

# **The University of Texas M. D. Anderson Cancer Center**

**Speeding Innovation to  
Practice**

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Provost and Executive Vice President**

# **The University of Texas M. D. Anderson Cancer Center**

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## **Vision**

**We shall be the premier cancer center  
in the world, based on the excellence  
of our people, our research-driven  
patient care and our science.**

**We are Making Cancer History®  
for each patient we serve and for mankind.**

# America's Best Hospitals

## U.S. News & World Report

EXCLUSIVE RANKINGS

The Top Care in 10 Specialties Including: Cancer, Heart, Orthopedics

### REGIONS

- Northeast
- South
- West
- Midwest

Rank Hospital

- 1 University of Texas M. D. Anderson Cancer Center, Houston
- 2 Memorial Sloan-Kettering Cancer Center, New York
- 3 Johns Hopkins Hospital, Baltimore
- 4 Mayo Clinic, Rochester, Minn.
- 5 Dana-Farber Cancer Institute, Boston
- 6 University of Washington Medical Center, Seattle

**What do we know about  
cancer on planet Earth?**

# History of Cancer

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- 70-80 million years ago -- evidence of cancer exists in dinosaur fossils
- 3000 BC -- evidence of cancer exists in mummies
- 400 BC -- The Greek physician Hippocrates was the first to recognize the difference between benign and malignant tumors
- 50 AD -- Romans found that some tumors could be removed by surgery, which would turn out to be the mainstay of treatment for the next several hundred years
- 1939-45 -- during World War II the US Army discovered that nitrogen mustard was effective in treating lymphoma, which ushered in the “era of chemotherapy”

# What do we currently know about Cancer?

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- **One in three people will develop cancer in their lifetime**
- **One in four people will die from cancer**
- **In 2005, about 1.4 million new cases of cancer were diagnosed in the USA**
- **More than 1500 Americans died each day of cancer this year, about 60 people will die of cancer during our presentation**
- **Over 1 million cases of skin cancer will be diagnosed this year**
- **Cancer is the leading cause of death for Americans under the age of 85**

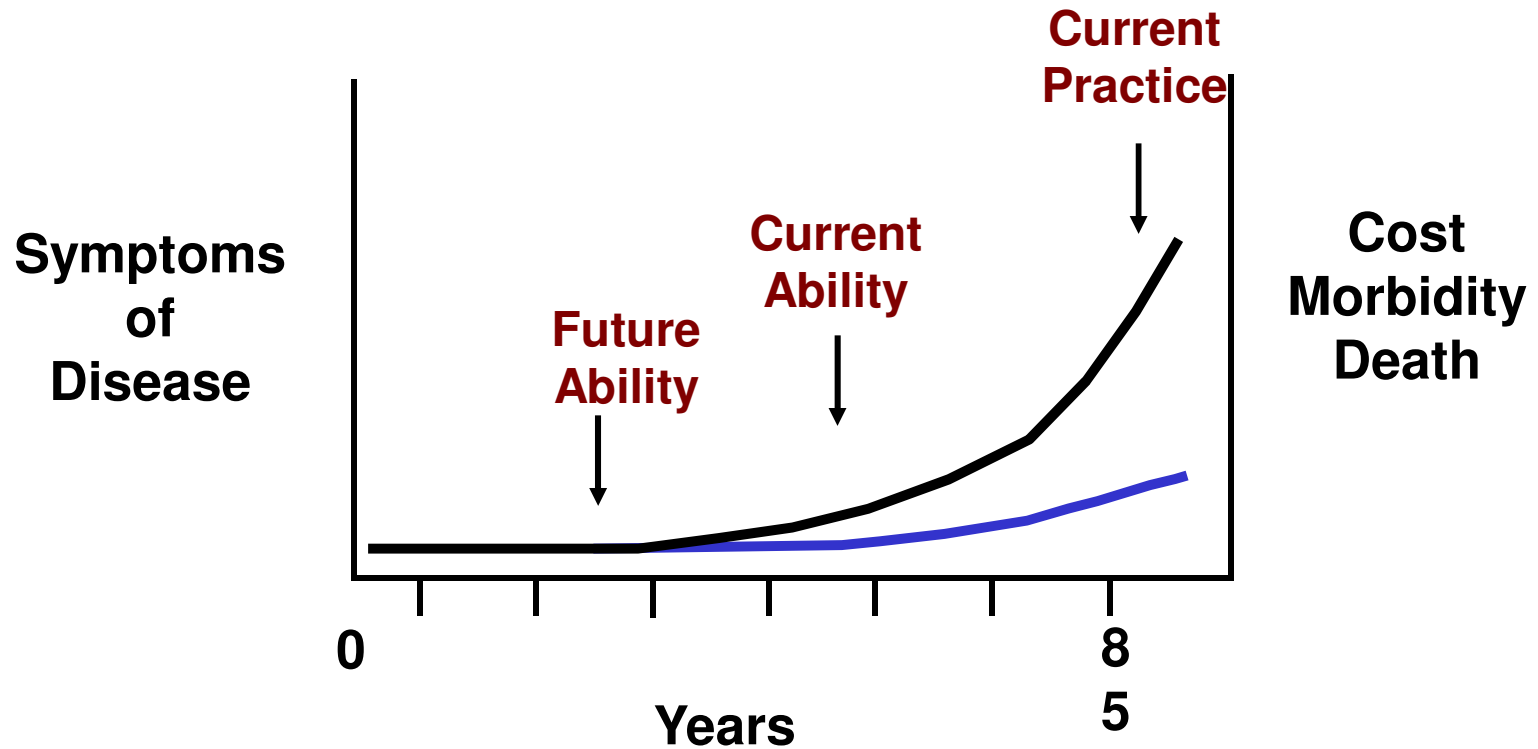
**In many instances cancer doesn't have  
to happen...it can be prevented or  
delayed!!**

