Cancer Control in the 21\textsuperscript{st} Century

The Emergence of the Field of Cancer Health Disparities
Disclosures

• Employment:
  • Johns Hopkins University

• Consulting
  • National Institutes of Health
  • Centers for Disease Control
  • Department of Defense
  • Turner Broadcasting (CNN)
HOW WE DO HARM
A DOCTOR BREAKS RANKS
ABOUT BEING SICK
IN AMERICA

OTIS WEBB BRAWLEY, M.D.
with Paul Goldberg
Health Disparities

• The Concept that there are differences in healthcare outcome by population.

• Healthcare outcome
  – Incidence
  – Quality of Life
  – 5 year survival
  – Mortality

• Population can be defined by:
  – Gender
  – Race
  – Socioeconomic Status
  – Area of Residence
Health Disparities

• Differences in Health outcome are due to differences in appropriate:
  – Prevention
  – Screening
  – Diagnostics
  – Treatment

• Note that there is significant inappropriate prevention, screening, diagnostics, and treatment more so in the US than other western countries.
US Cancer Death Rate
1900 to 2016

A 26% decline over 25 years

Age Adjusted to 2000 Standard
Cancer Mortality by Race/Ethnicity from 1990 to 2015

State by State Disparities

Age Adjusted Cancer Mortality Rate 2015

- 125 deaths per 100,000 in Utah
- 195 deaths per 100,000 in Kentucky
Lung Cancer Mortality Rates 2011 to 2015 by State

The US has had a 40% decrease in age-adjusted mortality from 1990 to 2015.
Breast Cancer

In 2019,

269,000 Diagnosed

42,300 Deaths

There has been a 40% decline in age-adjusted female mortality from 1990 to 2016
Breast Cancer Mortality 1975-2015
SEER Data, Age Adjusted to year 2000 Standard

Breast Cancer Mortality Decline from 1988-90 to 2013-2015 by State
There are seven states where B-W mortality differences are no longer statistically significant.

DeSantis et al, CA, 2017
Disparities in Breast Cancer

Disparities in:
- Causes
- Quality of Screening
- Quality of Treatment
  - Surgery
  - Chemotherapy
  - Radiation

Some Americans do not get adequate care!!!
COLORECTAL CANCER
Colon Cancer Screening Saves Lives

• Stool blood testing (three samples per year analyzed in a lab) – results of randomized trials and is really underappreciated

• Sigmoidoscopy (every three to five years) – results of randomized trials

• Colonoscopy (every ten years) – to date no randomized trials

Smith RA et al, CA Cancer J Clin 2015
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.
Female Colorectal Cancer Mortality, 1975-2015
SEER, Age-Adjusted to year 2000 Standard

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

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

Disparities in prevention are a major and underemphasized cause of the differences in health outcomes.
## Potentials for Cancer Prevention

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

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


(*) JNCI 89:287,1997

JAMA 2016 315:68-76
Risk Factors/ Causes of Cancer in U.S.

- Prescription Drugs
- UV and Ionizing Radiation
- Alcohol
- Family History/Genetics
- Viruses
- Occupational Exposure
- Unknown
- Obesity/Poor Nutrition/Inactivity
- Smoking

Colditz, Wolin, Gehlert, Sci Transl Med,
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.


US Continues to Lead the World in Obesity Rates

OECD Obesity Update 2012
## Obesity U.S. 2010

<table>
<thead>
<tr>
<th>Category</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic Blacks</td>
<td>49.6%</td>
<td>37.3%</td>
</tr>
<tr>
<td>Mexican Americans</td>
<td>45.1%</td>
<td>35.9%</td>
</tr>
<tr>
<td>All Hispanics</td>
<td>43.0%</td>
<td>34.3%</td>
</tr>
<tr>
<td>Non-Hispanic Whites</td>
<td>33.0%</td>
<td>31.9%</td>
</tr>
</tbody>
</table>

CDC MMWR, 2011
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

The high availability of cheap calorie dense foods and lack of availability of fruits and vegetables is a major issue in many low SES communities.

Causes of Cancer Mortality Increases

The high availability of cheap calorie dense foods and lack of availability of fruits and vegetables is a major issue in many low SES communities.

- High carbohydrate diets contribute to high caloric intake.
- Red meat is a carcinogen!
- Alcohol is a carcinogen!

A Tsunami of Chronic Disease

Obesity, lack of physical activity and poor diet will surpass tobacco as leading cause of cancer within the next two decades.
A Tsunami of Chronic Disease

- Diabetes
- Cardiovascular Disease
- Orthopedic Disease
- Cancer
Infection and Cancer

- H. Pylori
- Hepatitis B*
- Hepatitis C
- Human Immunodeficiency Virus (HIV)
- Human Herpes Virus 8 (HHV8)
- Epstein-Barr Virus (EBV)
- Human Papilloma Virus (HPV)*
- Schistosomiasis
- Merkel Cell Polyoma Virus

*Vaccine available
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!

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?
THE TRUE COST OF AMERICAN HEALTHCARE (FROM A CANCER DOC!)
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!

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.
