







# **Overview: NCI's Global Cancer Research Programs – Highlighting Efforts in Specific Countries**

*Anna D. Barker, Ph.D.*

*Deputy Director, NCI*

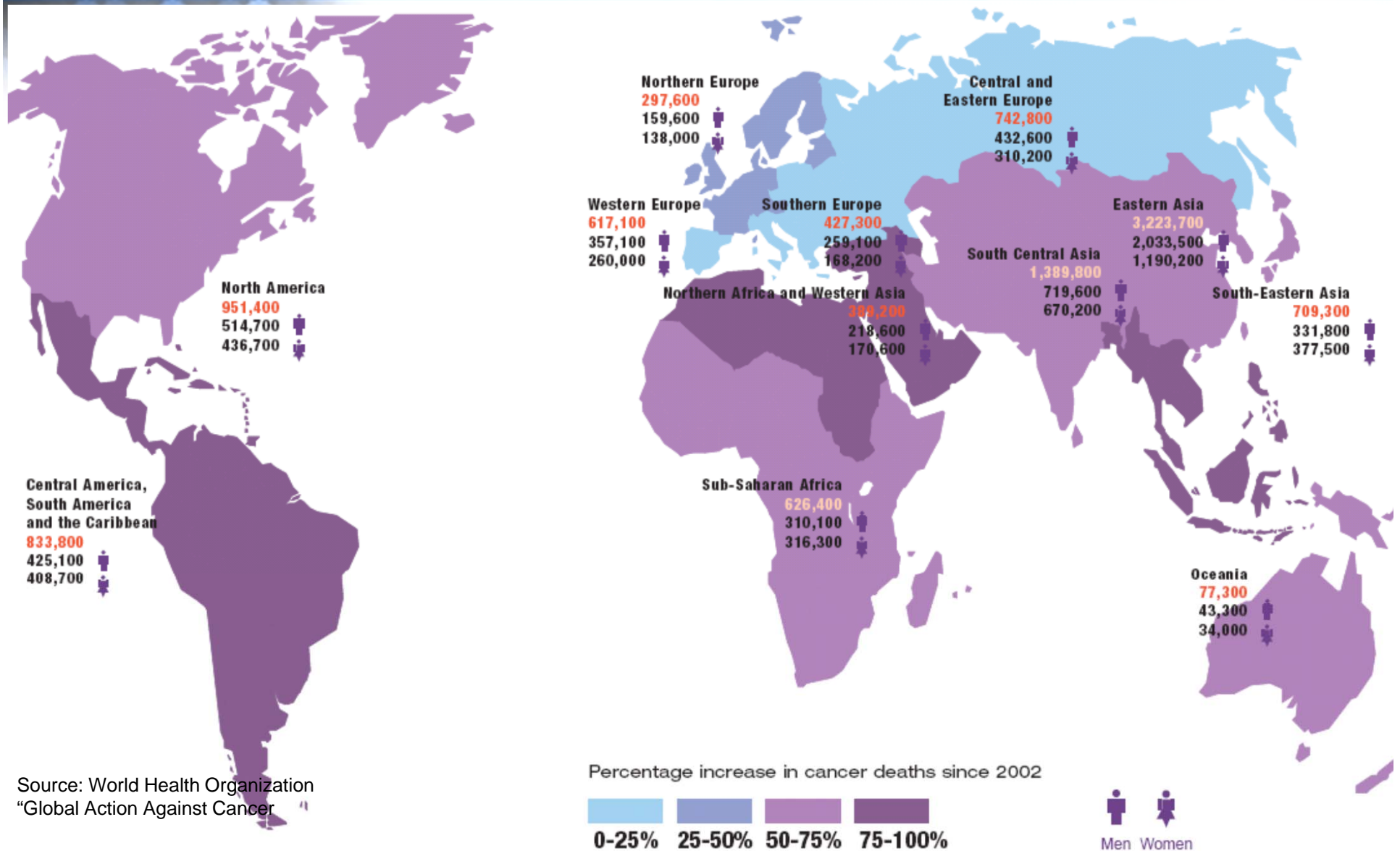
*September 16, 2009*

# Driving NCI's Interest and Strategies in International Partnerships/Globalization

-  *Emerging international human/economic cancer burden*
-  *Progress in 21<sup>st</sup> century molecular and clinical sciences depend on global partnerships (Talent, Costs)*
-  *Advanced technologies driving nearly exponential change in oncology*
-  *Advances in communication –  
real time communication –  
leveling the “playing field”*
-  *To assist in global delivery  
of 21<sup>st</sup> century cancer medicine  
 (“soft” political power)*

