DCEG is an intramural component of NCI whose mission is to conduct broad-based, high quality, high impact research to uncover the causes of cancer and the means of its prevention.

DCEG is uniquely able to conduct epidemiologic research projects that are:

• high risk
• need long-term commitments of funding and scientific staff
• require a national programmatic approach
• need a quick response to emerging public health or scientific issues
• might go unattended by groups without a national and international reach, or
• require an interdisciplinary approach that is fostered by the breadth and interactive potential of the intramural research program of NCI and NIH
Prevention Research Continuum

**Etiology**
- Tobacco
- Physical inactivity, diet, and obesity
- Infectious agents
- Radiation
- Occupational carcinogens
- Hormones
- Genetics

**Prevention**
- HPV vaccine trial
- Melanoma screening
- Genetic risk prediction
- Radiation
- Nicotine addiction
- Occupational exposure dose response and threshold levels

**Implementation**
- HPV screening recommendations and management guidelines
- Lung cancer screening guidelines
- Radiation protection guidelines
Role of DCEG in Prevention Research

• Focus on *foundational, etiologic* research
  • Extensive collaborative network
  • Special relationship with IARC (WHO)

• Randomized prevention trials as outgrowth of etiologic work
  • HPV (current 1 vs 2 DT non-inferiority trial in Costa Rica)
  • Chinese Nutritional Intervention Trial

• Observational studies can be critical when trials not feasible
  • Radiation
  • Chemical carcinogens
Cross-Branch Working Groups

- Tobacco
- Microbiomics
- Descriptive Epidemiology
- Early-life Exposures
- Geographic Analysis
- Breast Cancer
- Genetic Mosaicism
- Translational Epidemiology
## DCEG Staff

<table>
<thead>
<tr>
<th>Staff Category</th>
<th>Total Number</th>
<th>Women (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division leadership</td>
<td>11</td>
<td>5 (45%)</td>
</tr>
<tr>
<td>Tenured Investigators</td>
<td>53</td>
<td>23 (43%)</td>
</tr>
<tr>
<td>Tenure-track Investigators</td>
<td>20</td>
<td>12 (60%)</td>
</tr>
<tr>
<td>Staff Scientists/Clinicians</td>
<td>33</td>
<td>24 (73%)</td>
</tr>
<tr>
<td>Fellows</td>
<td>105</td>
<td>68 (65%)</td>
</tr>
</tbody>
</table>
## Approximately 550-600 Scientific Publications per Year

<table>
<thead>
<tr>
<th>Journal</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nature</strong></td>
<td>Integrated genomic and molecular characterization of cervical cancer</td>
</tr>
<tr>
<td><strong>JAMA Internal Medicine</strong></td>
<td>Association of long-term, low-intensity smoking with all-cause and cause-specific mortality in the National Institutes of Health-AARP Diet and Health Study</td>
</tr>
<tr>
<td><strong>PEDIATRICS</strong></td>
<td>Cancer risk after pediatric solid organ transplantation</td>
</tr>
<tr>
<td><strong>Nature Communications</strong></td>
<td>Evolution of multiple cell clones over a 29 year period of a CLL patient</td>
</tr>
<tr>
<td><strong>JNCI Journal of the National Cancer Institute</strong></td>
<td>Kinetics of the human papillomavirus type 16 E6 antibody response prior to oropharyngeal cancer</td>
</tr>
<tr>
<td><strong>Nature Communications</strong></td>
<td>Functional characterization of a multi-cancer risk locus on chr5p15.33 reveals regulation of TERT by ZNF148</td>
</tr>
<tr>
<td><strong>JAMA</strong></td>
<td>Trends in thyroid cancer incidence and mortality in the United States, 1974-2013</td>
</tr>
<tr>
<td><strong>JNCI Journal of the National Cancer Institute</strong></td>
<td>Ultraviolet radiation and Kaposi sarcoma incidence in a nationwide US cohort of HIV-infected men</td>
</tr>
<tr>
<td><strong>Radiology</strong></td>
<td>Mortality in U.S. physicians likely to perform fluoroscopy-guided interventional procedures compared with psychiatrists, 1979 to 2008</td>
</tr>
<tr>
<td><strong>PLOS ONE</strong></td>
<td>Diet and biliary tract cancer risk in Shanghai, China</td>
</tr>
<tr>
<td><strong>JNCI Journal of the National Cancer Institute</strong></td>
<td>Association between breast cancer genetic susceptibility variants and terminal duct lobular unit involution of the breast</td>
</tr>
<tr>
<td><strong>THE LANCET</strong></td>
<td>Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: An analysis of death certificate data</td>
</tr>
<tr>
<td><strong>IJ C International Journal of Cancer</strong></td>
<td>Common genetic variation and risk of gallbladder cancer in India: a case-control genome-wide association study</td>
</tr>
<tr>
<td><strong>THE LANCET Oncology</strong></td>
<td>Ultraviolet radiation and Kaposi sarcoma incidence in a nationwide US cohort of HIV-infected men</td>
</tr>
<tr>
<td><strong>BJC British Journal of Cancer</strong></td>
<td>Body weight trajectories and risk of oesophageal and gastric cardia adenocarcinomas: A pooled analysis of NIH-AARP and PLCO Studies</td>
</tr>
</tbody>
</table>
DCEG Scientific Approaches – Selected Examples

- General Population Prospective Cohort Studies
  - PLCO, ATBC, NIH-AARP
- Special Exposure Studies
  - Agricultural Health Study, DES, Diesel, Chernobyl, HPV Vaccine Trial, HPV SUCCEED Study
- Families and Other Populations at High-risk
  - Inherited bone marrow failure syndrome study, melanoma families, HIV
- Case-Control Studies of Cancers of Special Interest (Cancer Maps)
- Omics: Genetics, Microbiomics, Metabolomics
- Methods: Biostatistics Branch, Cancer Genome Research Laboratory
Health Disparities

DCEG conducts research on disparities related to gender, race and ethnicity, socioeconomic status, geographic area, urban-rural patterns, migration history, and time.
Landscape of Characterizing Somatic Alterations in DCEG

- Molecular characterization of tissues
- Capitalize on distinctive studies within DCEG portfolio with high attributable fraction of risk identified
- Select examples:
  - Thyroid Cancer post-Chernobyl (Ukraine/Belarus)
  - Lung Cancer - High Quality Smoking Data & Indoor Air-Pollution (China)
  - Second Cancers
  - Very High Risk Families (TP53, RB)
  - Cervical Cancer & HPV Genomics
Strategic Initiatives in Genomics

• Germline Genomics
  • Susceptibility
  • Focus on highly informative cases
  • Laboratory investigation of mechanistic insights
    • How does the germline inform somatic alterations?

• Somatic Molecular Epidemiology
  • Investigate interaction between exposures, germline and somatic profiles in high-quality studies
  • Close partnership with Center for Cancer Genomics
  • TCGA-related projects

• Risk Assessment and Modeling
Why Conduct Epidemiologic and Prevention Research in Other Countries?

- Discover causes or effective interventions for high/unusual rates of cancer
- Understand subtypes of cancer that are more prevalent in other geographic areas
- Evaluate role of high/unusual exposures in causing cancer
- Exploit unique data resources not available in U.S.
  - Registries, national health care systems
- Explore role of genetic contribution to cancer
DCEG Today

- High quality, high impact, value-added research
- National and international in scope
- Superb investigators, fellows, and staff
- Value of team science
- Strategic pursuit of methodological issues (laboratory work, study design & analysis)