**Every year in the USA alone we lose  
about 500,000 lives due to cancer**

**Over half of these premature deaths  
could have been prevented!!**

# Disease Prevention Concepts

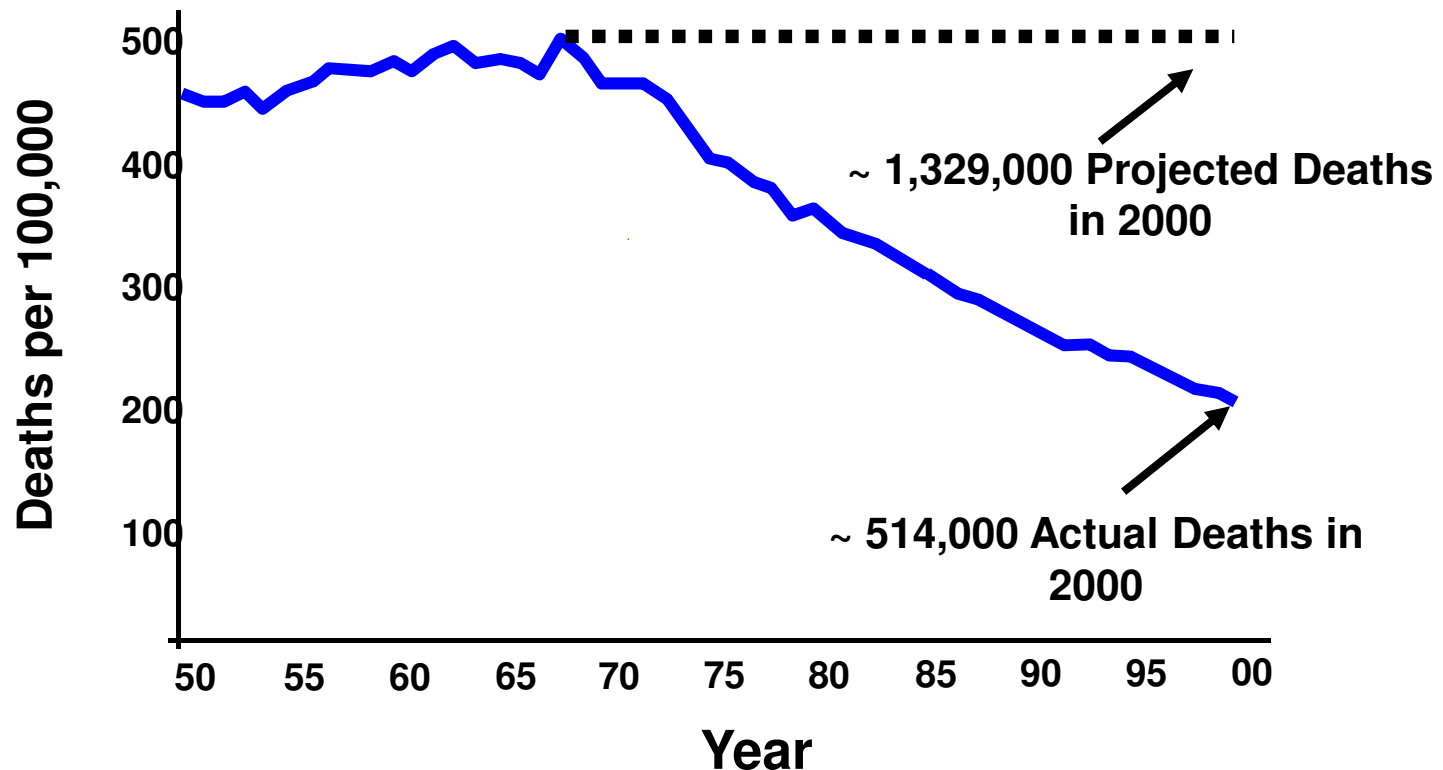
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**Why is it so important for  
our country to invest in  
biomedical research?**

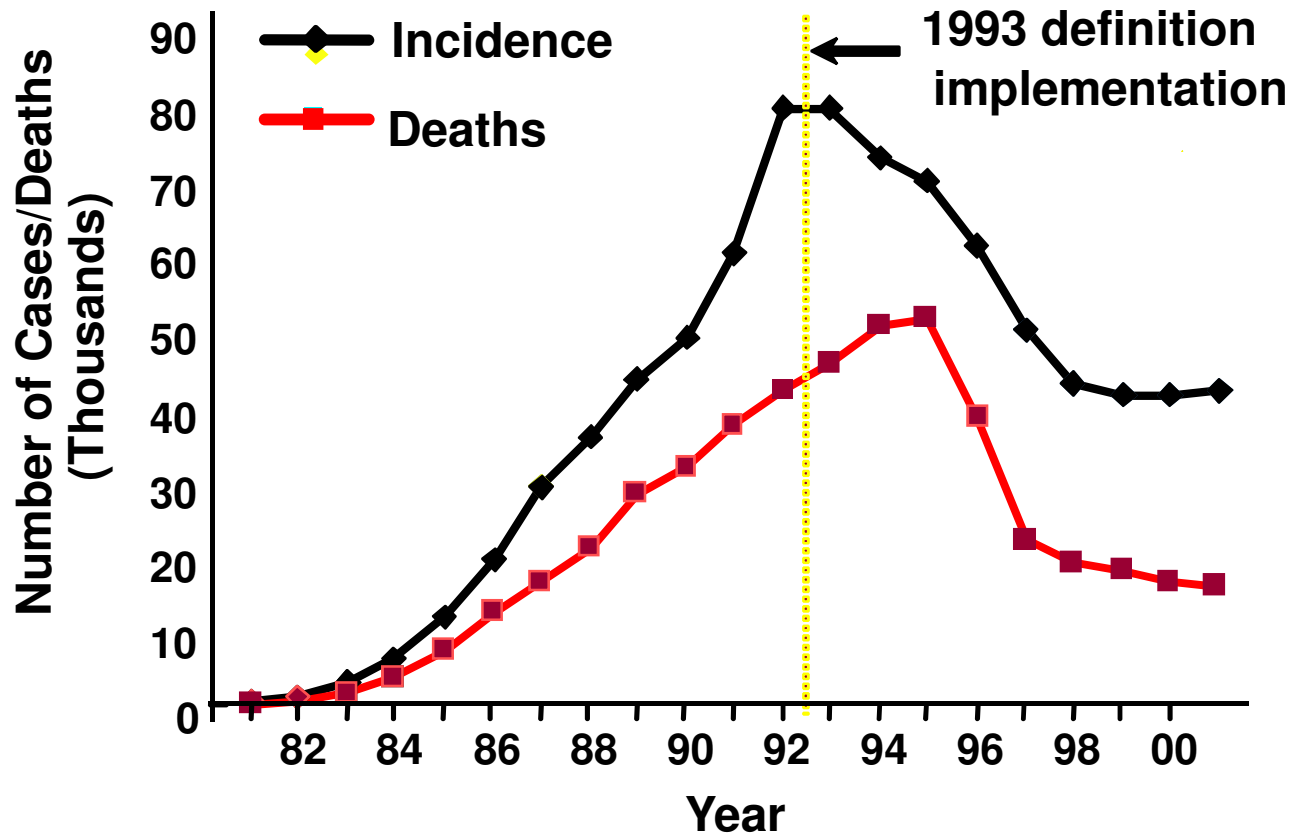
**What is our return on this  
investment?**

