

# Division of Cancer Epidemiology and Genetics

Stephen J. Chanock, M.D.

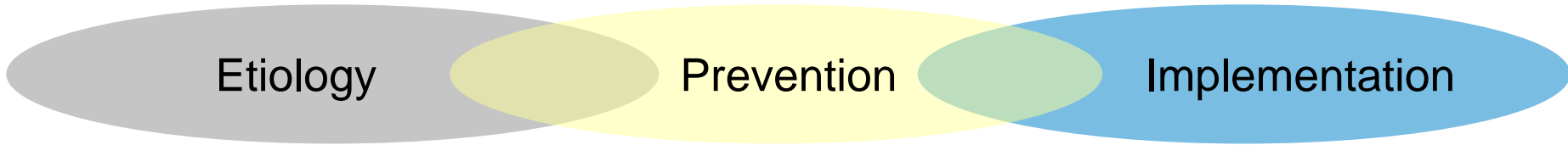
# Division of Cancer Epidemiology and Genetics

**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

Prevention

Implementation

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

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

- 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

NATIONAL CANCER INSTITUTE  
**Division of Cancer Epidemiology and Genetics**

**Office of the Director**

Stephen J. Chanock, M.D.  
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Acting Chief

**Laboratory of Translational Genomics**

Michael Dean, Ph.D.  
Chief

**Cancer Genomics Research Lab**

Stephen J. Chanock, M.D.  
Director

# Cross-Branch Working Groups

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

# DCEG Staff

Staff Category	Total Number	Women (%)
Division leadership	11	5 (45%)
Tenured Investigators	53	23 (43%)
Tenure-track Investigators	20	12 (60%)
Staff Scientists/Clinicians	33	24(73%)
Fellows	105	68 (65%)

# Approximately 550-600 Scientific Publications per Year

**nature**

Integrated genomic and molecular characterization of cervical cancer

**JAMA Internal Medicine**

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

**PEDIATRICS**

Cancer risk after pediatric solid organ transplantation

**nature COMMUNICATIONS**

Evolution of multiple cell clones over a 29 year period of a CLL patient

**JNCI** JOURNAL OF THE NATIONAL CANCER INSTITUTE

Kinetics of the human papillomavirus type 16 E6 antibody response prior to oropharyngeal cancer

**nature COMMUNICATIONS**

Functional characterization of a multi-cancer risk locus on chr5p15.33 reveals regulation of TERT by ZNF148

**JAMA**

Trends in thyroid cancer incidence and mortality in the United States, 1974-2013

**JNCI** JOURNAL OF THE NATIONAL CANCER INSTITUTE

Ultraviolet radiation and Kaposi sarcoma incidence in a nationwide US cohort of HIV-infected men

**Radiology**

Mortality in U.S. physicians likely to perform fluoroscopy-guided interventional procedures compared with psychiatrists, 1979 to 2008

**PLOS** | ONE

Diet and biliary tract cancer risk in Shanghai, China

**JNCI** JOURNAL OF THE NATIONAL CANCER INSTITUTE

Projecting individualized absolute invasive breast cancer risk in US Hispanic women

**THE LANCET**

Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: An analysis of death certificate data

**IJC** International Journal of Cancer

Association between breast cancer genetic susceptibility variants and terminal duct lobular unit involution of the breast

**THE LANCET Oncology**

Common genetic variation and risk of gallbladder cancer in India: a case-control genome-wide association study

**BJC** British Journal of Cancer

Body weight trajectories and risk of oesophageal and gastric cardia adenocarcinomas: A pooled analysis of NIH-AARP and PLCO Studies

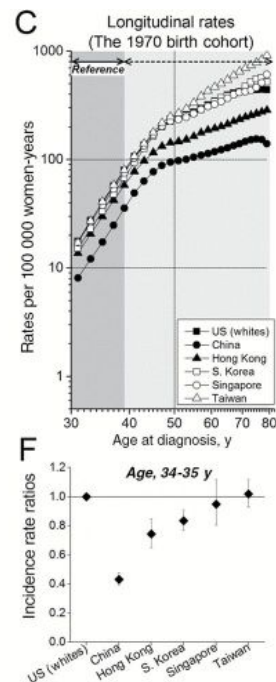
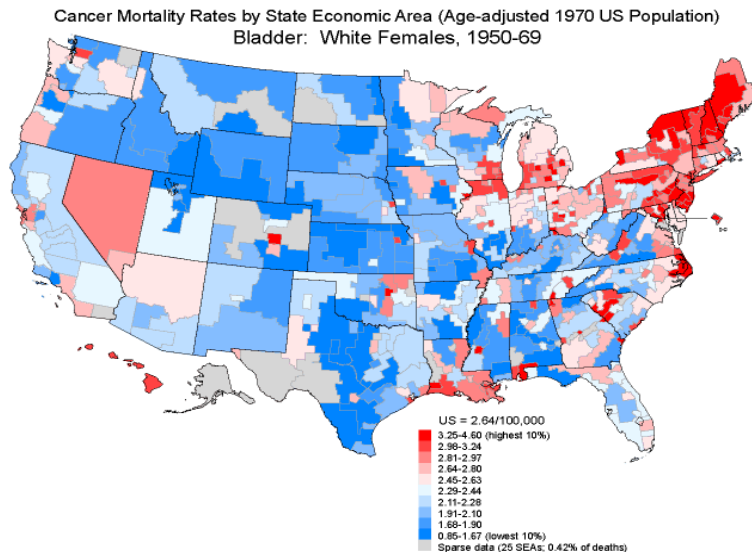
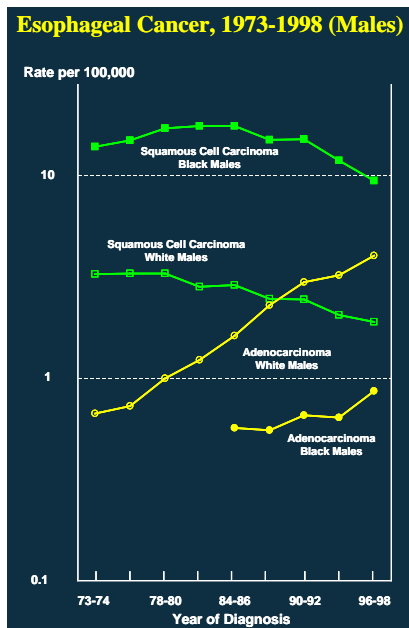


