Death Rate over all since 1993
45% in men since 1990
19% in Women since 2002

Figure 4B

U.S. Smoking Prevalence by Gender 1955-2010



Adult Smoking Prevalence in 2016 (A) and
Lung Cancer Mortality Rates During 2011-2015 (B).



The Causes of Cancer

The Key to Cancer Prevention!

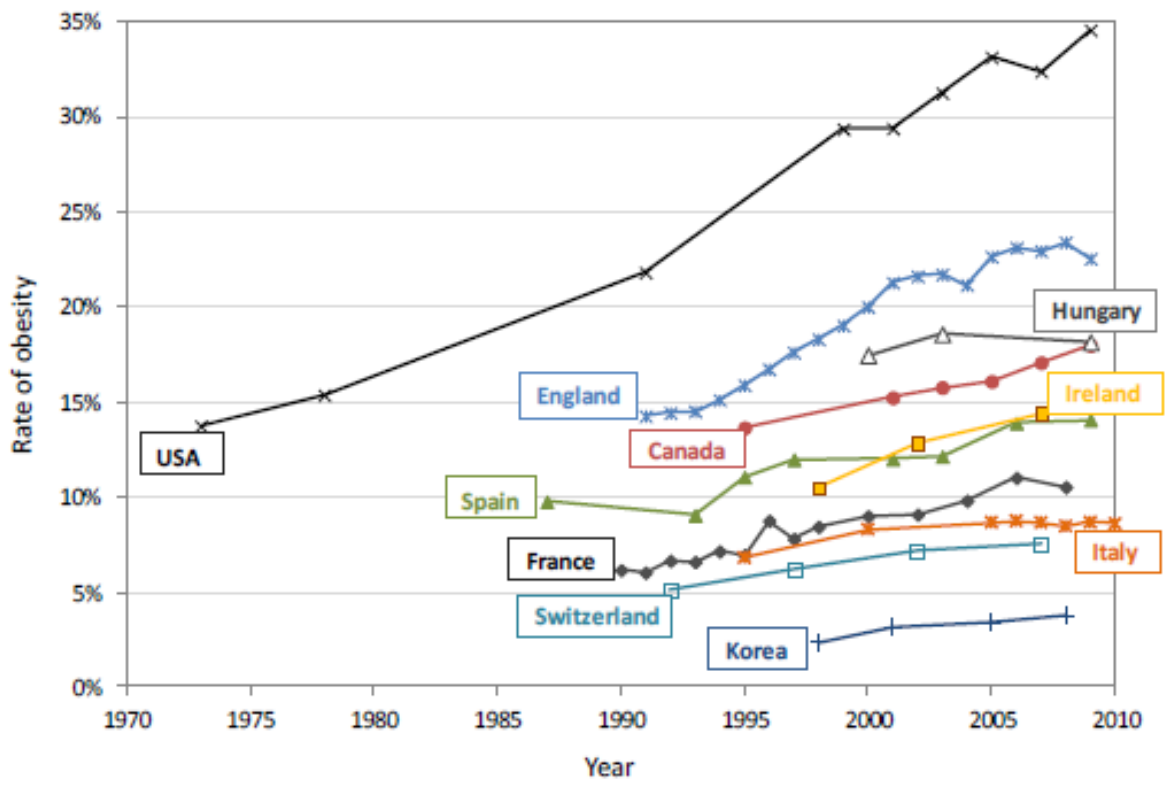
Potentials for Cancer Prevention

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

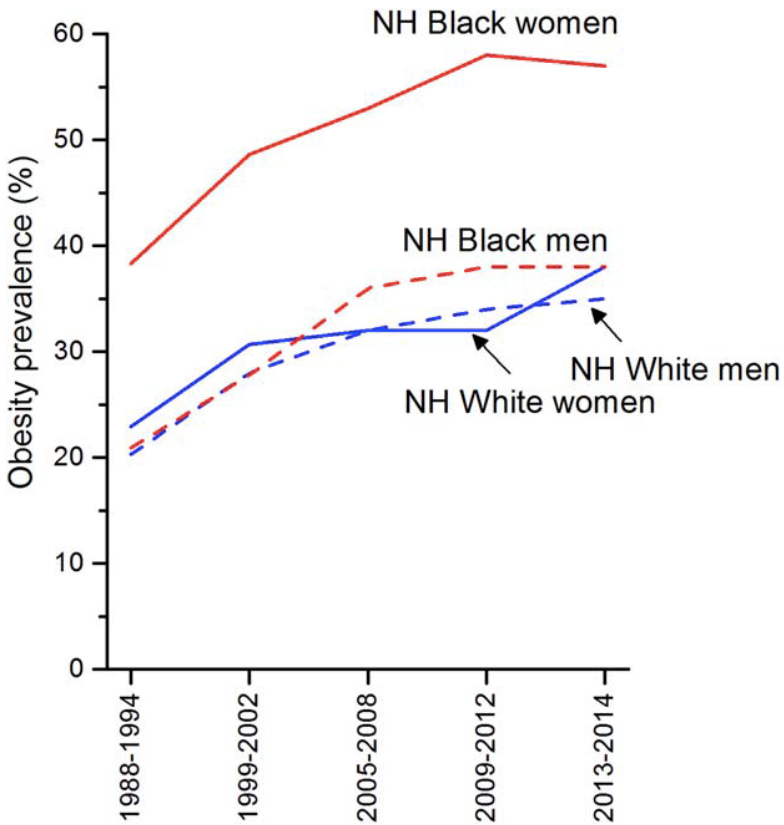
We could reduce cancer deaths 60% by paying attention to known risk factors Modified from Colditz, *Sci Trans Med* 4:127,2012

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

US Continues to Lead the World in Obesity Rates