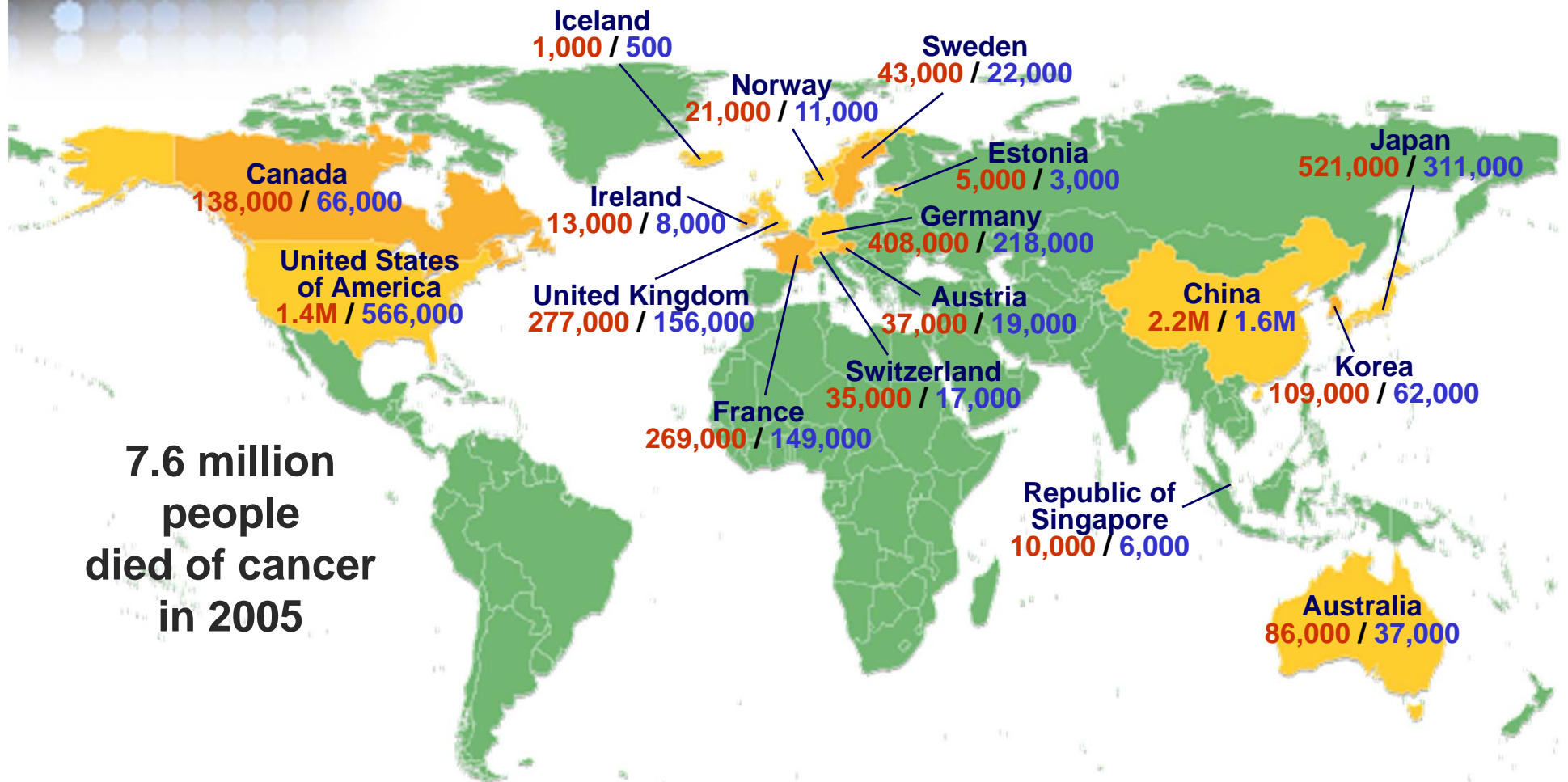


# By 2020, Cancer Could Kill 10.3 Million People per Year (16 million new cases per year)



Source: World Health Organization  
"Global Action Against Cancer"

# An International Imperative: Address the Growing Cancer Burden



Cancer **Incidence** / **Mortality** per year

Source: Derived from International Agency for Research on Cancer, GLOBOCAN 2002 database

# NCI's Global Cancer Research "Portfolio" and Intent

## **Leadership:**

All Divisions and Centers, Fogarty International Center, Other NIH Institutes, Joseph F. Harford, Ph.D.; Jorge Gomez, M.D., Ph.D.; Julie Schneider, Ph.D.; Richard Love, M.D.

## **Mission:**

To provide leadership across the cancer research and training continuum to develop mutually beneficial partnerships that facilitate advances in cancer research and aid countries to address their cancer burden

## **Focus:**

New partnerships that further support and expand NCI's historical strengths, leverage resources and expertise from the NCI and target countries through mutually beneficial, culturally appropriate research and development programs; emphasis on collaborative funding and development of in-country independence

## **New Models:**

Co-funding/other models that include the target countries, NIH components and philanthropic groups

# Strategic Components of NCI's International Programs in Cancer Research

- ❑ **Office of International Affairs**
- ❑ **Large numbers of existing research programs (Divisions, Centers and new strategic initiatives)**
- ❑ **Historically - scientifically outstanding programs - distributed around the globe (key strengths in epidemiology, molecular sciences, cancer control and clinical studies)**
- ❑ **Strong international training programs**
- ❑ **Collaborative efforts with the NIH Fogarty International Center**
- ❑ **Strategic pilot programs in Latin America, Russia and China – ongoing trials in Bangladesh**

