Welcome and Charge

Muin J. Khoury, M.D., Ph.D.
EGRP, DCCPS, NCI
Commentary

Frontiers in Cancer Epidemiology: A Challenge to the Research Community from the Epidemiology and Genomics Research Program at the National Cancer Institute

Muin J. Khoury, Andrew N. Freedman, Elizabeth M. Gillanders, Chinonye E. Harvey, Christie Kaefer, Britt C. Reid, Scott Rogers, Sheri D. Schully, Daniela Seminara, and Mukesh Verma

Abstract

The Epidemiology and Genomics Research Program (EGRP) at the National Cancer Institute (NCI) is developing scientific priorities for cancer epidemiology research in the next decade. We would like to engage the research community and other stakeholders in a planning meeting in December 2012 to help shape new foci for cancer epidemiology and define the future of cancer epidemiology, we invite the research community to participate in a high-impact studies. Cancer Epidemiol Biomarkers Prev; 1–3. ©2012 American Association for Cancer Research.

In recognition of the 20th year of publication of CEBP, the editor proposed a series of invited commentaries from experts in various disciplines to reflect on major advances and trends in cancer epidemiology over the last two decades and to foresee "what lies ahead." Pieces published in this special topic will be available at www.pubmedcentral.nih.gov.

Excerpt from Khoury et al., CEBP July 2012; 21(7): 999-1001 used with permission of American Association of Cancer Research.
Brief Timeline of Cancer Epidemiology

1937 - 1979

- NCI established
- Asbestos linked to lung cancer
- Warning labels added to cigarette labels
- DES linked to vaginal adenocarcinoma

Hepatitis B vaccine shown to prevent liver cancer

HPV DNA identified in cervical biopsies

H. pylori linked to gastric cancer

Gail model used to calculate breast cancer risk

Adapted from Greenwald P and Dunn BK. Cancer Res. 2009; 69(6): 2151-8.
Brief Timeline of Cancer Epidemiology

Adapted from Greenwald P and Dunn BK. Cancer Res. 2009; 69(6): 2151-8.
HPV vaccine approved to prevent four forms of HPV

GWAS studies launched

HRT increases breast cancer risk

NIH’s GEI program launched

Human Genome Project completed

2000 - 2009

Adapted from Greenwald P and Dunn BK. Cancer Res. 2009; 69(6): 2151-8.
Brief Timeline of Cancer Epidemiology

2010 – beyond


EGRP funds its first Exome sequencing study

Today

the future of epidemiology and how we get there

Unless the Mayans were right, we need to think about...

12/21/12
The Study of Distribution and Determinants of Disease Occurrence and Outcomes in Populations

Epidemiology comes in different flavors

- By Outcomes: Cancer, Cardiovascular, Diabetes, Birth Defects...
- By Risk Factors: Infectious, Genetic, Nutritional, Environmental, Social.....
- By Life Stages: Reproductive, Perinatal, Pediatric, Geriatric....
- By Context: Descriptive, Analytic, Clinical, Public Health...
- By Methodologies: Observational, Experimental (RCT)....

- By Phase of Translation: from Discovery to Population Health
Four “Drivers” of Epidemiology in the Context of Translational Research


Phases of Translation:
- **T0** (Discovery); **T1** (Characterization); **T2** (Evaluation); **T3** (Implementation and Health Services); **T4** (Outcome Research)

*Figure* adapted from Khoury (2011)
Collaboration: Trends in Funded Research

EGRP-funded* Consortia and Cohorts
(1992-2011)

Source: Epidemiology & Genomics Research Program (EGRP), http://epi.grants.cancer.gov/
*Prior to 1997, EGRP did not exist, so some grants funded by other NCI Divisions/Programs
Multi-level Analysis: The Example of Obesity

A quick look at 300 random publications from 2000, 2005, and 2010 reveals very few multi-level analyses in the cancer epidemiology literature beyond GxE at the individual level.
Multi-level Analysis: Trends in G-G and G-E in Genetic Epidemiology Studies

Source: HuGE Navigator, http://hugenavigator.net/HuGENavigator/startPagePubLit.do
Technology: Trends in Published Research (1 of 3)

Publications related to classic "OMIC" cancer studies (1992-2011)