OECD Obesity Update 2012



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.

The Heritable Fraction of Human Cancers As Estimated By the Scandinavian Twin Registry

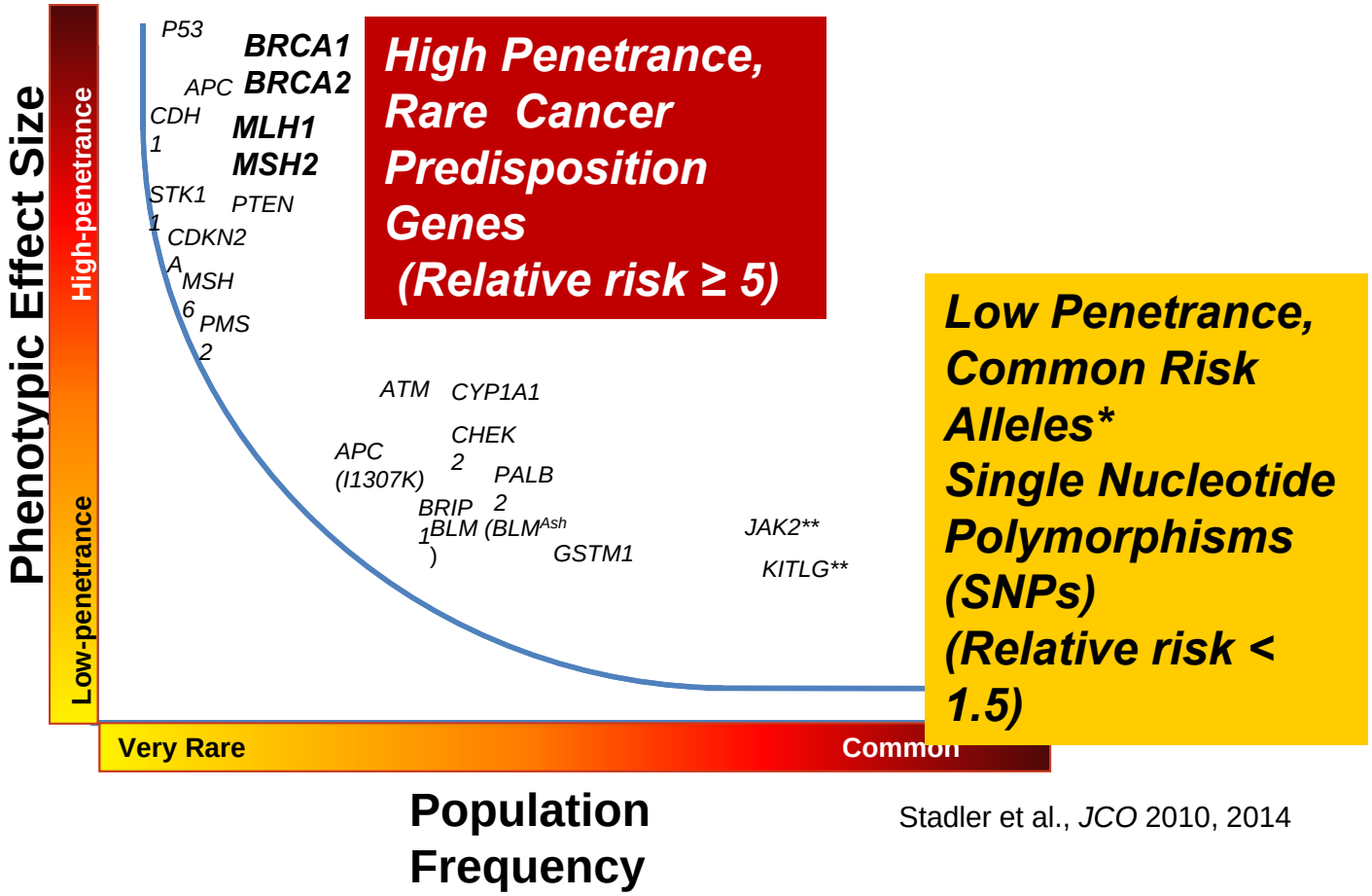
Cancer	Heritable Fraction* n=44,788	Heritable Fraction* n=203,691(**)
Stomach	0.28 (0-0.51)	0.22 (0-55)
Colon	0.35 (0.10-0.48)	0.15 (0-0.45)
Pancreas	0.36 (0-0.53)	-
Lung	0.26 (0-0.49)	0.18 (0-0.42)
Breast	0.27 (0.04-0.41)	0.31 (0.11-0.51)
Cervix	0 (0-0.42)	-
Uterus	0 (0-0.35)	0.27 (0.11-0.43)
Ovary	0.22 (0-0.41)	0.39 (0.23-0.55)
Prostate	0.42 (0.29-0.50)	0.57 (0.51-0.53)
Bladder	0.31 (0-0.45)	0.30 (0-67)
Leukemia	0.21 (0-0.54)	0.57 (0-100)

