Economic Strategy for Health Care through Bio and Information Standards and Technologies

Biotech 2007: A Global Transformation

G. Steven Burrill, CEO
Burrill & Company

Gaithersburg, MD – September 25, 2007

Burrill & Company

Exclusive focus on Life Sciences

- Human Healthcare (Rx and Dx)
- Nutraceuticals/Wellness
- Agbio
- Industrial
- Biofuels/ Bioenergy
- Enabling Technologies

Burrill & Company

Venture Capital Group

- Venture Capital—investing across the entire spectrum of the life sciences/biotechnology . . . over $900 million under management

Merchant Banking Practice

- Strategic Partnering including licensing, research and other collaborations
- Strategic Advisory Services including new company formation
- Merger & Acquisitions across life sciences
- Spin-outs ranging from products, to research divisions to disease area franchises

Media

- Conferences
- Publications

Headcount: 50+ professionals and staff

Burrill & Company U.S. & International Locations

- **San Francisco (HQ)**
- New York
- Indianapolis
- Portland
- Shanghai
- Beijing
- Kuala Lumpur
- Mumbai
- Dubai
- London
- Tokyo

Burrill & Company U.S. & International Locations

Burrill Venture Capital Funds Under Management ($ millions)

Burrill Life Sciences Capital Fund III (2006)		$233
Burrill Life Sciences Capital Fund II (2003)[1]		$211
Burrill Life Sciences Capital Fund I[1]		
- Burrill Biotechnology Capital Fund (1999)[1]	$140	
- Burrill Agbio Capital Funds I & II (1998[1]/2001)[1]	$ 80	
- Burrill Nutraceuticals Capital Fund (2000)[1]	$ 57	$277
Malaysian Life Sciences Capital Fund (a JV Fund)		$150
Burrill AgBio II Annex* (a side-car fund to the MLSCF)		$ 25
Total Funds Under Management at 9/1/07		**$936**
Additional Funds Pending Close[2]		*$264*
Total Est. Funds Under Management at 12/31/07		**$1.2B**

(1) Fully invested, including reserves/commitments for subsequent financings in existing portfolio companies
(2) Including Burrill China, Burrill India and additional investors to BLSCF III

Corporate Limited Partners

Merchant Banking Group Services

M&A Transactions

Transactions Across Life Sciences for Public and Private Clients

- Sell-side
- Buy-Side
- Divestitures
- Reverse mergers

Strategic Partnering

Early Stage Research to Product Development and Commercialization

- Out-license, co-development, co-promotion
- Preclinical through marketed products
- Representing pharma and biotech