# NCI's Strategies for Global Development

- ❑ **Build on significant historical strengths in international epidemiology (Dr. Joseph Fraumeni's vision)**
- ❑ **Leverage existing strong base of intramural alumni, international investigator-investigator relationships, broad global focus (CCR and DCEG, FIC training programs)**
- ❑ **Leverage strengths in international cancer data bases and cancer control (DCCPS)**
- ❑ **Leverage strengths in advanced technologies (e.g., nanotechnology, genomics)**
- ❑ **Undertake international partnerships in both basic and clinical research that extend U.S. capabilities**
- ❑ **Collaboratively with FIC develop pilot programs in selected geographic areas of high interest – put people in-country**
- ❑ **Move strategically to coordinate efforts across the NCI**
- ❑ **Bring new resources into international programs - new funding models**

# Implementation - Developing NCI's Global Agenda

- Understand the problems in-country**
- Assess the real needs and opportunities**
- Assess the capabilities – partnerships should be built on strengths**
- Develop strategic pilot initiatives – meet milestones – deliver something**
- Determine what works**
- Integrate success - better patient management**
- Contribute to advances in cancer research across the discovery, development and delivery continuum in-country**
- Pursue new opportunities for new funding models**
- Develop true trust-based partnerships and collaborations**



# Global Healthcare Policy Challenges

- Informed consent issues – genetic information in public databases; loss of privacy and risks; permission for future research; protection of family members**
- Achieving synergy – reducing redundancy**
- Bioethics – patient biospecimens management**
- Advanced technologies (Nanotechnology - environmental constraints affecting medical applications)**
- Management of intellectual property - conflict-of-interest**

## Example: Why Focus on Latin America

- ❑ **Cancer Burden in Latin America overall reflects trends in the U.S. – cancer on the rise as population ages**
- ❑ **Cancers that can be prevented are prevalent – e.g. stomach cancer**
- ❑ **Cancers such as stomach, uterine, liver can be addressed using known approaches**
- ❑ **2020 – Hispanic population will grow to ~59 million (19% of U.S. population) – largest minority population**
- ❑ **Shift in population make-up – 2000 80% of Hispanic population from Mexico, in 2006 had shifted to 65% from Mexico**
- ❑ **Increasing wealth in these countries – rise of science infrastructure**
- ❑ **Significant potential strengths in clinical trials**

# What Might We Expect from Globalization in the Next 10 Years?

- ❑ **Leadership in science and medicine – distributed – and driven by talent base – ability to access and leverage information and investment**
- ❑ **Medicine: shift toward understanding disease mechanisms – diagnosing earlier – down staging; moving toward global standards**
- ❑ **Health care system changes – knowledge base combined with new bioinformatics tools and broadband will enable access to unprecedented information, tools and strategies – conceivably anywhere on the globe**
- ❑ **Healthy populations becomes critical – and will define stability and economic capability**
- ❑ **Economics – rapid rise of knowledge based economies – shift of economic strength**

# Some Questions

- Is global health (perhaps personalized – but yet to be defined) a viable long-term collaborative goal?**
- Can we capitalize globally on the convergence of advances in biomedical research, technologies, bioinformatics and broadband to realize global health and drive knowledge based economies?**
- Can we achieve unprecedented connectivity - new HIT systems - information management?**
- If so, will information be a revolutionary “leveler” – and enable delivery on the promise of 21st century global health?**
- Can we hope to connect biomedical research to physicians and electronic medical records to consumers across the globe?**
- Can we develop the business models and policies to ensure delivery beyond the developed world?**

# Today's Presentations

- **Overview – Anna D. Barker, Ph.D.**
- **China – Anna D. Barker, Ph.D.**
- **Latin America – Jorge Gomez, M.D., Ph.D.**
- **Middle East – Russia – Joseph F. Harford, Ph.D.**
- **Bangladesh – Richard Love, M.D.**