NEJM 343:78-85, 2000

(**) *JAMA* 2016 315:68-76

**Heritable Fraction= proportion of cancers due to hereditary causes*

Cancer Suceptibility Alleles 2018



Stadler et al., *JCO* 2010, 2014

Kauff, Offit, *NEJM* 2002; 23;346(21):1609-1534

Robson and Offit, *NEJM.* 2007;357(2):154-62.

Couch..Offit *Science* 343: 1466, 2014

The NEW ENGLAND JOURNAL of MEDICINE

CLINICAL PRACTICE

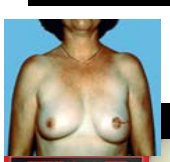
Management of an Inherited Predisposition to Breast Cancer

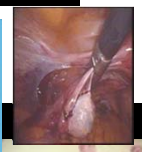
Mark Robson, M.D., and Kenneth Offit, M.D., M.P.H.

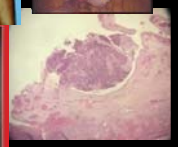
Positive *BRCA1* or *BRCA2* test result

Identify at-risk adult relatives; offer genetic counseling/testing

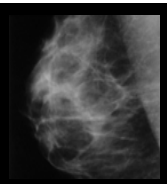
Surgery

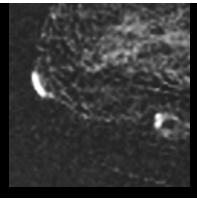






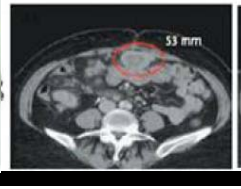
Increased surveillance





Chemo-prevention

