

***But How Do We Translate
Advances in Genomics into Population
Health?***

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CDC National Office of Public Health Genomics



SAFER • HEALTHIER • PEOPLE™



What is “Public Health Genomics?”

- A multidisciplinary field concerned with the effective and responsible translation of genome-based knowledge and technologies to improve population health

- **Focus:**

- Populations
- Gene-environment Interaction
- Disease prevention
- Evidence-based applications
- Health disparities

July 2006 · Vol. 8 · No. 7 commentary


The path from genome-based research to population health: Development of an international public health genomics network

Wylie Burke, MD, PhD¹, Muin J. Khoury, MD, PhD², Alison Stewart, PhD³, and Ronald L. Zimmern, MA, FFPHM⁴ for the Bellagio Group⁵

The health benefits of the Human Genome Project have been widely anticipated. Experts predict a new era of individualized disease prevention based on testing for genetic susceptibilities,¹ and safer, more effective use of drugs based on

Which vision of the future should the prudent clinician believe: A cornucopia of healthcare innovations based on genomic research, or a stream of genetically-based interventions that fail to deliver value to the public? We argue that both visions are

Genome-based Research and Population Health



Report of an expert workshop held at the Rockefeller Foundation Study and Conference Centre Bellagio, Italy, 14–20 April 2005

Public Health Genetics
University of Michigan
Institute for Public Health Genetics
CDC