# The NCI's Office of China Cancer Research Programs

*(Dr. Julie Schneider, Ph.D., Director)*

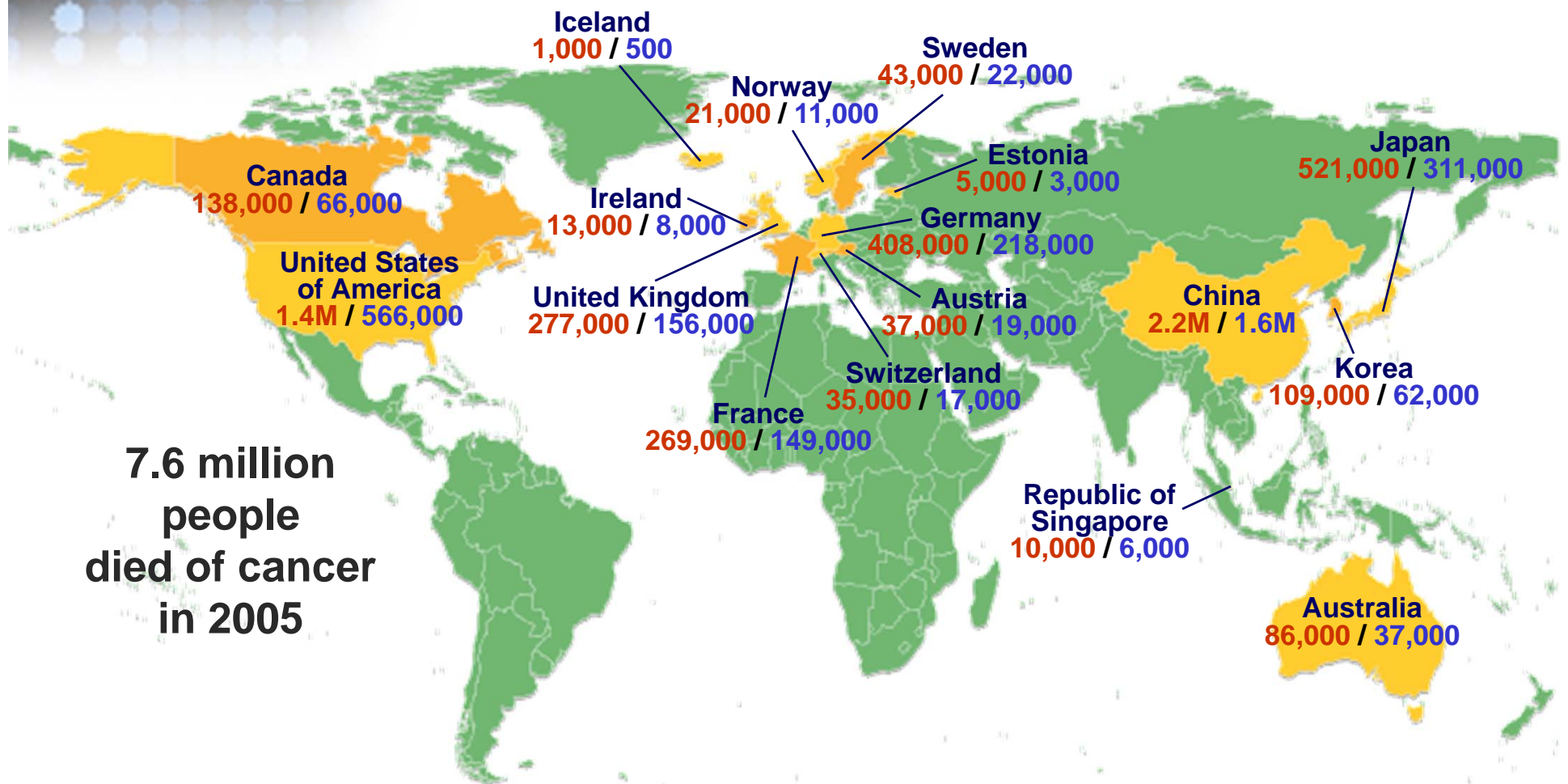
**(Building on U.S. – China History of Successful Cooperative Programs in Cancer Research)**

*Anna D. Barker, Ph.D.*

*Deputy Director, NCI*

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# An International Imperative: Address the Growing Cancer Burden



Cancer **Incidence** / **Mortality** per year

Source: Derived from International Agency for Research on Cancer, GLOBOCAN 2002 database

