

# Cancer Pharmacogenomics: *Setting a Research Agenda to Accelerate Translation*

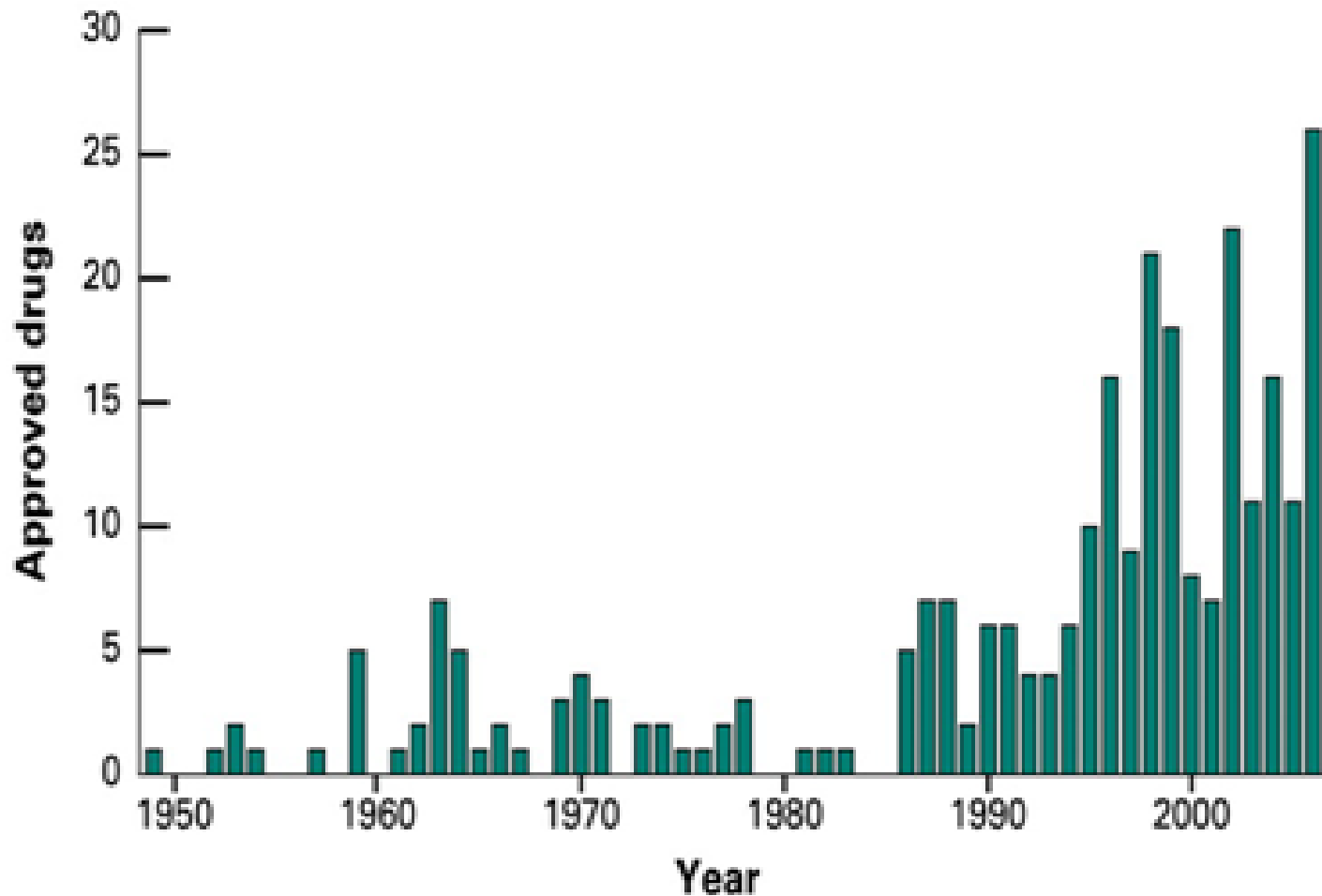
Bethesda, Maryland  
July 21, 2009

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National Cancer Institute

# OUTLINE

- Background
- Personalized Cancer Medicine
  - Pharmacoepidemiology
  - Pharmacogenomics (PGx)
- Conceptual Model
- Workshop Agenda

# Currently Approved Oncology Drugs



Citation: Listing of approved oncology drugs with approved indications, <http://www.fda.gov/cder/cancer/druglistframe.htm>, and approval statistics, <http://www.accessdata.fda.gov/scripts/cder/onctools/statistics.cfm>. Center for Drug Evaluation and Research, Food and Drug Administration.

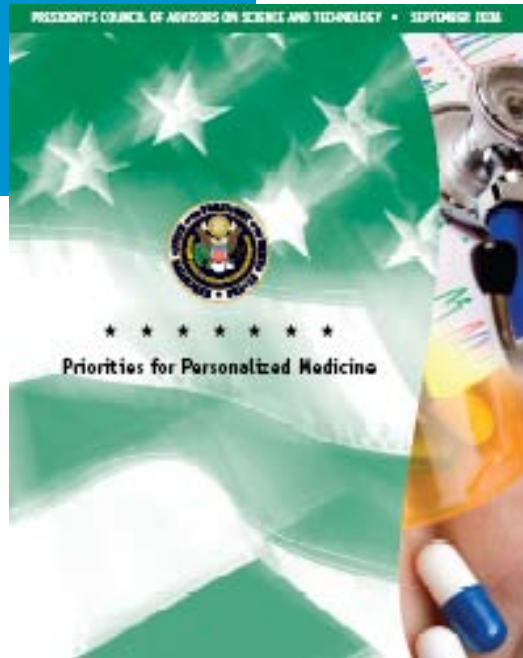
Source: *JNCI*. 2007; 99 (5): 344. Reprinted by permission of Oxford University Press.



