Underrepresentation of minorities in GEP research and disparities in breast cancer outcomes

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No relationships to disclose

Black-White Disparities in Breast Cancer

Second leading cause of cancer-related deaths for women in the U.S.

http://www.cdc.gov/cancer/dpcpdata/women.htm

Compared to white women, black women have

- Lower incidence rates
- Higher mortality rates

<table>
<thead>
<tr>
<th>Racial/Ethnic Group</th>
<th>Incidence</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>127.8</td>
<td>25.5</td>
</tr>
<tr>
<td>African American/Black</td>
<td>118.3</td>
<td>33.8</td>
</tr>
<tr>
<td>White</td>
<td>132.5</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Female Breast Cancer Incidence and Death Rates, 2000-2004

NCI Cancer Health Disparities Factsheet

Biomedical & sociomedical factors in black–white patient BC disparities


**Breast Cancer Biology**

- Black women
  - Have Higher rates of ER-, triple-negative BC
- Earlier age at incidence
- Diagnosis at later stages?
- Higher mortality, regardless of ER status
- Genetic factors?
- Racial identity/lived experience

**Social Determinants**

Social disadvantage is associated with:
- Poor health outcomes
- More aggressive cancers
- Less access to care/new technologies
- Toxic exposure, poor nutrition, chronic stress, generalized vulnerability, etc.
- Epigenetics
- Social disadvantage + race

**Gene Expression Profiling (GEP) of breast tumors**

- Personalized medicine technique
- Identifies the expression of a set of genes in a biologic sample using microarray technology
- Marchionni et al 2008, Sotiriou et al 2009
- Used to predict risk of recurrence and guide chemotherapy treatment

**Gene Expression Profiling (GEP) of breast tumors**

- GEP uptake is rapidly growing
- New start for diffusion of technology?

**GEP Prognostic Tests for Recurrence and Tx response**

- Oncotype DX: ER+, node-negative disease; adjuvant chemotherapy.
- H/I Ratio Signature and Breast Cancer Profiling Test: ER+ disease; endocrine therapy.
- MammaPrint: Early-stage ER+ and ER- node-negative disease, adjuvant chemotherapy. Fresh or frozen tissue only

**Methods**

- 20 studies (2004-7) from Evaluation of Genomic Applications in Practice and Prevention Program (EGAPP) report “Impact of GEP tests on breast cancer outcomes.”
- Abstracted race/ethnicity, ER status
Results: Race/Ethnicity
22 studies, 6500+ participants
• 6 studies reported race/ethnicity
  471 (23%) participants coded nonwhite (6% of total participants)
  127 (6%) participants coded black/AA (2% of total participants)
• 1 study looked at race and outcomes

Results: ER +/- Status
22 studies
• 12 studies reported ER status
  918 ER- cases (14% of total)
• 2 stratified by ER status (H/I ratio)
  No association found ER- and outcome

Exclusion from benefits of GEP research?
• Race

Exclusion from GEP Technology?
• Racial differences in genomic testing? ---Lund et al., 2011
• Oncotype Dx
  — Most commonly-used test in US
  — Not approved for ER-
• Only MammaPrint is approved for ER-
  — Requires fresh/frozen tissue
  — Not tested in nonwhite populations
  — May not be predictive in triple-negative BC

Future Perspectives in Personalized Medicine
• Need more information about the utility of GEP in diverse populations
• Lack of well-validated evidence base could exacerbate growing disparities
• Studies should adequately enroll and analyze diverse populations
• Policy-makers should explore social and health system policies to ensure universal access and benefit

Future Perspectives
• Truly personalized medicine
  — Genetic, social, environmental factors, emerging technologies
  — Potential to improve population health and reduce disparities
• Let’s get it right!
Thanks

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