Potential Scope of Merchant Banking Group Client Relationship

Spin-Outs

Create a New Company or Merge into an Established Entity

- Newco financings for pharma and biotech

Financing

Private Placements

- PIPE financing
- Late-stage venture financing
- M&A financing

Burrill Created/Hosted Industry Events

The China Life Sciences Partnering Meeting

A Transformation in Healthcare
The Burrill Personalized Medicine Meeting

The Stem Cell Summit

The Japan Biotech Meeting

The India Life Sciences Partnering Meeting

The Burrill Health and Wellness Meeting

The Biotech Meeting at Laguna Niguel

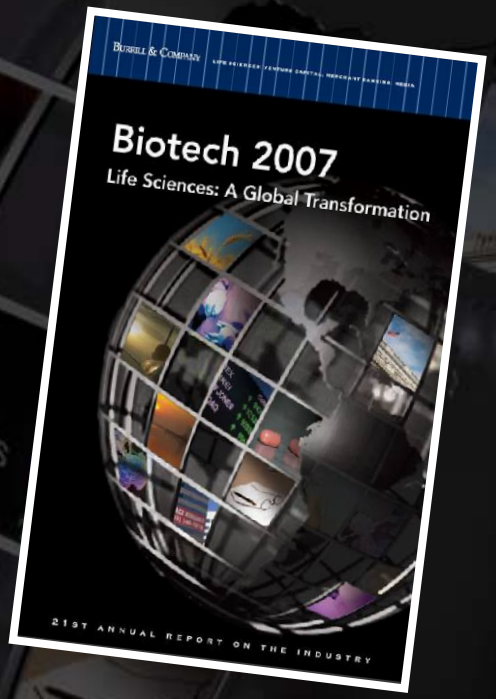
The Stem Cell Meeting

The Indiana Life Sciences Forum

For inquires, contact Thea Schwartz at (415) 591-5477 or tschwartz@b-c.com

Annual Book's

G. Steven Burrill's annual book - the State of the Industry is out now…

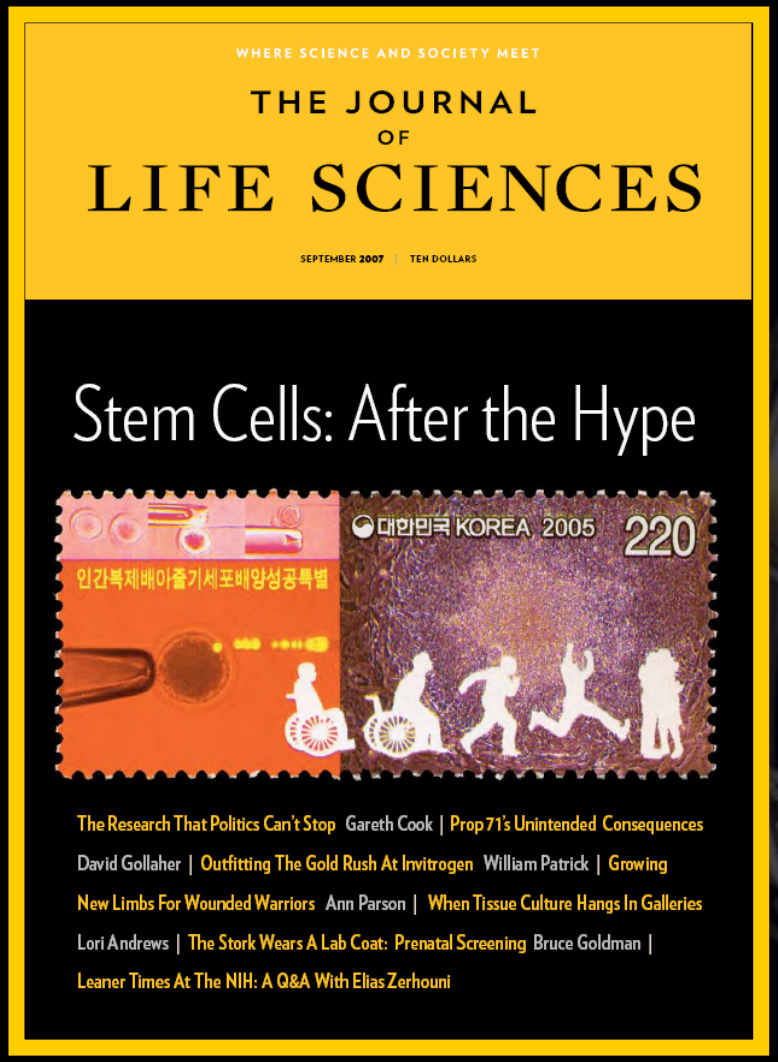


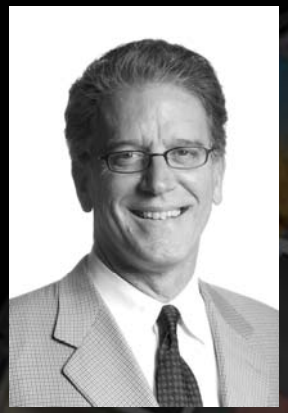
To order most recent book visit *www.burrillandco.com*

Burrill Biointelligence Reports

- *The Burrill Life Sciences Media Group's monthly and quarterly bio-intelligence reports and publications:*

  - The Burrill Greater China Life Sciences Biointelligence Report
  - The Burrill Japan Life Sciences Biointelligence Report
  - The Burrill India Life Sciences Biointelligence Report
  - The Burrill European Life Sciences Biointelligence Report
  - The Burrill Canadian Biotech News
  - The Burrill Biotechnology Biointelligence Report
  - The Burrill M&A/Partnering Biointelligence Report
  - The Burrill Personalized Medicine Biointelligence Report
  - The Burrill Stem Cell & Regenerative Medicine Biointelligence Report





Mr. William Patrick

Editor in Chief

A six-times per year publication. For information, see our website

www.burrillandco.com

The Journal of Life Sciences – Weekly Brief

THE JOURNAL OF LIFE SCIENCES

WHERE SCIENCE AND SOCIETY MEET

WEEKLY BRIEF

PERIOD ENDING AUGUST 10, 2007

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OBESITY: FAT IS THE NEW NORMAL

American women have gotten fatter as it has become more socially acceptable to carry a few extra pounds, according to researchers at Florida State University and the Federal Reserve Bank of Boston. Writing in the journal *Economic Inquiry*, the researchers argue that the ballooning weight of the population has fed even more collective weight gain as the perception of what is considered a normal body size has changed. The paper is the first to provide a mathematical model of the impact of economic, biological and social factors on aggregate body weight distribution. It also is one of the first studies to suggest that weight norms may change and are not set standards based on beauty or medical ideals.

