Differences in Cancer Care in the U.S.: The Racial Divide

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Objectives

1. Discuss the factors associated with the increased cancer burden that exists in black adults.
2. Outline the socioeconomic issues that have been implicated in the increased incidence and mortality of cancer in black adults and the rationale behind them.
3. Formulate approaches to reduce the existing disparities in cancer and its treatment in black American adults.
Racial Differences in Cancer:

A Comparison of Black and White Adults in the United States

Robin Hertz, Ph.D
Edith Mitchell, MD, FACP
Total Cancer: Morbidity and Mortality
Incidence Rates for Total Cancers in Men by Race and Age

Source: SEER 1996–2001

Note: Graphs may not begin at age 20 due to sample size limitations.

Note: Excludes basal and squamous skin cancers and carcinomas in situ. This exclusion applies to all analyses.
Incidence Rates for Total Cancers in Women by Race and Age

Source: SEER 1996–2001
Note: Graphs may not begin at age 20 due to sample size limitations
Age-adjusted Total Cancer Mortality Rates by Race and Gender

Total Cancer:
Survival and Prevalence
Five-year Relative Survival for Total Cancers in Men by Race and Age

Note: Graphs may not begin at age 20 due to sample size limitations.
Five-year Relative Survival for Total Cancers in Women by Race and Age


Note: Graphs may not begin at age 20 due to sample size limitations.
Total Cancer-Attributable Spending
Annual Direct Medical Spending for Total Cancer Treatment by Race and Payment Source, Age 40–64

**Black**
- Medicare: $0.38B (11.5%)
- Medicaid: $0.69B (21.1%)
- Self-pay: $0.06B (1.8%)
- Other public: $0.10B (3.0%)
- Other: $0.01B (0.3%)

**White**
- Medicare: $1.25B (10.9%)
- Medicaid: $0.40B (3.5%)
- Self-pay: $0.96B (8.4%)
- Other public: $0.42B (3.7%)
- Other: $0.16B (1.4%)

Total annual spending = $3.26B
Total annual spending = $11.50B

Source: MEPS 1998–2002 annual average
Direct medical spending adjusted to year 2002 dollars
Note: Percents and spending may not add to totals because of rounding
Annual Direct Medical Spending for Total Cancer Treatment by Race and Payment Source, Age 65 and Older

**Black**
- Private: $0.18B (16.5%)
- Other public: $0.12B (10.9%)
- Other: $0.03B (2.3%)
- Medicaid: $0.16B (14.9%)
- Self-pay: $0.04B (3.8%)
- Medicare: $0.57B (51.6%)

**White**
- Private: $0.75B (5.6%)
- Other public: $0.37B (2.7%)
- Other: $0.04B (0.9%)
- Medicaid: $0.12B (18.1%)
- Self-pay: $0.65B (4.8%)
- Medicare: $9.21B (68.0%)

Total annual spending = $1.10B
Total annual spending = $13.56B

Source: MEPS 1998–2002 annual average
Direct medical spending adjusted to year 2002 dollars
Note: Percents and spending may not add to totals because of rounding.
Total Cancer Summary

- Blacks more likely than whites to be diagnosed with cancers

- Despite overall decreases in cancer death rates over the past decade, age-adjusted total cancer mortality is higher in blacks than whites

- Blacks less likely than whites to be diagnosed with cancer at an early stage and are also less likely to survive five years after being diagnosed with cancer
Breast Cancer
Breast Cancer Incidence Rates by Race and Age

Source: SEER 1996–2001
Note: Graphs may not begin at age 20 due to sample size limitations
Five-year Relative Survival in Women With Breast Cancer by Race and Age


Note: Graphs may not begin at age 20 due to sample size limitations.
Breast Cancer Summary

- Although the incidence of breast cancer is lower among black women than white women, black females have higher mortality and lower five-year relative survival.
- Breast cancer in black women is less likely to be diagnosed in the local stage compared with white women.
- Five-year relative survival rates are approximately ten percentage points lower for black women than for white women in each age group.
Uterine Cervix Cancer
Uterine Cervix Cancer Incidence Rates by Race and Age

Source: SEER 1996–2001
Epidemiology

- Breast cancer is the most common female cancer in the United States
- In 2008:
  - An estimated 182,460 new cases of invasive breast cancer will be diagnosed
  - 40,480 breast cancer deaths
- Lifetime risk is approximately 1 in 8 for developing invasive breast cancer

Breast Cancer Deaths 1930 – 2003

- On the decline since the 1990s
  - Decrease of 3.3% per year in women < 50 years
  - Decrease of 2.0% per year in women ≥ 50 years

## Higher Mortality in African-Americans

<table>
<thead>
<tr>
<th></th>
<th>Caucasian</th>
<th>African American</th>
<th>Asian and Pacific Islander</th>
<th>American Indian and Alaskan Native</th>
<th>Hispanic and Latino</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incidence per 100,000</strong></td>
<td>130.8</td>
<td>111.5</td>
<td>91.2</td>
<td>94.4</td>
<td>92.6</td>
</tr>
<tr>
<td><strong>Mortality per 100,000</strong></td>
<td>25.4</td>
<td><strong>34.4</strong></td>
<td>12.3</td>
<td>13.8</td>
<td>16.3</td>
</tr>
</tbody>
</table>

Incidence and Mortality by Race and Ethnicity: 2000 – 2004

Trends in 5 Year Survival:

The 5-year survival has increased in all races over the last 30 years.