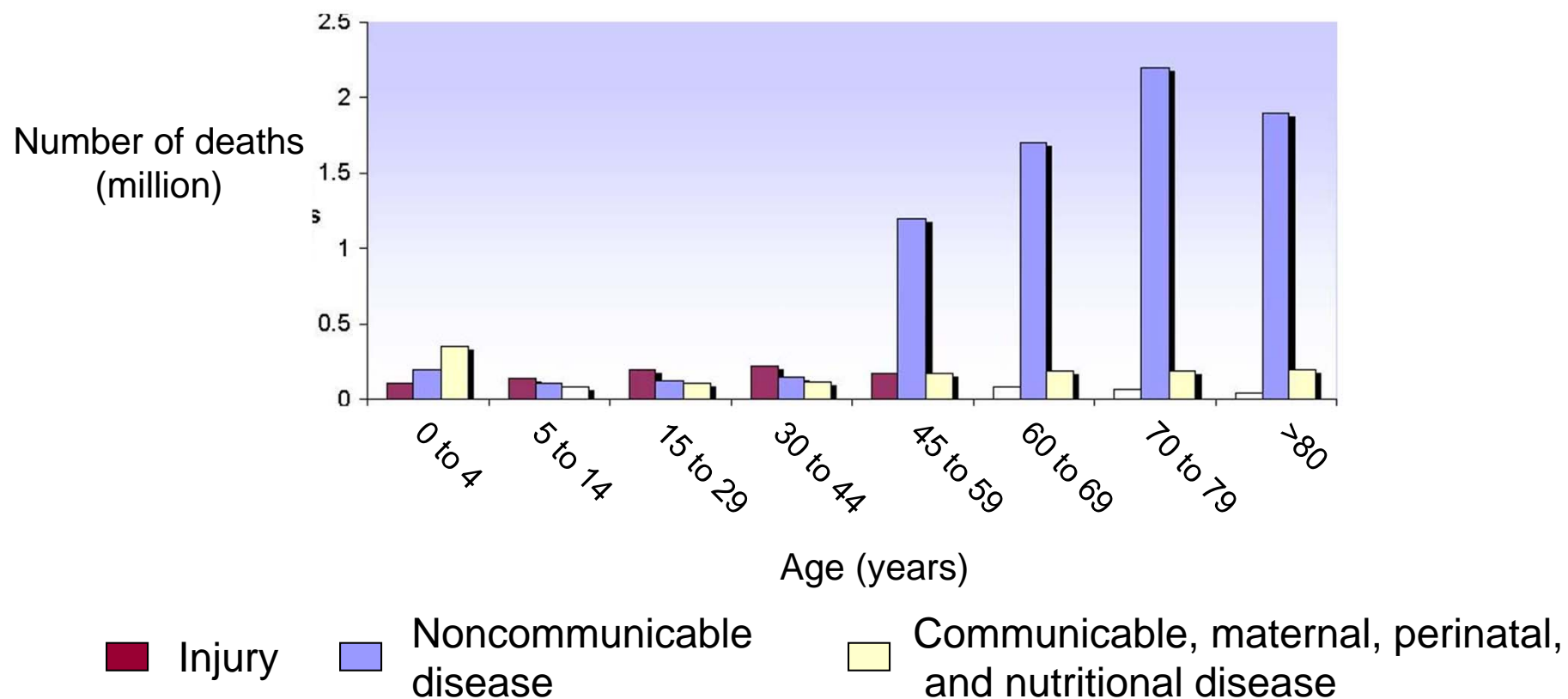


# Overview and Rationale for Expanding Cancer Partnerships in China



# Disease in China: Acute and Chronic Diseases

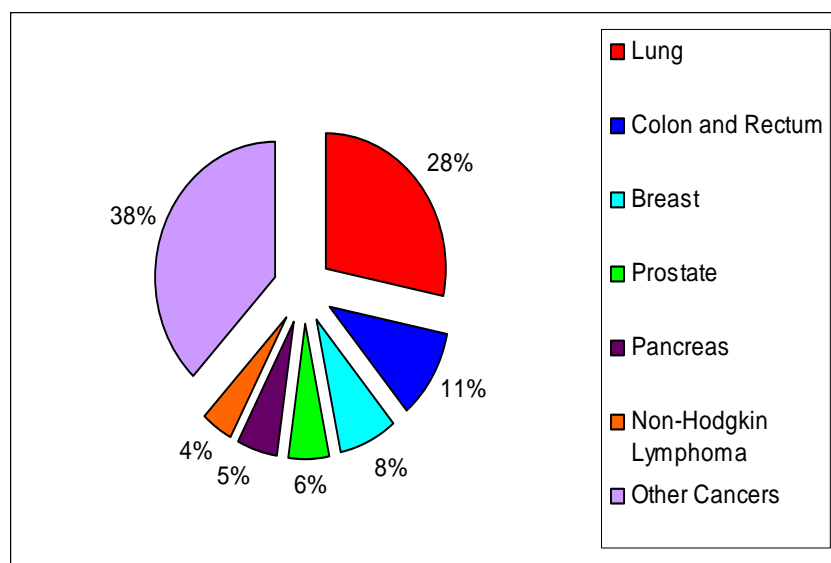
Number of Deaths in China by Cause and Age in 2003



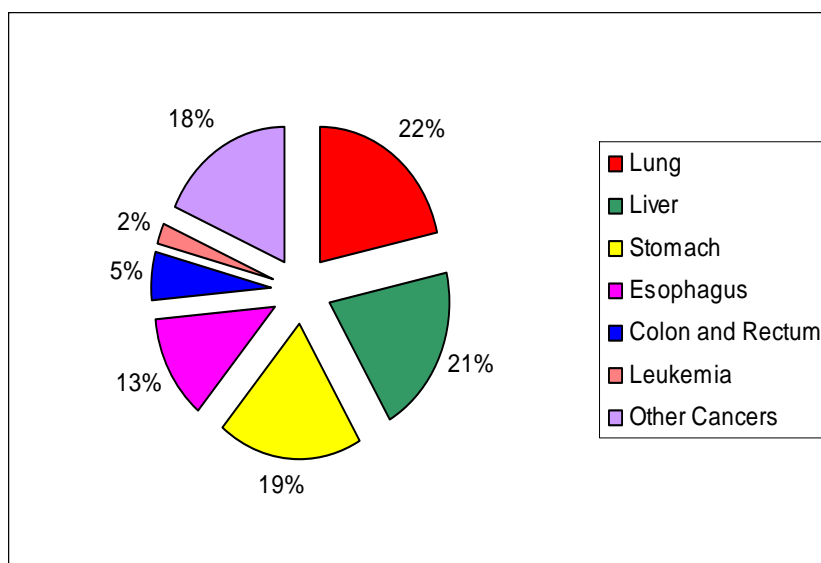
Source: WHO World Health Report (2005)

# Cancer Deaths in the U.S. and China

## U.S.



## China



Source: GLOBOCAN 2002 combined data for males and females.

# Cancer in China

- 2008 national mortality survey estimates that cancer is #1 killer in Chinese cities and #2 killer in countryside
  - Accounts for 25% urban deaths, 21% rural deaths
- Contributing factors include:<sup>1</sup>
  - Aging population
    - 23% of Chinese population will be >60 years by 2035
  - Dietary changes
    - 23% population is overweight
  - Environmental/occupational hazards
  - Hepatitis B
  - Smoking
    - 350 million Chinese smoke

<sup>1</sup>WHO Country Health Information Profiles (2008).