FOOD CHOICES: KIDS SWAYED BY BRAND PREFERENCES

Asked to sample two identical foods from the fast-food giant McDonald's, children preferred the taste of the version branded with the restaurant's familiar "Golden Arches" to one extracted from unmarked paper packaging, according to researchers at the Stanford University School of Medicine and Lucile Packard Children's Hospital. The study shows that even young children are swayed by brand preferences. The researcher said the results are likely to fuel more debate over a growing movement to restrict marketing to kids under 8 years old. The study, published in the *Archives of Pediatrics & Adolescent Medicine*, reports that the kids don't just ask for food from McDonald's but actually believe that the chicken nugget they think is from McDonald's tastes better than an identical, unbranded nugget.

Biotech Is Transforming The Globe…

…and being transformed by it

Transformation

Webster: *trans for ma tion*

Pronunciation: *"tran(t)s-f&r-'mA-sh&n"*, -Function: *noun*

1. The act or process of transforming somebody or something

Webster: *trans.form*

1a: To change in composition or structure

A Global Transformation…

…From		To…
Chemistry	⇨	Biochemistry
On Size fits all drugs	⇨	Personalized medicine
Aging (just happens)	⇨	Aging is optional / controllable
Therapeutics/diagnostics/devices	⇨	"Theranostics"
Treating sickness	⇨	Preventing Sickness
Food for survival	⇨	Food for health

A Global Transformation…

…From		To…
Fossil fuels	⇨	Alternative fuels (biomass conversion)
Unavailable local capital	⇨	Global arbitrage
Fully integrated business model (FIPCO)	⇨	Virtually Integrated business model (VIPCO)
Local companies	⇨	Global companies
US centric biotech industry	⇨	Global industry
Changing the healthcare environment	⇨	Transforming the world

Life Sciences – Biotech: A Short History …

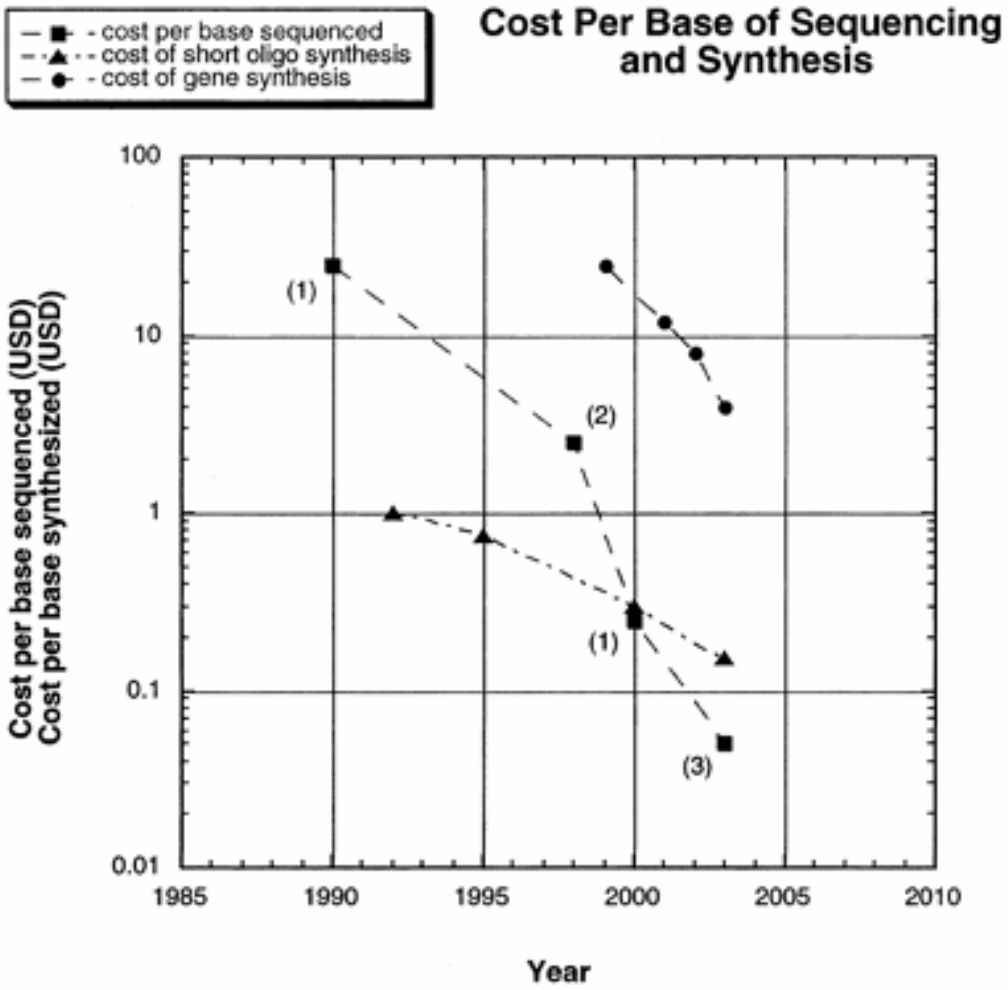
- Circa 1953 – Watson and Crick
- Circa 1973 – Inception of biotech
  - ALZA (`68) Cetus (`71) Amgen (`80),
  - Genentech (`76 ) Biogen (`78),
  - Centocor (`79) Hybritech (`78)
- Circa 1993 - Meaningful biotech revenue
- Circa 2007 – Transforming the world