The Public Health Genomics Enterprise

**Genome-
based
Science and
Technology**

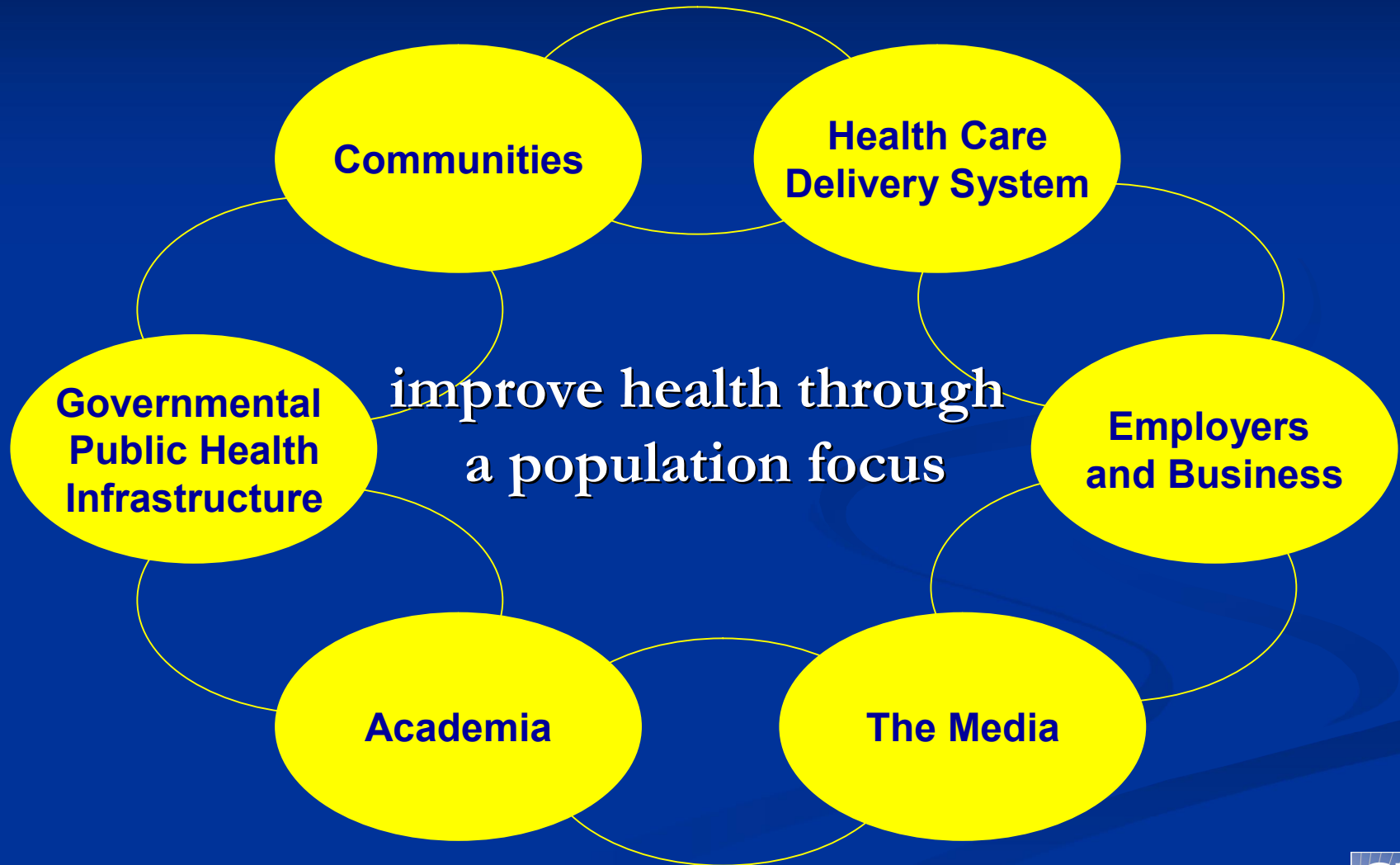


**Improvement
in
Population
Health**

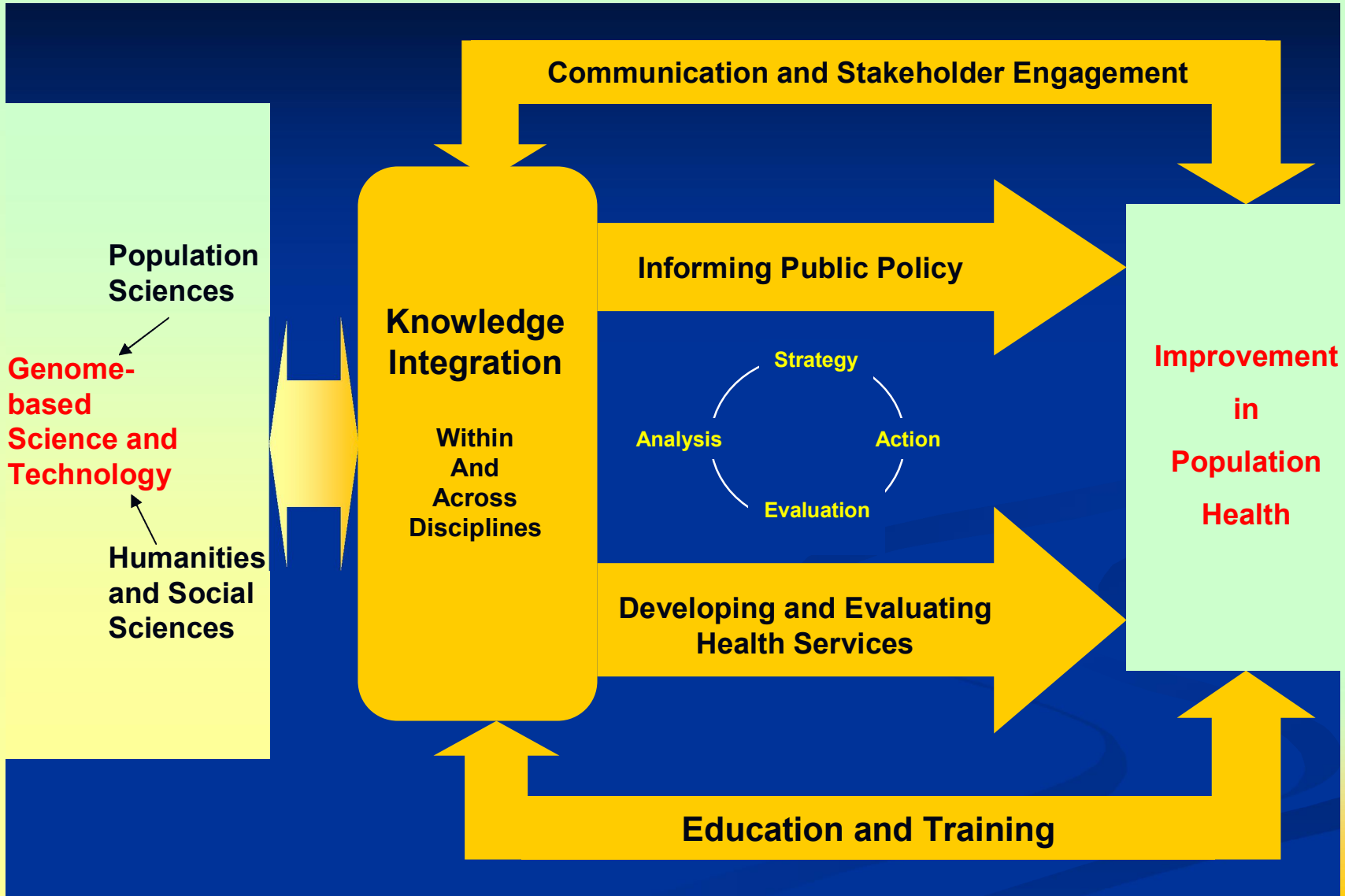
**Closing the Gap Between Gene Human
Genome Discoveries and Population Health**