<table>
<thead>
<tr>
<th>Years</th>
<th>Caucasian</th>
<th>African American</th>
<th>All Races</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975-1977</td>
<td>76%</td>
<td>63%</td>
<td>75%</td>
</tr>
<tr>
<td>1974-1986</td>
<td>80%</td>
<td>65%</td>
<td>79%</td>
</tr>
<tr>
<td>1996-2002</td>
<td>90%</td>
<td>77%</td>
<td>89%</td>
</tr>
</tbody>
</table>

SEER, Epidemiology and End Results Program 1975-2003. Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, Maryland, 2006.
Risk Factors
Overall Results:

- African American, Hispanic, & American Indian women were younger and heavier
- Minority women less likely to use alcohol
- Age at 1st birth greater in Whites & Asians
- White women had more mammograms
Clinical Phenotypes
Differences amongst ethnic groups:
WHI Observation Study—Chlebowski, 2005

- Tumor size, histology, stage – no difference
- African–American vs. White women
- Histologic Grade
  - Lower incidence of well differentiated (HR = 0.52) & mod
differentiated (HR = 0.59)
  - Higher incidence of poorly differentiated (HR= 1.36)
- Hormone Receptor Status:
  - Lower incidence of ER+ (HR= 0.72) & PR+ (HR=0.63)
  - Higher incidence of ER− (HR=1.54)
National Cancer Data Base
M.C. Lee et al, 2007 Breast Cancer Symposium

- Data base maintained by ACS and CoC (American College of Surgeons)
- 70% of cases reported in US
- >1,600 hospitals in all 50 states
- 170,079 cases – in situ and invasive diagnosed 1998
NCDB: Age Distribution of Breast Cancer Cases

- **White American**
  - <45: 13.2%
  - 45-60: 33.7%
  - 61-80: 43.2%
  - >80: 9.9%

- **African American**
  - <45: 22.0%
  - 45-60: 36.8%
  - 61-80: 34.2%
  - >80: 6.4%
NCDB: Stage Distribution

Stage of Diagnosis

- Stage 0: 15.6% (White American), 15.3% (African American)
- Stage I: 42.1% (White American), 28.9% (African American)
- Stage II: 29.7% (White American), 35.4% (African American)
- Stage III: 6.1% (White American), 10.6% (African American)
- Stage IV: 3.3% (White American), 5.9% (African American)
<table>
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<tr>
<th>Histologic grade</th>
<th>African American (%)</th>
<th>White American (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-differentiated</td>
<td>10.5</td>
<td>16.1</td>
</tr>
<tr>
<td>Moderately differentiated</td>
<td>25.9</td>
<td>32.2</td>
</tr>
<tr>
<td>Poorly differentiated</td>
<td>38.0</td>
<td>27.4</td>
</tr>
</tbody>
</table>
NCDB: Frequency of ER-Negative Tumors in AA and WA Cases Stratified by Stage ($p<0.01$)
NCDB: Frequency of ER-Negative Tumors in AA and WA Cases Stratified by Income (p<0.01)
Summary of NCDB Findings

- African American compared to White American breast cancer patients:
  - Younger age distribution
  - More advanced stage disease at presentation
  - Increased risk for biologically-aggressive tumors
    - Higher frequency of ER-negative tumors
    - Increased frequency of high-grade tumors
  - These findings are consistent across all age, stage, and income variables
Molecular Phenotypes………..
Molecular Portrait of Breast Cancers

"Intrinsic" gene set on 78 single tumor samples

5 “clusters”
- Basal-like
- HER-2
- "Normal"
- Luminal B
- Luminal A

476 cDNA clones

85 Arrays
Gene Expression Patterns of Breast Carcinomas Predict Survival

Adapted from Sorlie et al. PNAS, 2001
Triple-Negative Disease
ER−, PR−, and HER2 Negative

- Unique characteristics
  - Comprises about 15% of all breast cancers
    - 39% young African American women
  - Linked to BRCA1 mutation carriers
  - High grade and highly proliferative
    - Poor prognosis
  - High risk of early distant relapse

Differences in breast carcinoma characteristics in newly diagnosed African-American and Caucasian patients; a single-institution compilation compared with the National Cancer Institute SEER database (Morris, Mitchell et al).

• **Results**: More AA pts presented with advanced stage (AS) tumors in both databases, and higher histologic grade (p<0.001) and nuclear grade than C pts (p<0.001).

• AA pts had lower ER-positivity (51.9% vs. 63.1%, p<0.001) but significantly higher ki-67 (42.4% vs. 28.7%, p<0.001) and p53 expression (19.4% vs. 13.1%, p<0.05) than C pts with all stages of tumors.