Era of Unprecedented Advances in Medical Research

- Understand the pieces
  - Hardware of Life (20th Century) genes/proteins
  - Software of Life (21st Century) – systems/network
- "Biomarkers 'r us" (Note: "genes 'r us" biz model failed)
- Cost per bit of biological info rapidly decreasing (Moore's law)

The consequences are staggering …

Moore's law – Cost Per Base



Challenges/Opportunities in Improvement of Care

And we see its implications:

- Evidence based medicine
- Advances in health information (Web MD)
- Personalized, predictive, preventative medicine - (3 P's)
- Electronic Health Records (EHR)

BUT …

- Delivery system so flawed can't bring healthcare "advances" to market place
- Government increasingly the payor (Medicare/other government healthcare systems)

Current Healthcare System in "Silos"

- Insurers
- Employers (Providing $)
- Providers/ Managed Care
- Doctors/Nurses/Hospitals
- Suppliers
  - Pharma Companies
  - Diagnostic Companies
  - Medical Device Companies
  - Medical Innovators

Integration is Essential BUT where is it happening?

- Kaiser Permanente (California)
- Intermountain Health (Utah)
- Analogy (Clayton Christiansen/ Harvard)
  - Color TVs invented by RCA but no sales since nobody would broadcast in color
  - RCA then bought NBC, then integration happened

…Therefore integration within the healthcare system is essential if benefits of new technologies are to be realized

HHS Secretary Michael Leavitt

"Combining gene based medical care with health information technology could transform healthcare…"

"Personalized healthcare will combine basic scientific breakthrough of the human genome with computer-age ability to exchange and memorize data"

Not only integration, but a greater need for international collaboration

- Pandemic diseases
- Regulatory harmonization
  - Approvals
  - Patents
  - Drug/ Food Safety
- Diseases know no borders
- It's a global economy

Entering a Period of Co-opetition (Cooperation / Competition)

- Strategic Partnering
  - Co-development
  - Co-branding
  - Co-promotion
  - Co-marketing
- Country to country
- Public/private
- Big/small
- Within industry/outside industry (IT/biotech)

Let's look at where we are…

Key Industry Stats – Biotech 2007

	USA	Europe	Asia/ Pacific	Canada	Total
Sales/Rev.	$72B	$12B	$3B	$2B	$89B
Annual R&D	$19B	$5B	$0.3B	$0.6B	$25B
# of Companies	1,500+	1,600+	700+	400	4300+
# of Employees	146,100	68,000	12,000	7,440	233,600
# of Public Cos.	363	120	140	84	>700
Market Cap	$482B	$26B	$45B	$44B	$597B

Pharma vs. Biotech Industry Market Cap ($B)

