National Cancer Advisory Board
Division of Cancer Epidemiology and Genetics
Overview
Stephen J. Chanock, M.D.
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Background

- Came to NIH in 1958
  - Building 7
- Undergraduate degree in music
  - Composition
- Studied conducting/composition in UK
- Harvard Medical School
- Two pediatric subspecialties
  - Infectious Diseases
  - Hematology/Oncology
- Laboratory Fellowship in Molecular Hematology
  - Dr. Stuart H. Orkin (HHMI / Boston Children’s Hospital)
Career at NCI

• 1991 - Joined Pediatric Oncology Branch
  • Infectious complications of pediatric cancer and HIV infections
  • Molecular biology of immunosuppression

• 1996 - First DCEG collaborations

• 1991-2007  CCR PI

• 2001-Today  Director of CGR

• 2007-2013  Chief of LTG

• 2012-2013  Acting Co-Director of CCG
To uncover the causes of cancer and the means of its prevention through broad-based, high-quality, high-impact research

- Classical epidemiology
- Molecular epidemiology
DCEG Today

- Intellectually strong
- Remain committed to etiological work
- Do not refrain from investigation of clinical implications
- Superb investigators and excellent staff
- Academically productive
- At the cutting edge of many fields
- But not all
- Imminent strategic decisions for ongoing priorities

Selected Publications

14 PLoS One/Genetics/Medicine
5 N Engl J Med
11 JNCI
6 Nature Genetics
6 JCO
2 JAMA/JAMA Archives
2 Lancet/Lancet Oncology
Key Issues

• Use emerging technologies to improve exposure assessment

• Develop analytic/informatic capacity to match scientific goals
Exploring New Technologies

- Evaluate feasibility of new technologies as applied to population sciences
  - Epigenomics
  - Microbiomics
  - Metabolomics
  - Proteomics
Strategic Initiatives in Germline Genomics

• **Susceptibility**
  • Discovery
  • Comprehensive maps of cancer-specific genetic architecture

• **Focus on highly informative cases**
  • Familial Cancers
  • Pediatric cancers
    • TARGET germline initiative
  • Second Cancers
    • Childhood Cancer Survivor Study

• **Laboratory investigation of mechanistic insights**
  • How does the germline inform somatic alterations?
Strategic Initiatives in Genomics

• Somatic Molecular Epidemiology
  • Investigate interaction between exposures, germline and somatic profiles in high-quality studies
    • EAGLE- lung cancer
    • Chernobyl radiation-induced thyroid cancer
  • Close partnership with Center for Cancer Genomics
  • TCGA-related projects
    • PanCan analysis
TCGA: Lessons Learned from the Data

M. Lawrence & G. Getz/Broad Institute
Strategic Initiatives in Genomics

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  • Investigate interaction between exposures, germline and somatic profiles in high-quality studies
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• Risk Assessment and Modeling
Detectable Clonal Mosaicism in ‘Germline’ Unexpected Finding in GWAS

Normal Cellular Population

Somatic Alteration

Clonal Selection/Expansion

Mosaic Loss

Mosaic Gain

Mosaic Copy Neutral

LOH

• Breadth of mosaicism
• Risk factor for cancer?
• Insights into ‘genomic stability’
Economic and Occupational Exposures

- Ultrafine particulates and lung cancer
- Pesticides and cancer
- Systematically characterize mechanisms of action of leukemogens and lymphomagens
  - Benzene
  - Formaldehyde
  - Trichloroethylene
  - Perchloroethylene
Leverage Areas of Special Expertise

• **Radiation Exposure**
  • **Environmental**
    o Risk assessment in Chernobyl and atomic bomb survivors
    o Genomic characterization of radiation-induced thyroid cancer
  • **Medical and Occupational**
    o CT scans
    o Healthcare workers
      o Nuclear medicine
      o Angiography
Emerging Opportunities

• Develop New Strategic Studies
  • Energy balance and obesity
    o Physical activity
  • HPV vaccine
    o Optimal dose efficacy (< 3)
  • Second cancers
    o Childhood Cancer Survivors Study
Emerging Opportunities

- Launch new long-term prospective cohort study
  - Serial biospecimens
  - Exposure assessments
- Leveraging existing infrastructure
  - HMOs
  - Military/VA
  - International partners
Management Style

• Gather information before making decisions
  • Ask many questions
  • Seek wise counsels
  • Listen to many perspectives

• Present problems with possible solutions
  • Consider alternative perspectives

• Support the next generation
  • Feature young investigators (TT/Fellows) in team science

• Consider the past, but not be wedded to it
“When you call me that, smile.......”

Mae West
Strategic Planning

- Concise statements of
  - Principal Investigators’ scientific goals over 1, 3, 6 years
  - Staff Scientists/Clinicians’ accomplishments and future directions
- Value in assessing
  - State of science across DCEG
  - Improvements for managing key resources
  - Promote new initiatives
  - Enhance collaboration
Education & Training

- Assess mentoring and recruiting
- Deepen connections across NCI Divisions
- Expand DCEG knowledge base
  - Furthering exposure to mechanistic insights
  - Modeling
  - Translating etiologic findings to public health
Senior Expert Lectures

- ‘State-of-the Art’ presentation of a discipline
  - Feature *some* of their work
- Experts in related cancer fields
  - Oncogenes
  - Targeted Therapy
  - Immunology
- Discuss synergies between their field and population sciences
- *Important Metric: New Collaborations*
The Challenges Ahead

• Retain academic excellence in fiscally restricted times
• Strengthen connections across DCEG
  • Enhance collaborative network
  • Promote new initiatives
    • Translational Epidemiology
    • Unattended Opportunities
• Upgrade informatic infrastructure
• Sunset studies past their prime