- Genetic
- Gene expression

Source: PubMed search excluded reviews, meta-analyses, systematic reviews and filtered on cancer and humans
Publications related to emerging "OMICS" cancer studies (1992-2011)

Source: PubMed search excluded reviews, meta-analyses, systematic reviews and filtered on cancer and humans
Technology: Trends in Published Research (3 of 3)

Publications related to usage of accelerometer as objective measure of physical activity (1992-2011)

Source: PubMed search excluded reviews, meta-analyses, systematic reviews and filtered on cancer and humans

Knowledge Integration: Trends in Published Research

Publications on cancer epidemiology
(1992-2011)

Source: PubMed search excluded trials and treatment studies and filtered on cancer and humans

Welcome to the Era of “Omic” and “Big Data” Epidemiology!

Which Brand of Epidemiology will Show up in the 21st Century?

Incidentalomic Epidemiology vs. Translationalalomic Epidemiology
Translational Epidemiology


Welcome to 12-12-12

Our Big Objective: Come up with 12 recommendations for action to Influence the field of epidemiology in the next 12 years
Session 1: The Evolution of Epidemiology and its Applications to Cancer

- “Historical perspectives on the evolution of cancer epidemiology” by Bob Hoover

- Panel’s questions:
  1. What lessons and success stories have we learned from 20th century cancer epidemiology?
  2. What are the major scientific questions that cancer epidemiology should address in the next decade to impact public health?
Session 2: The Impact of New Methods and Technologies on Epidemiologic research

- “Technology-driven epidemiology: a paradigm shift” by Geoff Gingsburg

Panel’s questions:
1. Which technologies do you feel are ready for “prime time” in epidemiologic research and for what purpose?
2. What criteria would you use to determine when emerging technologies should be integrated into epidemiologic research?
Session 3: The Evolution of Epidemiologic Cohorts in the Study of Natural History of Cancer and Other Diseases

- “What have we learned from epidemiology cohorts and where should we be going next?” by Julie Buring

- Panel’s questions:
  1. What developments are needed to make epidemiologic cohorts a cornerstone of the discovery to practice continuum?
  2. How should NCI and NIH facilitate multidisciplinary collaboration to integrate these developments into the research portfolio?
Session 4: Use of Epidemiology to Advance Clinical and Public Health Practice

- “Epidemiology and evidence-based research along the cancer care continuum” by David Ransohoff

- Panel’s questions:
  1. What are new ways in which epidemiology can be used to fill evidence gaps between discoveries and population health impact?
  2. How can observational epidemiology make the greatest scientific contributions in understanding cancer-related risk factors that cannot be studied through randomized clinical trials?
Session 5: Use of Epidemiology in Knowledge Integration and Meta-Research

- “The role of epidemiology in knowledge integration and meta research” by John Ioannidis

- Panel’s question:
  1. How can epidemiology help integrate knowledge from basic, clinical and population sciences to accelerate translation from research to practice?
Session 6: Where do We Go From Here?

- General Discussion Moderated by Patricia Hartge

- Objective: 12 Recommendations for Action for Epidemiology in the Next 12 Years
Engaging the Scientific Community

- The digital conversation started via our blog 6 months ago
- This meeting is being webcast to the community at large (smile for the camera)
- We will also be monitoring an email box and Twitter feed for questions from the community at large
- We will continue the dialogue after 12/13/12
Your Charge!

- Engage, participate, invigorate!
- Think provocatively and creatively about the future of cancer epidemiology and how the discipline needs to evolve with a changing landscape
- Engage online and tweet about the meeting
  - Email questions to nciepimatters@mail.nih.gov
  - Ask questions on Twitter (Follow @NCIEpi; #TrendsinEpi)
- Engage others and continue the conversation after you leave tomorrow
A Big Thank You

Planning Committee:
- Bob Hoover
- Muin Khoury
- Tim Rebbeck
- Sheri Schully

EGRP Scientific Team:
- Mahesh Divi
- Joanne Elena
- Tram Kim Lam
- Stefanie Nelson
- Joseph Su

EGRP Communications Team:
- Christie Kaefer
- Dacia Beard
- Audrey Babkirk

EGRP Fellows:
- Christine Chang
- Paul Ebohon

CMP:
- Trinh Lieu