# Examples of Progress in the 20<sup>th</sup> Century Heart Disease



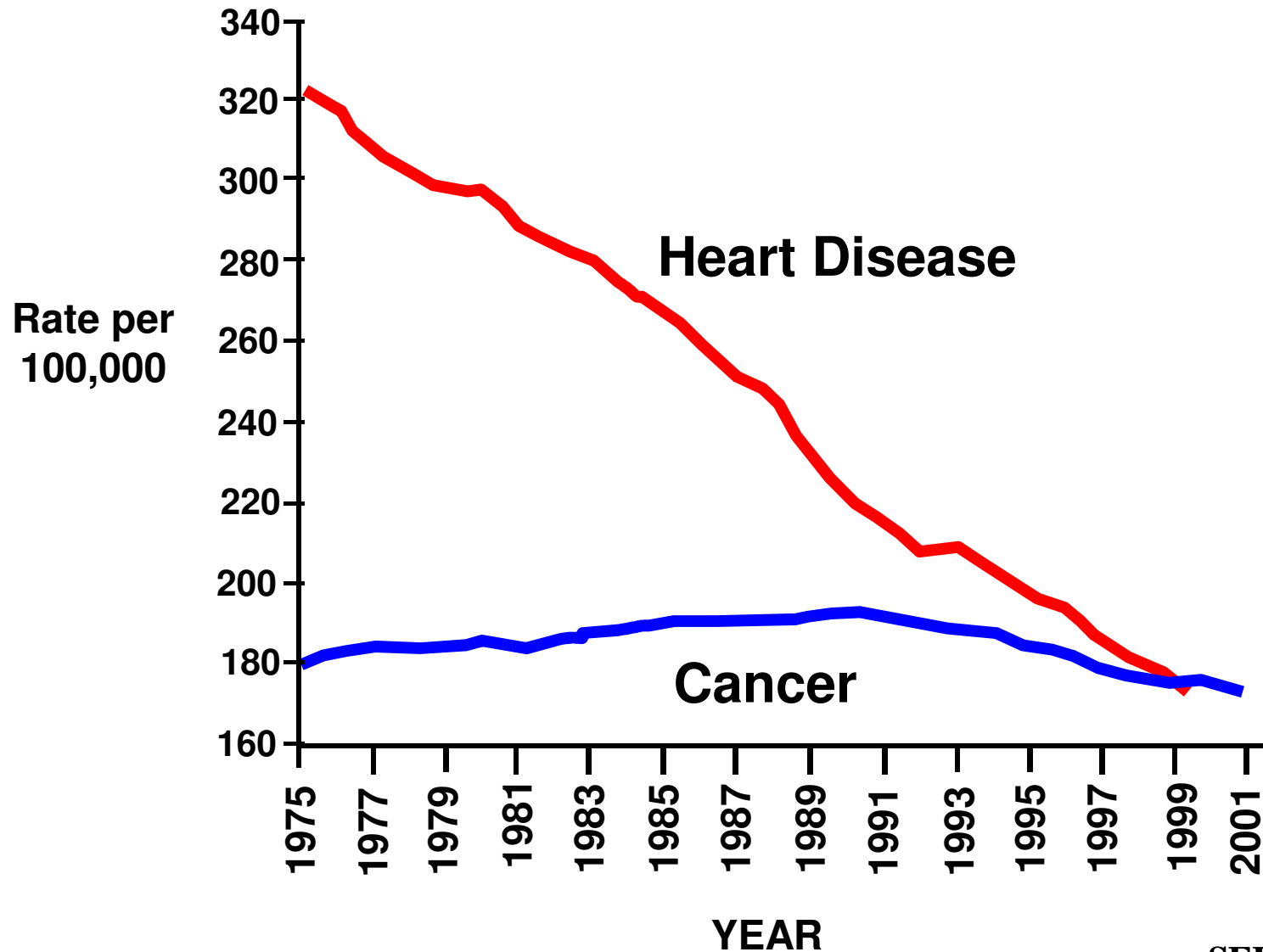
**An investment in research prevented 815,000 deaths due to coronary heart disease!!**

# Examples of Progress in the 20<sup>th</sup> Century HIV/AIDSs



**An investment in research reduced the death rate and disease caused by HIV/AIDSs in the U.S.!!**

# Death Rates from Heart Disease & Cancer



# What is the value of an investment in Cancer Research?

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- What is the value of improved health and longevity?
- University of Chicago economists Kevin Murphy and Robert Topel studied this carefully and reported their findings at the latest AACR meeting (April 2006)
- They found that a 1% reduction in cancer mortality would be worth nearly \$500 billion to the economy
- They concluded that an additional \$100 billion spent on cancer research would be worthwhile even if it only had a 1 in 5 chance of reducing mortality by just 1%