# Unique Scientific Opportunities in China

- Access to large numbers of cancer patients
  - An estimated 1.9 million Chinese died of cancer in 2005<sup>1</sup>
  - Key differences in most common types of cancer
  - Rapid increases in certain cancers common in the developed world
- Access to populations exposed to chemical and/or infectious agents that increase cancer risk not observed in the U.S.
- Access to cohorts with unique dietary habits not observed in the U.S.
- Opportunities to use Western scientific approaches to evaluate Traditional Chinese Medicine techniques

<sup>1</sup>World Health Organization

# Rationale: Expanding Partnerships in China Now

- Growing burden of chronic disease in China
  - Highlighted in Fogarty International Center Strategic Plan 2008-2012
- China's investment in science and technology nearly tripled between 2000 and 2005<sup>1</sup> to an estimated 1.1% of GDP,<sup>2</sup> and continues to increase
  - Opportunity to partner for mutual benefit during the development of China's cancer research capabilities during growth phase
- Large numbers of U.S.- trained scientists are returning to leadership positions in China's biomedical research sector<sup>3</sup>

<sup>1</sup>*Science* (2007) **318**: 586-587.

<sup>2</sup>*Science* (2005) **309**: 65-66.

<sup>3</sup>*Washington Post*, February 20, 2008.

# Summary: Range of Reasons for NCI's Active Role in China

- “Affording” the cost of 21<sup>st</sup> century cancer research – and taking advantage of major scientific talent pools
- Build on 30 years of cooperation
  - Currently, NCI supports more than 50 China-related projects (basic research, epidemiology, occupational/environmental health, tobacco control)
- Build on network of NCI/NIH alumni in China
  - More than 500 Chinese work in the NIH intramural program each year
- Continue to encourage talented Chinese researchers to work in U.S. cancer research laboratories
- Promote health diplomacy, “soft power,” and maintain open channels of communication with China’s leadership
  - Theme highlighted in Dr. Francis Collins’ August 17, 2009 inaugural lecture as NIH Director



# History and Background: NCI-China Programs

# Atlas of Cancer Mortality in China

- In the 1970's China completed a 3-year mortality retrospective investigation of 850,000,000 individuals
- In 1976 an Atlas of Cancer Mortality was published that identified several cancer “hot spots”





# 1979: A Key Year in the History of NCI-China Cooperation

June

U.S. and Chinese Governments sign the Health Protocol

September

Annex 1 of Health Protocol specifies areas of cancer research for increased cooperation

November

NCI Director, Arthur Upton, meets with Chinese Academy of Medical Sciences (CAMS) Cancer Center Director in Beijing

# Examples of NCI-Supported Critical China Studies (1980's)

## ***Study:***

- Benzene
- Esophageal cancer
- Liver cancer
- Lung cancer
  - Xuan Wei (indoor cooking)
- Cancer in textile workers

## ***Partners:***

- DCEG-China CDC
- DCEG-CAMS Cancer Institute
- CCR- CAMS Cancer Institute, Qidong Liver Cancer Institute
- DCEG-China CDC
- University of Washington-Shanghai Textile Industry Bureau

# Examples of Later NCI-Supported Studies (1990's and 2000's)

## **Study:**

- Clinical trials -luteal adjuvant oophorectomy
- Gastric cancer
- Lung cancer and indoor radon exposure
- Lung cancer screening
- Nasopharyngeal carcinoma
- Shanghai cohorts
- Tobacco control
- Traditional Chinese Medicine

## **Partners:**

- Ohio State University - multiple Chinese inst.
- DCEG - Peking University
- DCEG-EPA-China CDC
- DCP-CAMS Cancer Institute, Yunnan Tin Corp.
- Harvard School Public Health-Zhongshan Univ.
- Vanderbilt-DCEG-Shanghai Cancer Institute
- Various U.S. institutions - China CDC, others
- MD Anderson-Fudan University