Treatment PARP inhib



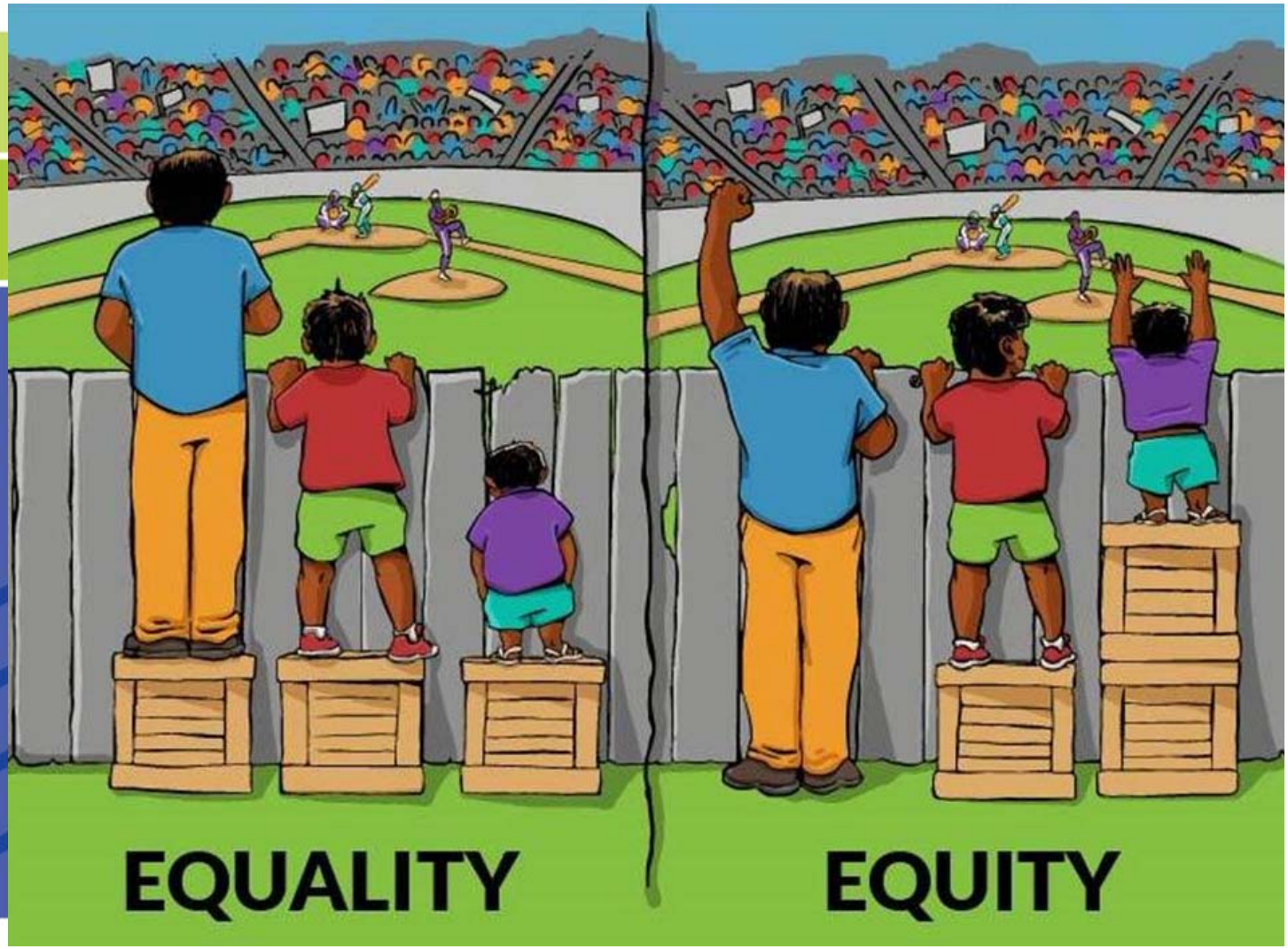
Patient 20, at 4 Mo

Some Interventions for Hereditary Cancers Now Standard Of Care

Tumor site (gene)	Intervention (surgery; drug)
GIST tumor (***KIT***)	**imatinib**
Thyroid (***RET***)	**Thyroidectomy; vandetanib and cabozantinib**
Colon (***APC***)	**Colectomy** (**COX2 investigational**)
Stomach (***CDH1***)	**Gastrectomy**
Kidney (***STK11,VHL***)	Screening; **everolimus** (mTOR)
Basal Cell (***PTCH***)	Screening **vismodegib** (Hedgehog)
Colon (***MSH2***)	Screening, **Colectomy** (**PD-1 blockade, ASA)**
Breast/Ovary (***BRCA1/2***)	Screening, **Mastectomy, Hysterectomy** (PARPi)

The Most Important Question in Health Disparities Research

How Can We Provide Adequate High Quality Care (to Include Preventive Services) to Populations That So Often Do Not Receive It?


EQUALITY
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