# Key Risk Factors that you can do something about

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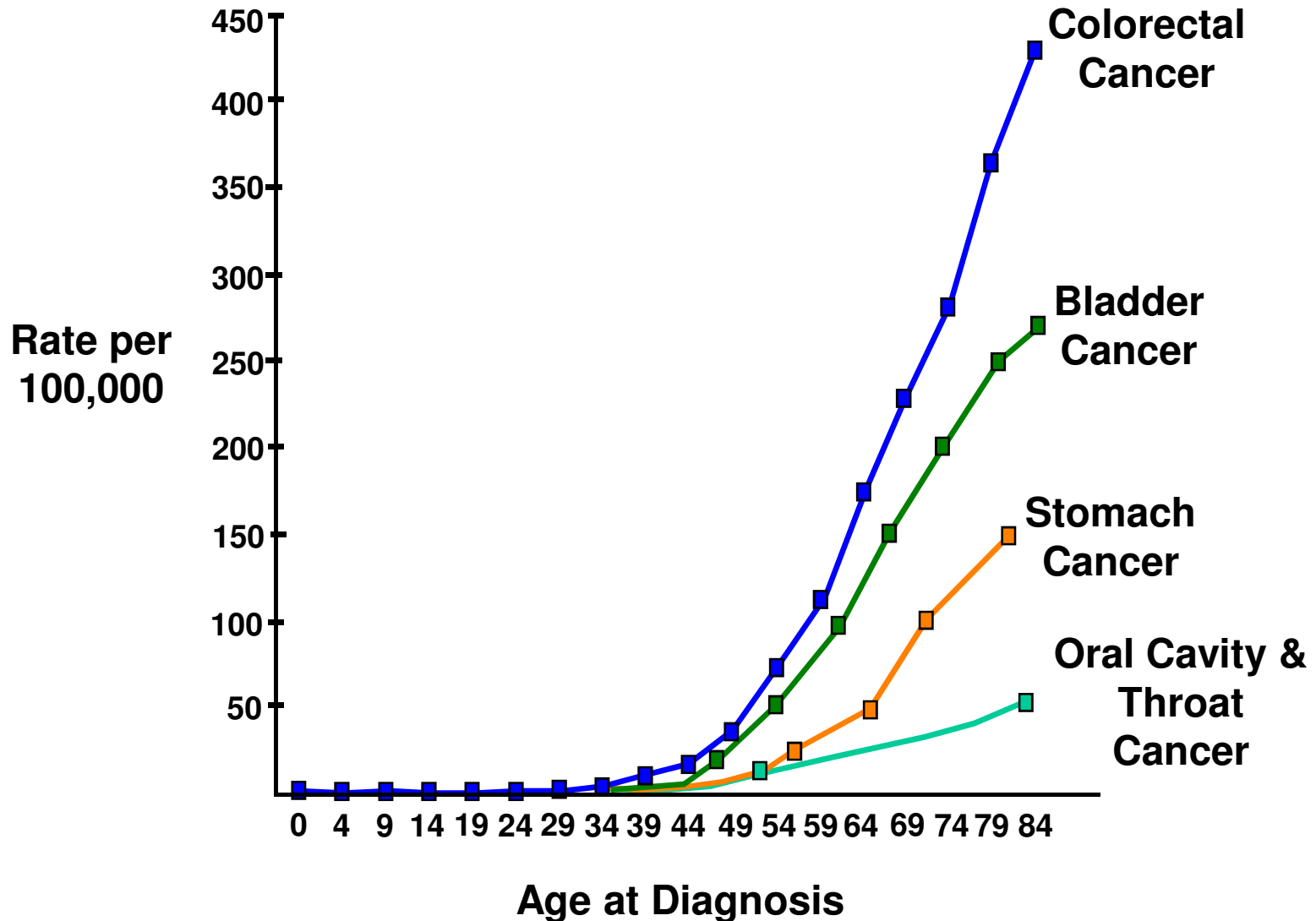
- **Physical activity**
- **UV radiation**
- **Tobacco - before 1900 lung cancer was rare**
- **Alcohol**
- **Occupational and environmental carcinogens**
- **Dietary risk factors**
- **Early detection and screening**

# Risk Factors that you can't do much about

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- **Age**
- **Ethnicity or race**
- **Sex**
- **Hereditary factors**

# Risk of Cancer Versus Age



# CANCER: 30 YEARS AGO

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- **Only able to detect large, advanced tumors**
- **Short Survival Times**
- **One child in 10 survives cancer**
- **Treatments were empirical, painful and required long hospital stays**
- **No early detection**

# CANCER TODAY



- For the first time annual cancer deaths in the United States have fallen for the previous 2 years
- 10 million survivors
- Early detection and screening are more effective
- New targeted, minimally invasive treatments for cancer have multiplied
- New discoveries make it possible for the first time to “PERSONALIZE” cancer treatment

What are we doing about  
cancer at the MD Anderson  
Cancer Center in Houston,  
Texas?

# Patient Care

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	<b>FY97</b>	<b>FY07</b>	<b>10-Year Growth</b>
<b>Total Patients Served*</b>	45,465	83,471	84%
<b>New Patients Served</b>	16,489	28,762	75%
<b>Patients in Therapeutic Clinical Trials</b>	3,466	11,661	235%

**\*1/3 Houston area, < 1/3 rest of Texas, > 1/3 USA and international**

# Resources

	FY 07	10-Year Growth
All Employees	15,686	118%
Faculty	1364	104%
Nurses	2498	170%
Trainees	5,541	188%
Operating Budget	\$2.5B	269%
Gross Sq Ft	9,752,625	161%

# Research Expenditures 2007

## 10 - Year Growth: 325%

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**Total Research Expenditures** **\$445M**

Federal grants/contracts 43%

Institutional support for research 15%

Philanthropy 14%

Industrial contracts 7%

State of Texas 5%

Institutional component of  
research faculty salaries 16%

# MDACC Programs of Excellence: Multidisciplinary Disease Site Centers

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- Bone Marrow/Stem Cell
- Breast
- Gastrointestinal
- Genitourinary
- Gynecology
- Leukemia
- Lymphoma
- Melanoma/Skin
- Neuro-Oncology
- Sarcoma
- Thoracic
- Head and Neck