Who Will Keep the Public Healthy? (IOM, 2002)

“Public Health” or “Population Health”?



Society



Research

Society

Communication and Stakeholder Engagement

Population
Sciences

Genome-
based
Science and
Technology

Humanities
and Social
Sciences

In January, Dr Stephen Channock
from NCI gave us a primer
on genome-based science
and technology

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Education and Training

Research

Society

Communication and Stakeholder Engagement

Population Sciences

Genome-based Science and Technology

Humanities and Social Sciences

In February, we explored with Drs Bob Hoover and Teri Manolio the role of population sciences with a focus on epidemiology

Education and Training

Research

Society

Communication and Stakeholder Engagement

Population Sciences

Genome-based Science and Technology

Humanities and Social Sciences

In March, we explored with Drs Colleen McBride and David Abrams the role of behavioral and social sciences

Education and Training

Research

Society



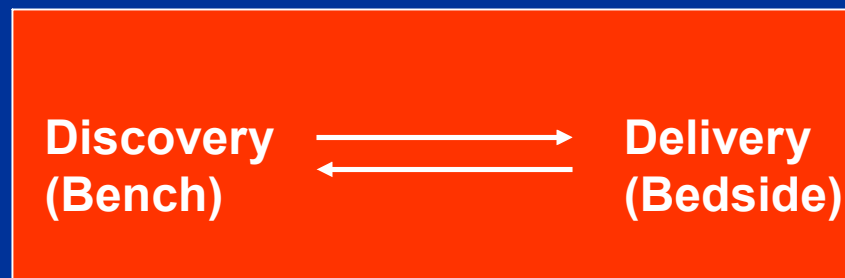
In April, Dr Nat Rothman and I explored the role of knowledge integration within the discipline of epidemiology

Society



In May, Dr Al Berg and I explored the role of knowledge integration across disciplines, with a focus on evaluation of genetic tests