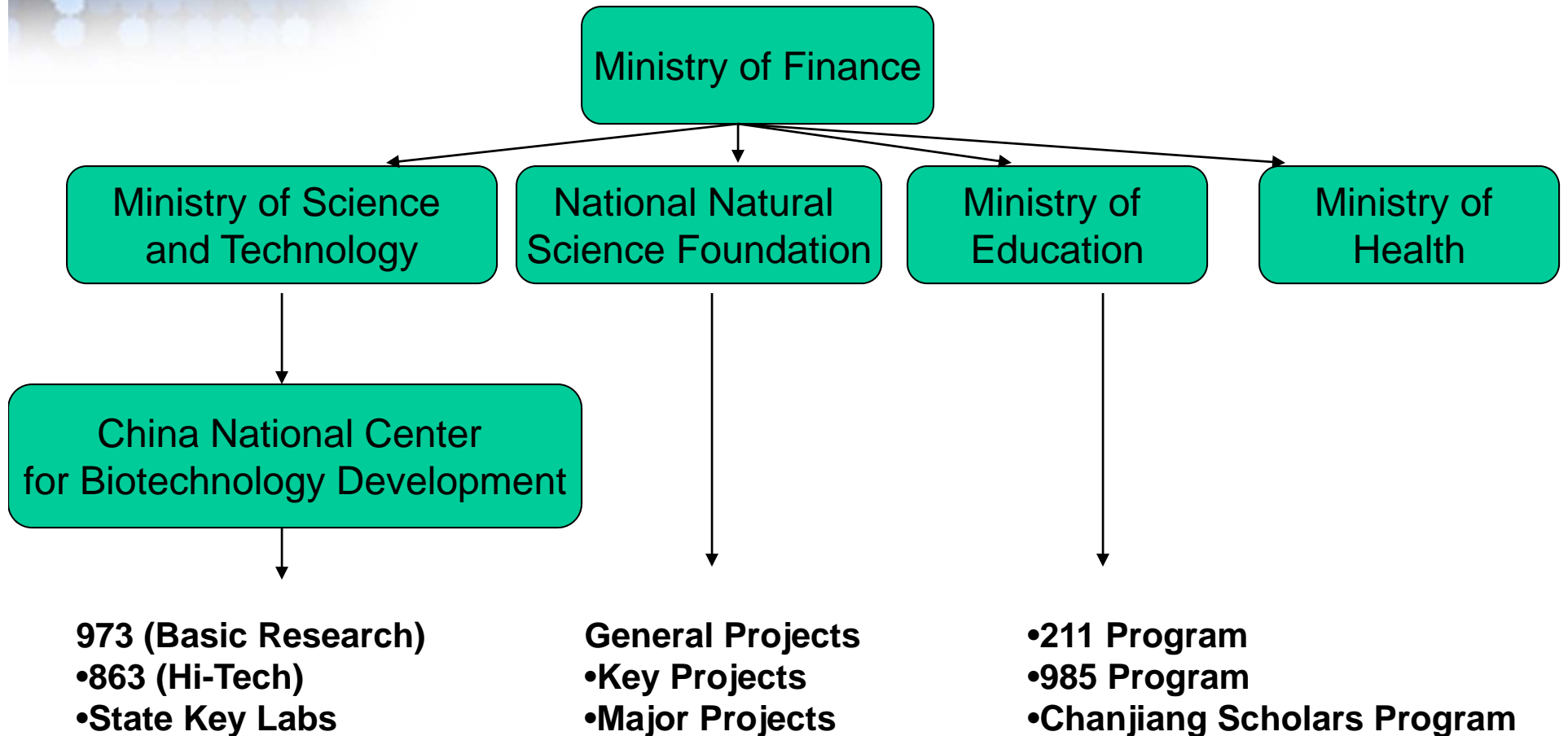
# NCI-Supported Extramural Institutions - Expanding China-Related Initiatives

- Asia Cohort Consortium
  - ACC coordinating Center located at Fred Hutchinson Cancer Research Center
- Duke-Peking University Cancer Clinical Trials Initiative
- Johns Hopkins Institute for Global Tobacco Control
- MD Anderson Global Academic Programs Sister Institution Program
- National Comprehensive Cancer Network April 2009 Conference in Beijing



# Brief Overview of Cancer Research System in China

# Sources of Government Cancer Research Funding in China



**973 (Basic Research)**  
•863 (Hi-Tech)  
•State Key Labs

**General Projects**  
•Key Projects  
•Major Projects

•211 Program  
•985 Program  
•Chanjiang Scholars Program

# Major Organizations in China Involved in Cancer Research



- Chinese Academy of Medical Sciences
  - Cancer Institute/Hospital recently designated as China's National Cancer Center



- Chinese Academy of Sciences
  - Approximately 20 out of 90 CAS Institutes focus on biological research

中国科学院  
CHINESE ACADEMY OF SCIENCES

- China CDC
  - Focuses on disease control and prevention
  - Cooperates with hundreds of provincial, city and county CDCs throughout China as well as township health centers and clinics



- Universities
  - Leading cancer research universities include: Fudan University, Tianjin Medical University Cancer Institute and Hospital, Peking University, and Zhongshan University

# Distribution of CAS and CAMS Biomedical Institutions







Overview and Goal of NCI  
Office of China Cancer  
Programs

# NCI's Office of China Cancer Programs

- Building on past scientific alliances, Chinese alumni (nearly every cancer institution in China is led by someone trained at NCI), scientific opportunities and advantages of having a presence in-country in 2007, as part of a broader global strategy, the NCI:
- Posted Dr. Julie Schneider to Beijing
- Began a due-diligence process to understand both opportunities and needs in China
- Elected to locate in the U.S. Embassy – where several other federal agencies are located:

HHS - NIH/NIAID - U.S. Centers for Disease Control - Food and Drug Administration - National Science Foundation - NCI



# Timeline for Establishing Position Overseas

<b>Task</b>	<b>Estimated Time</b>
HHS Approval	1-2 months
State Department Approval (NSDD-38)	2-3 months
Medical Clearance	2-5 months
(Immunizations)	2 months before travel
Security Clearance	3-5 months
Security Training	1-2 weeks
(Travel Arrangements)	2-3 months
(Moving Arrangements)	2-3 months
Assignment and Arrival Cables	1-2 weeks