## **Clinical Divisions:**

Anesthesiology and Critical Care

Cancer Medicine

Cancer Prevention and  
Population Sciences

Diagnostic Imaging

Internal Medicine

Pathology/Laboratory Medicine

Pediatrics

Quantitative Sciences

Radiation Oncology

Surgery

## **Basic Science Departments:**

Biochemistry & Molecular  
Biology

Biomedical Engineering

Cancer Biology

Cancer Genetics

Carcinogenesis

Immunology

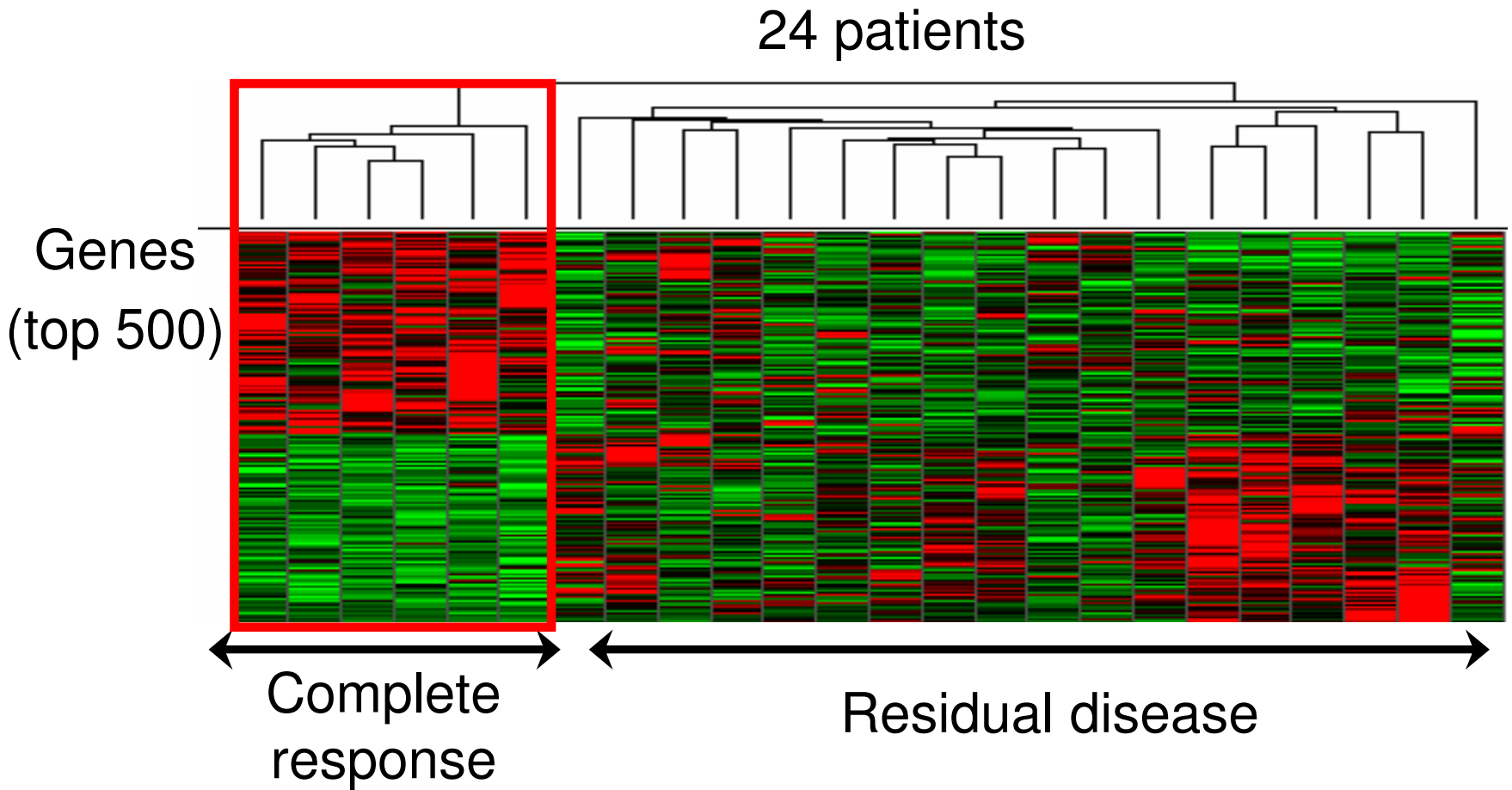
Molecular & Cellular Oncology

Molecular Genetics

Veterinary Medicine & Surgery

Veterinary Sciences

# Gene expression patterns can identify patients with complete response to chemotherapy



# The Best Cancer Treatment and Care

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- USA five year overall survival statistics

<u>CANCER</u>	<u>USA</u>	<u>MDACC</u>
Localized	77%	80%
Regional	46%	54%
Distant	18%	24%
Unstaged	25%	48%

- Patient Satisfaction Survey
- Surgical Track Record
- *Best Doctors In America*: 20% of our physicians

# MD Anderson Surgery: Highest Quality Available Anywhere

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## Post-surgical Mortality (30 day)

	<u>Lo Volume</u>	<u>Hi Volume</u>	<u>MDACC</u>
<b>Esophagus</b>	<b>15.5%</b>	<b>6.8%</b>	<b>2.1%</b>
<b>Liver</b>	<b>16.8%</b>	<b>7.9%</b>	<b>0.8%</b>
<b>Pancreas</b>	<b>12.8%</b>	<b>3.2%</b>	<b>0.7%</b>