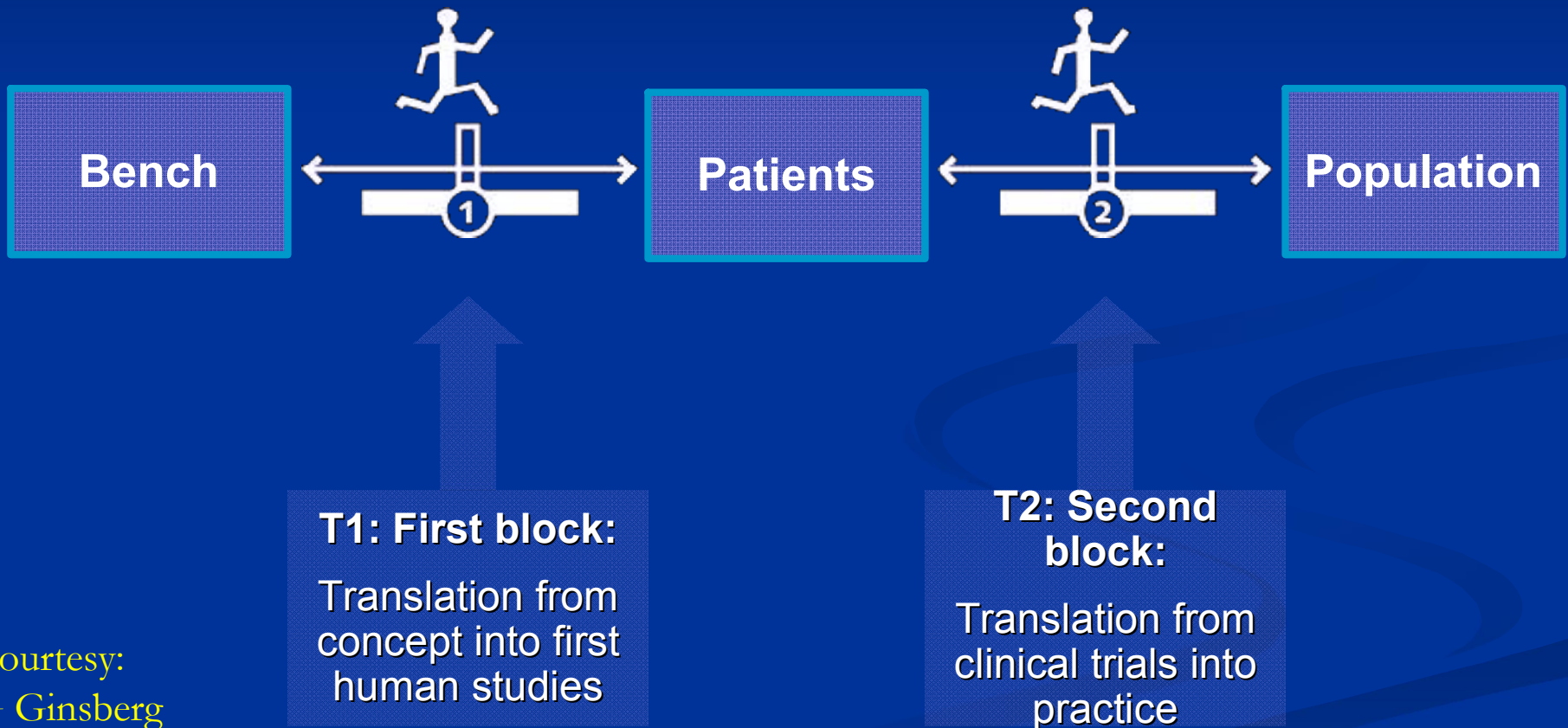
***“Translational and Clinical Science—
Time for a New Vision”
E. Zerhouni NEJM 2005;353:15***



It takes an estimated average of 17 years for 14% of new scientific discoveries to reach day to day clinical practice