Realizing the Potential of  
Pharmacogenomics:  
Opportunities and Challenges

Report of the  
Secretary's Advisory Committee on Genetics, Health, and Society

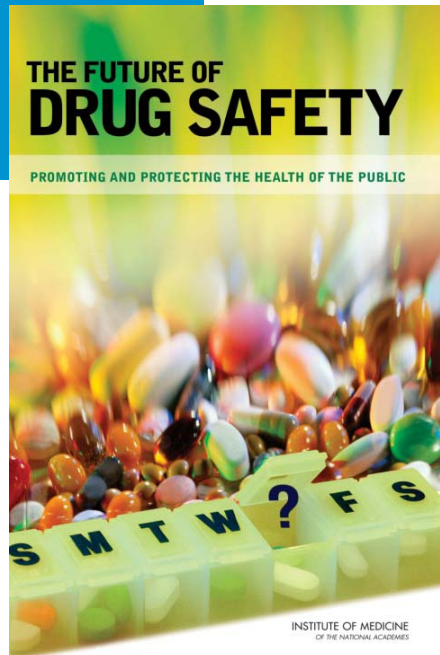
May 2008



U.S. System of Oversight of Genetic Testing:  
A Response to the Charge of the  
Secretary of Health and Human Services

Report of the Secretary's Advisory Committee  
on Genetics, Health, and Society

April 2008



# Personalized Cancer Medicine

- Tailoring medical cancer prevention and treatment therapies to the individual characteristics of each patient improving their quality of life and health outcome.

**"The right medicine to the right person at the right dosage at the right time"**

- Cancer Pharmacoepidemiology
- Cancer Pharmacogenomics

# Cancer Pharmacoepidemiology

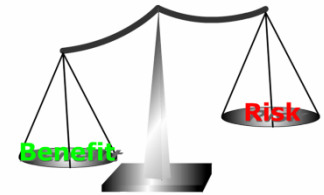
- The study of the benefits and risks of drug therapy outcomes among groups and subgroups of cancer patients
- Evaluation of an individual's age, environment, diet, lifestyle factors, health status and response to drugs

# Cancer Pharmacogenomics (PGx)

- Study of how variation in an individual's germline and/or tumor genome are related to their metabolism and physiological response to drugs used in cancer prevention and treatment
  - DNA sequence
  - Copy number
  - Methylation patterns
  - Molecular biomarkers
  - Gene expression

# Pharmacoepidemiology and PGx

- Identify clinical, epidemiologic and genomic/molecular factors are associated with response and/or toxicity to cancer prevention and treatment therapies
- Benefits
  - Select Optimal Therapy
  - Reduce adverse drug reactions
  - Reduce time, cost and failure rate of clinical trials
  - Rescue drugs that are failing in clinical trials
  - Rescue drugs withdrawn from the market
  - Shift emphasis in clinical practice from reaction to prevention





# Accelerating Translation

- Advances in molecular medicine and biotechnology
- Increasing use of electronic health records (EHRs)
- Increased availability of existing research infrastructures

Connect basic, clinical and population science discoveries to research in health care delivery systems: Move research to “where the patients are”

# Cancer Pharmacogenomics:

Setting a Research Agenda to Accelerate Translation

Bethesda, MD | July 21, 2009



- Goal: To evaluate and Revise Trans-NCI PPWG recommendations
- Participants:
  - NCI: DCTD, DCB, DCEG, DCCPS, DCP, CCR, CRCHD
  - NIH: NIGMS, NHLBI, NHGRI, NCCR
  - HHS: OD, FDA, CDC, AHRQ, CMS
  - Research Networks: Cooperative Groups, PGRN, HMO-CRN, SEER, Cohort and Case-Control Consortia
  - DOD and VA
  - Industry
  - Pharmacy Benefit Providers
  - Academic Medical Institutions
  - Comprehensive Cancer Centers
  - Health Maintenance Organizations
  - Advocates

# Workshop Agenda

**Richard M. Weinshilboum, M.D.**

*Cancer Pharmacogenomics: Development, Science, Translation*

**Mark J. Ratain, M.D.**

*Challenges in the Design and Conduct of Clinical PGx Studies*

**Howard McLeod, Pharm.D.**

*Interventional Pharmacogenetics: Moving the Science into Practice*

**Robert S. Epstein, M.D., M.S.**

*Applications of Cancer PGx in a Naturalistic Setting*

**Geoffrey S. Ginsburg, M.D., Ph.D.**

*Genome Guided Clinical Trials to Evaluate the Clinical Utility of Cancer PGx*

## Panel Discussion

**Moderator: Richard Schilsky, M.D.**

**Panelists: Geoffrey Liu, M.D., David Flockhart M.D., Ph.D.,  
and Cornelia M. Ulrich, Ph.D.**

## LUNCH

## Breakout Working Groups

# Breakout Working Groups

## **Working Group A: Moderators**

Rochelle M. Long, Ph.D.  
National Institute of General Medical Sciences (NIGMS)

Robert L. Davis, M.D.  
Center for Health Research, Kaiser Permanente of Georgia

## **Working Group B: Moderators**

Lawrence J. Lesko, Ph.D.  
Center for Drug Evaluation and Research, FDA

Sheila R. Weiss Smith, Ph.D.  
Center for Drug Safety, University of Maryland

## **Working Group C: Moderators**

Lori M. Minasian, M.D.  
Division of Cancer Prevention (DCP), NCI

Muin J. Khoury, M.D., Ph.D.  
Office of Public Health Genomics, CDC