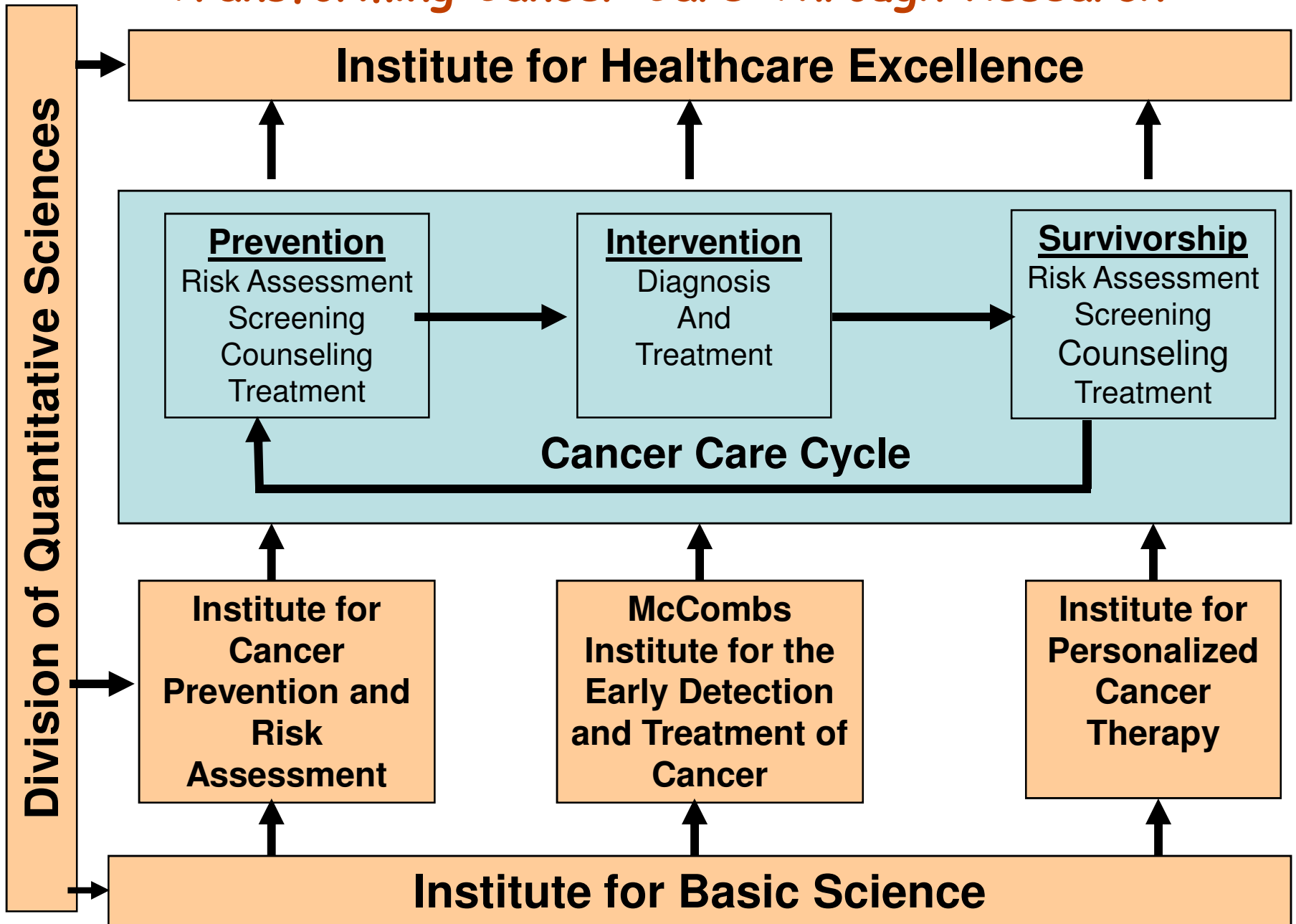
*Birkmeyer et al; Cancer 106:2476, 2006*

# Where are we in Making Cancer History?

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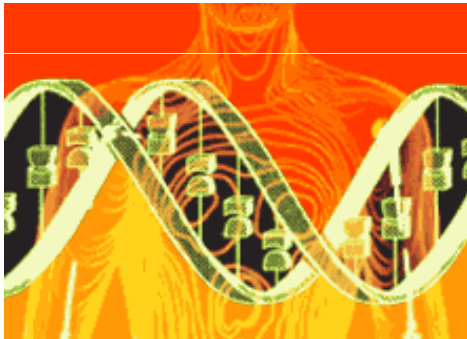
- Afflicts 41% of Americans and increasing due to aging population
- Improved statistics
  - 5 year survival: increasing – now at 64%
  - Death rate: decreasing 1-2% per year for over a decade
  - Total deaths: decreasing for 3 years
- New knowledge and technologies
  - Human genome/cancer genome
  - Regulation of growth, survival and spread of cancer cells
  - Technology: molecular diagnosis and imaging
  - Bioinformatics