JM Westfall JAMA 2007;297:403

Translational Blocks Apply to Genomics in Medicine

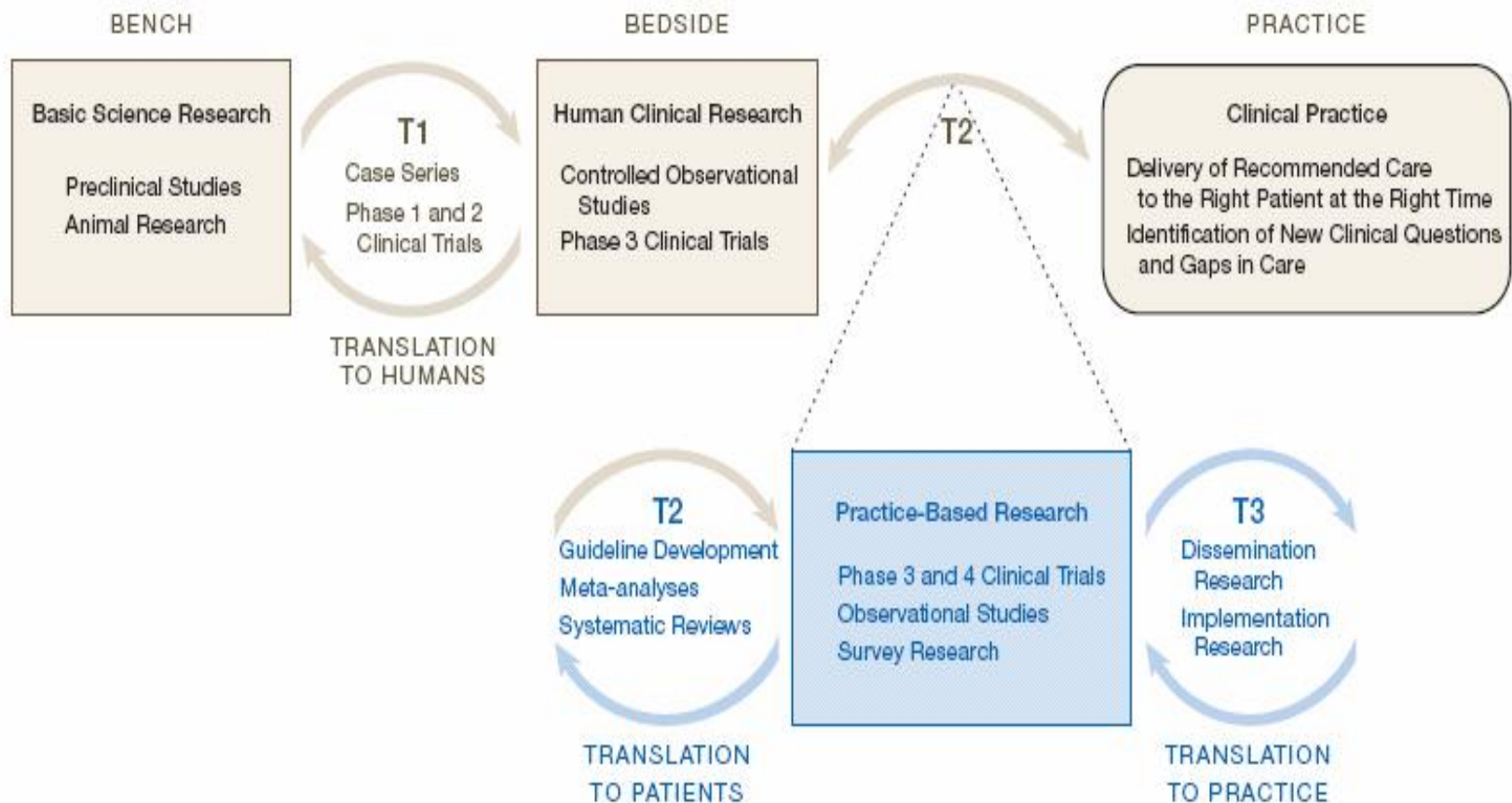


Courtesy:
G Ginsberg

Practice-Based Research-Blue Highways on the NIH Road Map

JM Westfall et al JAMA 2007;297:403.

