A California Roadmap For Identifying Chemicals That Affect Breast Cancer Risk

Symposium co-organizers:
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Megan Schwarzman, MD, MPH

Natural Resources Defense Council (NRDC)
UC Berkeley, Center for Occupational and Environmental Health
### US Mortality, 2006

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of Death</th>
<th>No. of deaths</th>
<th>% of all deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Heart Diseases</td>
<td>631,636</td>
<td>26.0</td>
</tr>
<tr>
<td>2.</td>
<td>Cancer</td>
<td>559,888</td>
<td>23.1</td>
</tr>
<tr>
<td>3.</td>
<td>Cerebrovascular diseases</td>
<td>137,119</td>
<td>5.7</td>
</tr>
<tr>
<td>4.</td>
<td>Chronic lower respiratory diseases</td>
<td>124,583</td>
<td>5.1</td>
</tr>
<tr>
<td>5.</td>
<td>Accidents (unintentional injuries)</td>
<td>121,599</td>
<td>5.0</td>
</tr>
<tr>
<td>6.</td>
<td>Diabetes mellitus</td>
<td>72,449</td>
<td>3.0</td>
</tr>
<tr>
<td>7.</td>
<td>Alzheimer disease</td>
<td>72,432</td>
<td>3.0</td>
</tr>
<tr>
<td>8.</td>
<td>Influenza &amp; pneumonia</td>
<td>56,326</td>
<td>2.3</td>
</tr>
<tr>
<td>9.</td>
<td>Nephritis*</td>
<td>45,344</td>
<td>1.9</td>
</tr>
<tr>
<td>10.</td>
<td>Septicemia</td>
<td>34,234</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*Includes nephrotic syndrome and nephrosis.

2009 Estimated US Cancer Cases*

Men
766,130

Women
713,220

27% Breast (1 in 8 women)
14% Lung & bronchus
10% Colon & rectum
6% Uterine corpus
4% Non-Hodgkin lymphoma
4% Melanoma of skin
4% Thyroid
3% Kidney & renal pelvis
3% Ovary
3% Pancreas
22% All Other Sites

*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
Source: American Cancer Society, 2009.
### 2009 Estimated US Cancer Deaths*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Estimated Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>292,540</td>
</tr>
<tr>
<td>Women</td>
<td>269,800</td>
</tr>
</tbody>
</table>

#### Cancer Sites and Percentages

- **26%** Lung & bronchus
- **15%** Breast
- **9%** Colon & rectum
- **6%** Pancreas
- **5%** Ovary
- **4%** Non-Hodgkin lymphoma
- **3%** Leukemia
- **3%** Uterine corpus
- **2%** Liver & intrahepatic bile duct
- **2%** Brain/ONS
- **25%** All other sites

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ONS=Other nervous system.  
Source: American Cancer Society, 2009.
Why focus on breast cancer?

- Most breast cancer is not caused by inherited genes
- Increasing recognition that environmental exposures contribute to the development of disease
- Over 200 chemicals have been associated with mammary (breast) cancer in laboratory studies.
California Breast Cancer Research Program (CBCRP)

- Established by the California Legislature in 1993 to administer funding for breast cancer research in the State of California.
- Largest state-funded research effort in the nation
- Funded through the tobacco tax, voluntary tax check-off on personal income tax forms, and individual contributions
- Make grants for California scientists and community researchers to find better ways to prevent, treat and cure breast cancer
- Supports new approaches that other agencies may be reluctant to support.
- Since 1994, the CBCRP has awarded over $205 million in 860 grants to 98 institutions across the state.
A $23 million research effort to find answers to:

- What role does the environment play in breast cancer?
- Why do some groups of women bear a greater burden of disease?
Project goals

1. Develop an approach to chemical hazard identification based on currently available methods for detecting chemicals that may raise the risk of breast cancer;

2. Identify data gaps and research needs to improve chemical decision-making, including informing a shift toward rapid screening methods performed without laboratory animals.

3. Pilot a project model that could be applied to other disease endpoints, with the ultimate goal of producing a comprehensive approach to chemical hazard identification.
Process

- Core and Expert Panel created.
- Identification of Biological Pathways Relevant to Development of Breast cancer
- Identification of Toxicity Assays
- Development of a Toxicity Testing Approach
- Prioritizing Chemicals for Testing
End products

• Publicly available report to funder intended for state of California to inform Green Chemistry Initiative Process
• Peer-reviewed publications
• Pilot a model that can be used for other disease endpoints – creating a comprehensive toxicity testing approach.
BCCP Panel members

- Sarah Janssen*, MD, PhD, MPH University of California San Francisco & Natural Resources Defense Council
- Megan Schwarzman*, MD, MPH University of California Berkeley & University of California, San Francisco
- Susan Braun, MA Commonweal
- Vincent James Cogliano, PhD WHO International Agency for Research on Cancer
- Shanaz Dairkee *, PhD California Pacific Medical Center Research Institute
- Suzanne Fenton, PhD National Institute of Environmental Health Sciences
- William H. Goodson III, MD California Pacific Medical Center Research Institute
- Joe Guth *, PhD, JD Science and Environmental Health Network
- Dale Johnson, PharmD, PhD University California Berkeley & Emiliem
- Jean Latimer, PhD School of Medicine University of Pittsburgh
- Ron Melnick, PhD National Institute of Environmental Health Sciences
- Rachel Morello-Frosch, PhD, MPH University of California Berkeley
- Ruthann A. Rudel, MS Silent Spring Institute
- Gina Solomon*, MD, MPH University of California San Francisco & Natural Resources Defense Council
- Carlos Sonnenschein, MD Tufts University School of Medicine
- Lauren Zeise*, PhD Cal/EPA Office of Environmental Health Hazard Assessment
- Catherin Thomsen, MPH Funding Liaison, CBCRP
Symposium speakers

• **Sarah Janssen, MD, PhD, MPH** – moderator

• **Megan Schwarzman, M.D., M.P.H.**
  “Reflecting Science in Policy: A Perspective on the California Green Chemistry Initiative”

• **Suzanne E. Fenton, Ph.D.**

• **Lauren Zeise, PhD**