• Basal or “triple-negative” breast cancer phenotype was found to be more common in AA pts as compared with C pts (20.8% vs 10.4%, p<0.0001), associated with higher histologic and nuclear grade (p<0.0001).
Differences in breast carcinoma characteristics in newly diagnosed African–American and Caucasian patients; a single-institution compilation compared with the National Cancer Institute SEER database.

Conclusions: AA pts with invasive breast carcinomas are more likely to present with later stage, higher grade, higher ki–67 expression, and less likely to have ER positivity than C pts in both the NCI SEER and TJUH databases. Due to these disparate presentations, molecular studies which may explain these differences, and correlations with survival, are proposed.
Colon and Rectum Cancer
Colon and Rectum Cancer Incidence Rates in Men by Race and Age

Source: SEER 1996–2001
Note: Graphs may not begin at age 20 due to sample size limitations.
Colon and Rectum Cancer Incidence Rates in Women by Race and Age

Source: SEER 1996–2001
Note: Graphs may not begin at age 20 due to sample size limitations.
Five-year Relative Survival in Men With Colon and Rectum Cancer by Race and Age


Note: Graphs may not begin at age 20 due to sample size limitations.
Five-year Relative Survival in Women With Colon and Rectum Cancer by Race and Age

Note: Graphs may not begin at age 20 due to sample size limitations.

Jefferson Kimmel Cancer Center
NCI-CC

NCI-CC

NCI-CC
Antiangiogenic Therapy With Bevacizumab in Preclinical Models

BEvacizumab binds to VEGF to prevent neovascularization and inhibition of tumor growth.

Tumor vascularization allows rapid tumor growth and metastasis.

VEGF secreted by tumors and nearby stromal cells stimulates angiogenesis.

E3200: Bevacizumab + FOLFOX4

Previously treated mCRC (N=829)

RANDOMIZE

FOLFOX4 + bevacizumab
(BEV 10 mg/kg Q2W)
(n=289)

FOLFOX4
(n=290)

Bevacizumab
(10 mg/kg Q2W)
(n=243)

Stratified by study center, ECOG PS, prior XRT

E3200: Overall Survival

HR = 0.76
A vs B: p = 0.0018
B vs C: p = 0.95

Giantonio BJ, et al. ASCO 2005
E3200: Progression-Free Survival

HR = 0.64
A vs B: \( p < 0.0001 \)
B vs C: \( p < 0.0001 \)

Giantonio BJ, et al. ASCO 2005
Integrating Minority Populations and Gender into KCC Cancer Studies

- Minority Populations
- Community Outreach and Education
- Partnerships/Strategies to Overcome Barriers
- Increasing Accrual
- Molecular Studies Pharmacology
- Epidemiology Statistics

Cancer Studies
Resources to Enhance Diversity and Assist Minority Populations

Breast Cancer Video
“African-American Women CAN Beat Breast Cancer”
- Developed in partnership with Region II of the NMA and the Eastern Cooperative Oncology Group.
- Recipient of the
  - 2001 Aegis Award for outstanding video production
  - 2001 Bronze Telly, one of the most sought after awards in the television and video industries.

“The Colon Cancer Puzzle: Putting all the right pieces together to beat it”
- Received Bronze Telly in the Health and Wellness category of 2004 Bronze Telly.

“A Guide to Clinical Trials for Cancer Patients”

“Guía de Ensayos Clínicos para Pacientes con Cancer”

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All KCC Colorectal Accrual by Year: White vs Black

- **1998**
  - White: 90
  - Black: 8

- **2005**
  - White: 161
  - Black: 89

**Legend:**
- Blue: White
- Red: Black
Summary
Current Status

- Blacks more likely than whites to be diagnosed with malignancy
- Despite overall decreases in cancer death rates over the past decade, age-adjusted total cancer mortality is higher in blacks than whites
- Blacks less likely than whites to be diagnosed with cancer at an early stage and are also less likely to survive five years after being diagnosed with cancer
- Blacks less likely than whites to be screened for cancer
- Black men with a history of cancer are more likely than their white counterparts to have smoked
- Blacks with cancer history have higher rates of both high blood pressure and diabetes
- Blacks are more likely than whites never to have been screened for prostate cancer and are more likely to develop prostate cancer before age 50
- Blacks experience higher incidence and mortality, and lower five-year survival for cancers of the prostate, colon and rectum, lung and bronchus, and uterine cervix
- Although the incidence of breast cancer is lower among black women than white women, black females have higher mortality and lower five-year relative survival
- Cervical cancer rates increase with age for black women, but not white women
Future Directions

- Increase participation in clinical trials
- Design and implement cancer prevention trials applicable to specific populations
- Create a climate that enhances accrual and retention of minority participation
- Expand opportunities for access and participation to underserved populations
- Define and understand possible biological and molecular differences
- Enhance cultural competence
- Expand collaborations with healthcare providers in underserved populations
- Apply existing cancer control measures
- Institute standard guidelines for diagnosis and treatment
- Maximize supportive care and hospice use
Acknowledgements

- ECOG
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- Patients who participated in trials
Questions?

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