# Mapping the Cancer Research Landscape in China

## Chinese Institutions

- Government representatives
  - MOST/CNCBD, MOH, MOE, NSFC, SFDA, China CDC
- Researchers
  - CAMS, CAS, and several top universities
- Private sector representatives
  - CROs, biotechnology and pharmaceutical companies
- Medical research ethics experts

## U.S. Institutions

- International Organizations
  - CMB, Clinton, Gates, IARC, WHO, World Bank, NRDC, NFCR
- Fogarty International Center
- NCI Program Directors with China activities
- NCI-supported (intramural and extramural) PI's working in China
- Science/Health experts at U.S. Embassy Beijing

# Observations to Date from "Due Diligence"

- There are effective models of international research collaboration in China: Joint research funding; jointly organized institutes (virtual) and computational Biology)
- There are significant challenges in increasing our partnerships and collaborations to conduct cancer research in China:
  - ✓ Biospecimen Export
  - ✓ Human Subjects Protection
  - ✓ Research Integrity
  - ✓ Intellectual Property
  - ✓ Further Development of Informatics Infrastructure

# Early Areas Identified as Highly Promising for Future NCI-China Research Partnerships

- **Advanced Technologies**
  - Cancer Genomics
  - Nanotechnology and Cancer
- **Environmental Pollution and Cancer**
- **Cancer Treatment Clinical Trials**

# Cancer Genomics

- Access large populations of patients with common cancers in China (e.g. esophageal, gastric, liver)
- Study rare cancers
- Investigate genetic differences in Chinese populations that may affect drug response
- Build on existing expertise in cancer research and genomics in China
  - Completed 1% of Human Genome Sequence
  - Launched Chinese Cancer Genome Project
- Build on interest of top Chinese organizations
  - Co-organizing 30<sup>th</sup> Anniversary meeting with CAMS

# Nanotechnology and Cancer

- Build on capacity and expertise in China
  - Chinese Central Government invested an estimated \$240 M USD from 2004-2007, and local governments another \$360 M USD<sup>1</sup>
  - China has the second largest world share of publications in nanotechnology after the U.S.
- Build upon interest of top Chinese organizations
  - Organized first Joint U.S.-China Symposium on Nanobiology and Nanomedicine with the National Center for Nanoscience and Technology of China (NCNST), CAS

<sup>1</sup>*Science* (2005) **309**: 65-66.

<sup>2</sup>*Scientometrics* (2007) **70(3)**: 693-713.



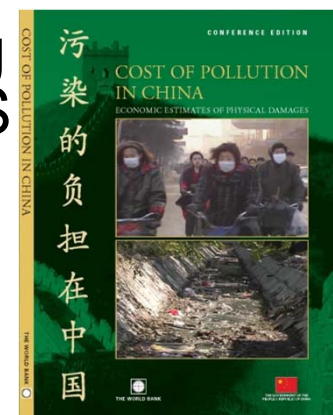
NCNST: [www.nanoctr.cn](http://www.nanoctr.cn)



# Environmental Pollution and Cancer

- Study levels and types of environmental exposures not observed in the U.S.
  - 16 of the world's top 20 most polluted cities are in China<sup>1</sup>
- Build on strong history of NCI epidemiology and occupational health studies
- Build upon interest of top Chinese research organizations to develop new partnerships in this area
  - Environmental pollutants and cancer meeting to be co-organized with CAS, FIC and NIEHS
- Leverage partnership opportunities with U.S. CDC, State Department experts, and International NGOs in Beijing

<sup>1</sup>Source: World Bank



# Cancer Treatment Clinical Trials

- Potential for faster patient enrollment
- Study cancers that are more common in China than the U.S.
- Build on international activities of the NCI Clinical Trial Cooperative Groups, Cancer Centers, and SPOREs
- Build on China central and local government support for globalizing clinical research in China
  - Examples include: Shanghai Clinical Research Center, China Medical City, Taizhou
- Influence the development of China's clinical trial infrastructure
  - Key issues include: data quality control, implementation of human subjects regulations, developing informatics systems

# Plans to Develop NCI Presence in China

- Phase 1(2007-2010)
  - Complete Due Diligence, Knowledge Building, Feasibility Assessment, and Pilot Project Design
- Phase 2 (2010-2012)
  - Develop and Launch Collaborative Mutually-Beneficial Pilot Studies
- Phase 3 (2012-2014)
  - Based on Pilot Studies, Launch Scientific Programs Based on a Broader NCI Research Agenda

# Upcoming Activities

- A 30<sup>th</sup> Anniversary Symposium to mark the signing of the MOU between NCI/HHS and the Chinese Academy of Medicine (November 2009)
- Environmental Pollutants and Cancer Meeting (January 2010)
- Finalize and Distribute Strategic Plan for the Office of Cancer China Programs, Launch Web Site - (First Quarter 2010)
- Joint U.S.-China Symposium on Nanobiology and Nanomedicine (Spring 2010)
- Potential Workshop to Review the State of Cancer Treatment Clinical Trials in China (Autumn 2010)