# Transforming Cancer Care Through Research



# Our Best Hope for the Future: Transform Medicine Through Discovery

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**Predictive**



**Personalized**



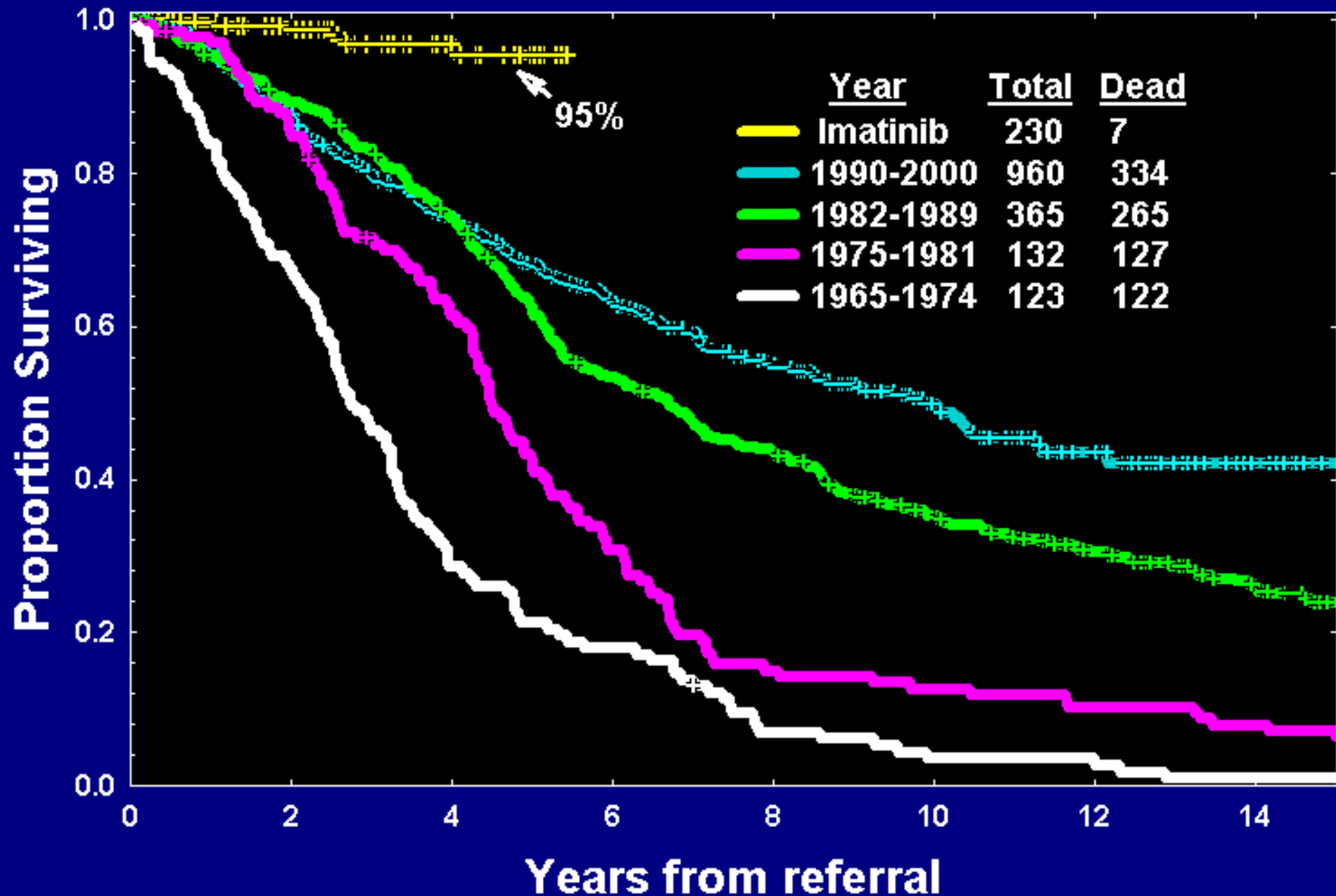
**Preemptive**

# Examples of Successful Targeted Strategies in Leukemia

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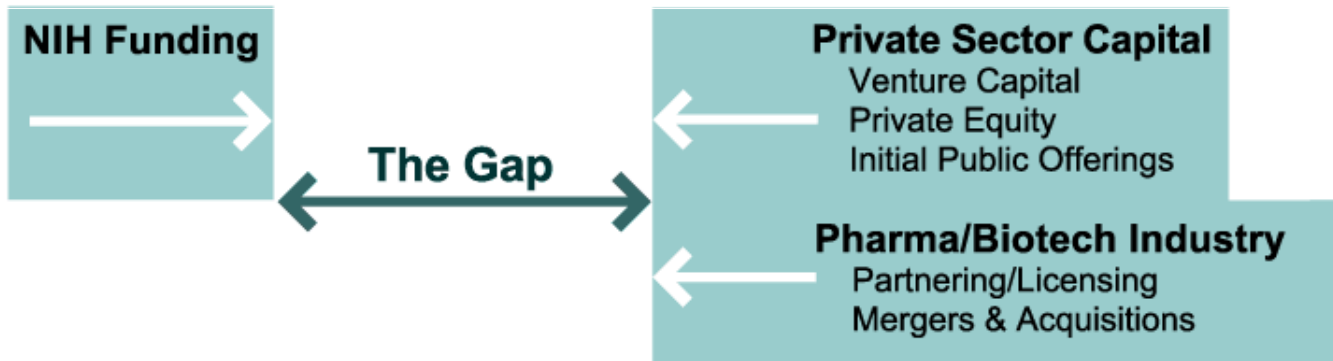
- Tyrosine kinase inhibitors in Chronic Myelogenous Leukemia: Gleevec, nilotinib, dasatinib (three FDA registration trials)
- Hypomethylation strategy for a number of leukemias: decitabine
- Retinoic acid +  $As_2O_3$  in Acute Promyelocytic Leukemia
- Anti CD20 monoclonal antibody in Chronic

# Survival in Early Chronic Phase CML



# Gap in our Progress

## The Gap In Capital Sources



# Office of Technology Discovery

- OTD created in late 2001
- Service for faculty to stimulate innovation, discovery, development, and commercialization of new technologies
- Services include:
  - Consulting
  - Funding
  - Project management
  - Education
  - Networking

# Technology Review Committee

- TRC = Technology Review Committee
- 29 members
- 1 monthly meeting
- Make funding recommendation to executive management team
- How we bridge the “funding gap”:
  - TRC to TIF to ETF to private investment/license
  - Role of Texas Cancer Funds