Figure. "Blue Highways" on the NIH Roadmap



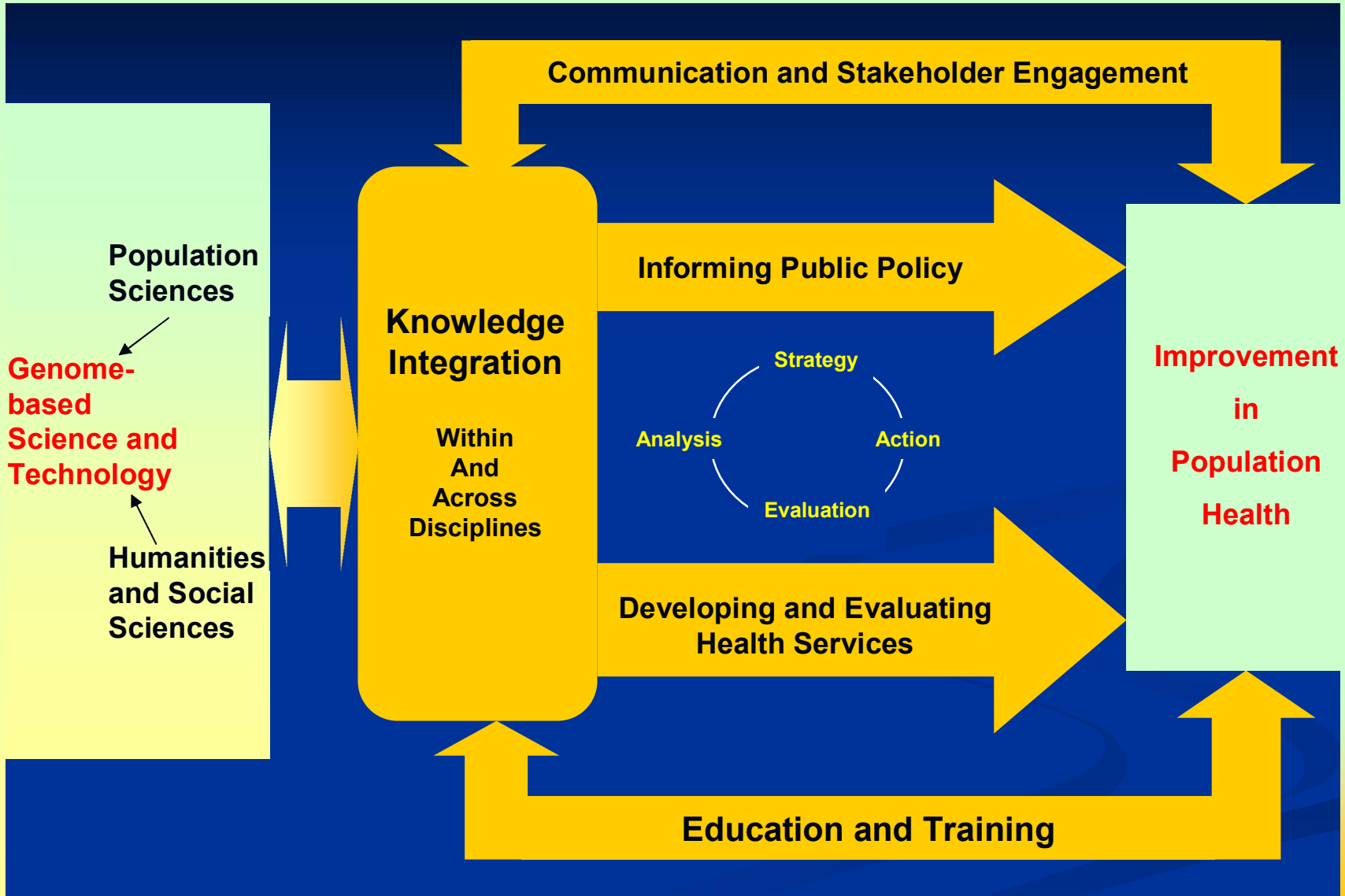
The Genomics Translation Highway: 2001-2006

- More than 350,000 published human genetics/genomics articles
 - Only 2% deal with translation research T2 and Beyond
 - Only 2 USPSTF evidence-based recommendations
 - *BRCA1*
 - *HFE*

USPSTF 2005 Recommendations on BRCA Testing

- Recommended “against routine referral for genetic counseling or routine breast cancer susceptibility gene (*BRCA*) testing for women whose family history is not associated with an increased risk for deleterious mutations in breast cancer susceptibility gene 1 (*BRCA1*) or breast cancer susceptibility gene 2 (*BRCA2*).”
- Recommended that “women whose family history is associated with an increased risk for deleterious mutations in *BRCA1* or *BRCA2* genes be referred for genetic counseling and evaluation for *BRCA* testing.”
- USPSTF spelled out clearly what family history criteria warranted the referral for counseling and possible testing.

Society



Research