# DCEG Scientific Approaches – Selected Examples

- 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.



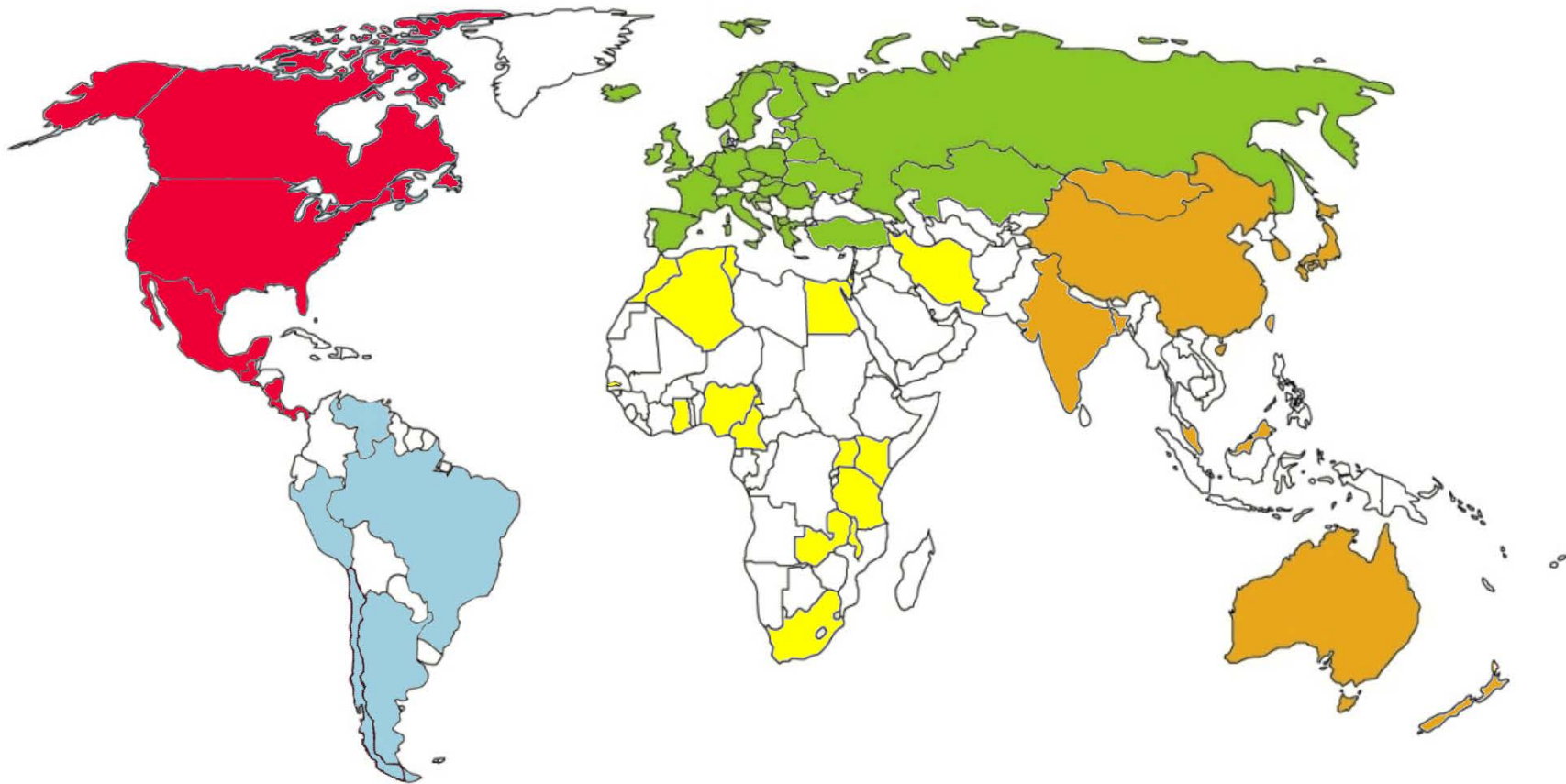
# Landscape of Characterizing Somatic Alterations in DCEG

- 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

# DCEG Global Research Portfolio



# 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)