# Activity (5 years)



1311 formal faculty contacts

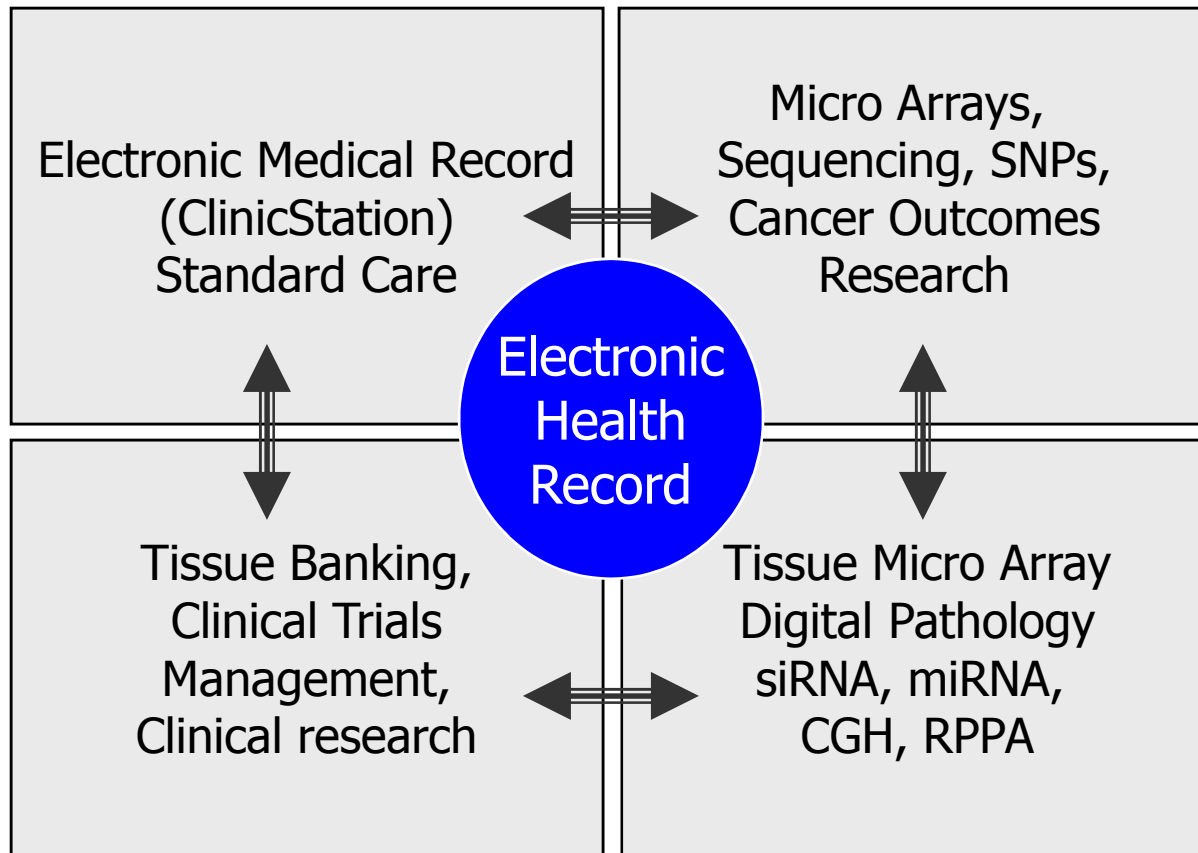
76 project teams formed

37 projects presented

26 projects funded

# Information Technology at MD Anderson

# Information Technology Systems Framework



# Major Information Technology Themes

- Managing the sheer volume of data generated though
  - Imaging
  - Genomic analysis
- Integrating genomic data into the care process
- Maintaining ongoing contact with survivors—after they have left our care
- Developing “commercial standard” software for both clinical and research-

# The NCI-NHGRI Cancer Genome Atlas (TCGA) Pilot Project

One hundred million dollar NCI-NHGRI Pilot project is designed to test the feasibility of a systematic approach to identifying genetic alterations in cancer to have ***meaningful clinical impact*** in a few rationally-selected cancer types.

Will provide an unprecedented information resource on **500 glioma, lung and ovarian cancers** at the level of DNA (copy number sequence methylation) and RNA (level exon) facilitating personalized molecular medicine

# T-REX: Translational Research Extensible Platform

- A platform that provides a way to access TCGA and other data types with the following features:
  - Provides an integrated View across data types through user query mechanism
  - Supports the 3 TCGA cancer types
  - Personalized system with an intuitive interface
  - Combines TCGA and MDACC data – maps between research & clinical data
  - Provides an extensible platform for integrating with other MDACC systems

# TREX Vision

- The platform will enable researchers and other consumers to frame intelligent questions, develop and test hypotheses and perform further analyses. The application will provide a platform for various cancer researchers to access, analyze and display results from multiple data sources in an intuitive and integrated fashion.
- The application will be designed to accept plug-in modules to provide for an extensible platform for other disease sites and add analytical tools and other functions.
- This application will ultimately enable physicians to make clinical decisions for personalized care based on molecular and genomic data.
- We will have a prototype by June 2008.

# MD Anderson Global



# Summary

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- **Cancer is a devastating disease in most industrialized countries**
- **Enormous progress has been made in developing better detection methods and treatments**
- **We are at a point in history where the pace of progress is rapid and the technology available is extremely powerful. We are in a position to have an enormous impact over the next two decades**
- **A continued investment in cancer research will pay off in lives saved and will help alleviate the burden of “advanced” disease**

# Free Advice

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**If you are approaching the age of 50 please tell your physician you need to be screened for certain cancers if that hasn't happened yet**

**If you have an alarming number of family members who have been diagnosed with cancer please let your health care provider know about this**

**Obtain moderate exercise, eat a healthy diet, avoid tobacco, use alcohol in moderation, use sunscreen and avoid exposure to other cancer causing agents**

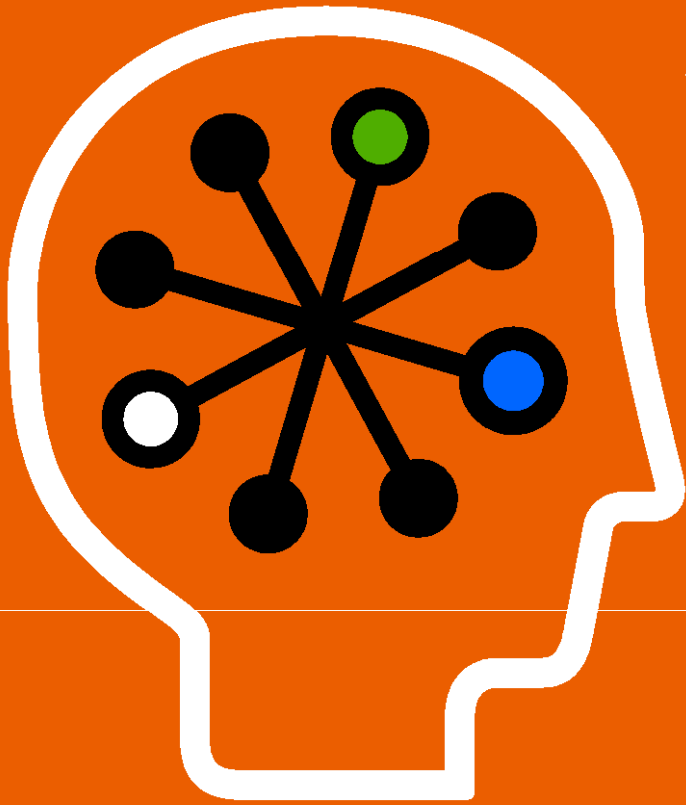
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# HP Health and Life Sciences Symposium

May 12-15, 2008 | Orlando, Florida



Speeding **Innovation** to Practice