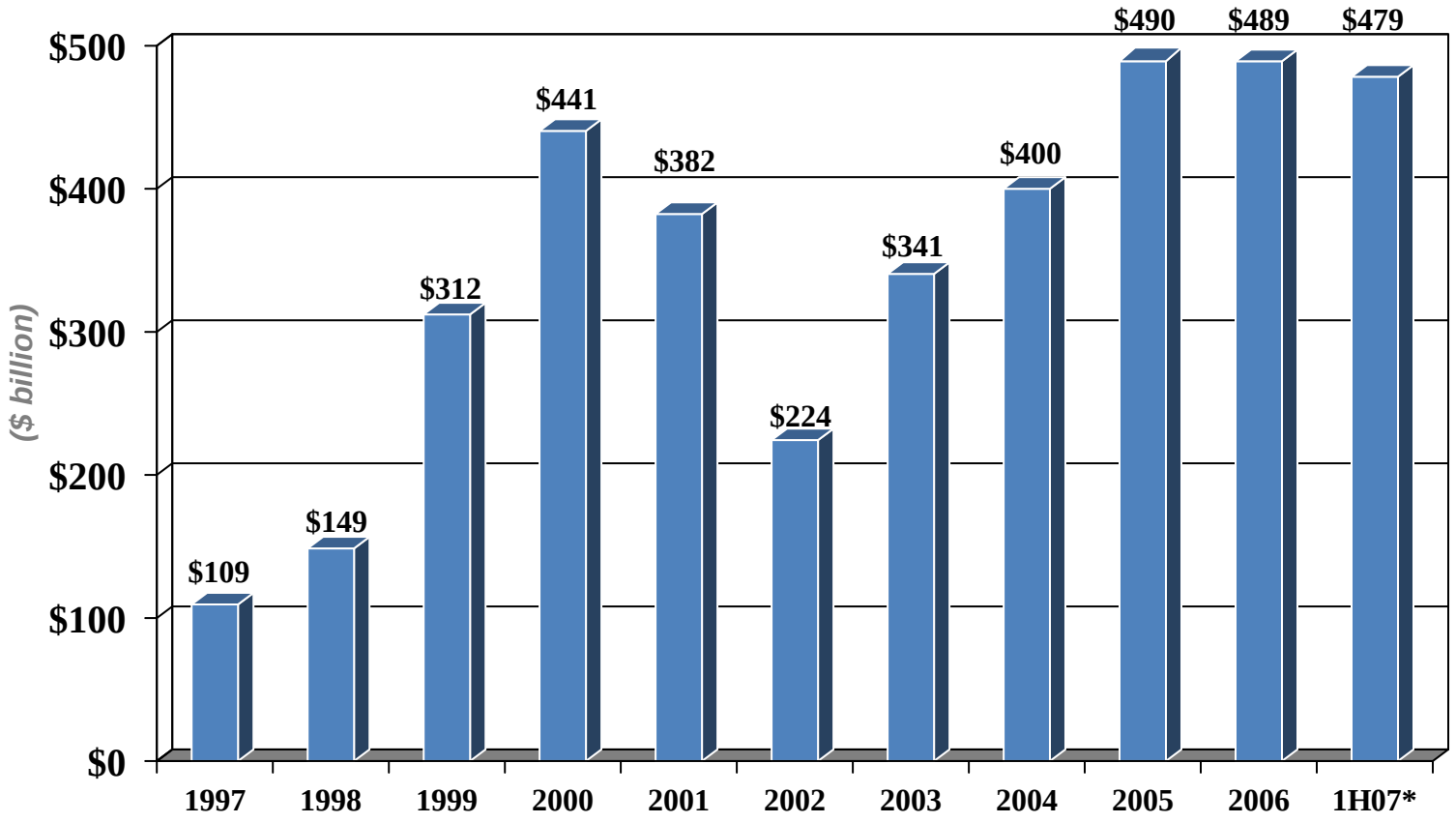
Company	08/31/07	12/31/06	12/31/05	12/31/04	12/31/03
Pfizer	172	187	172	199	280
Johnson & Johnson	179	180	186	184	154
Merck	109	82	69	69	103
Eli Lilly	65	62	65	65	77
Bristol-Myers Squibb	58	50	46	47	58
Pfizer/Merck	281	269	241	268	383
Total US Biotech	447	496	491	399	342
Industry	1.6x	1.8x	2.0x	1.5x	0.9x

**Based on preliminary filing*

Top ten Biotech Companies by Market Cap

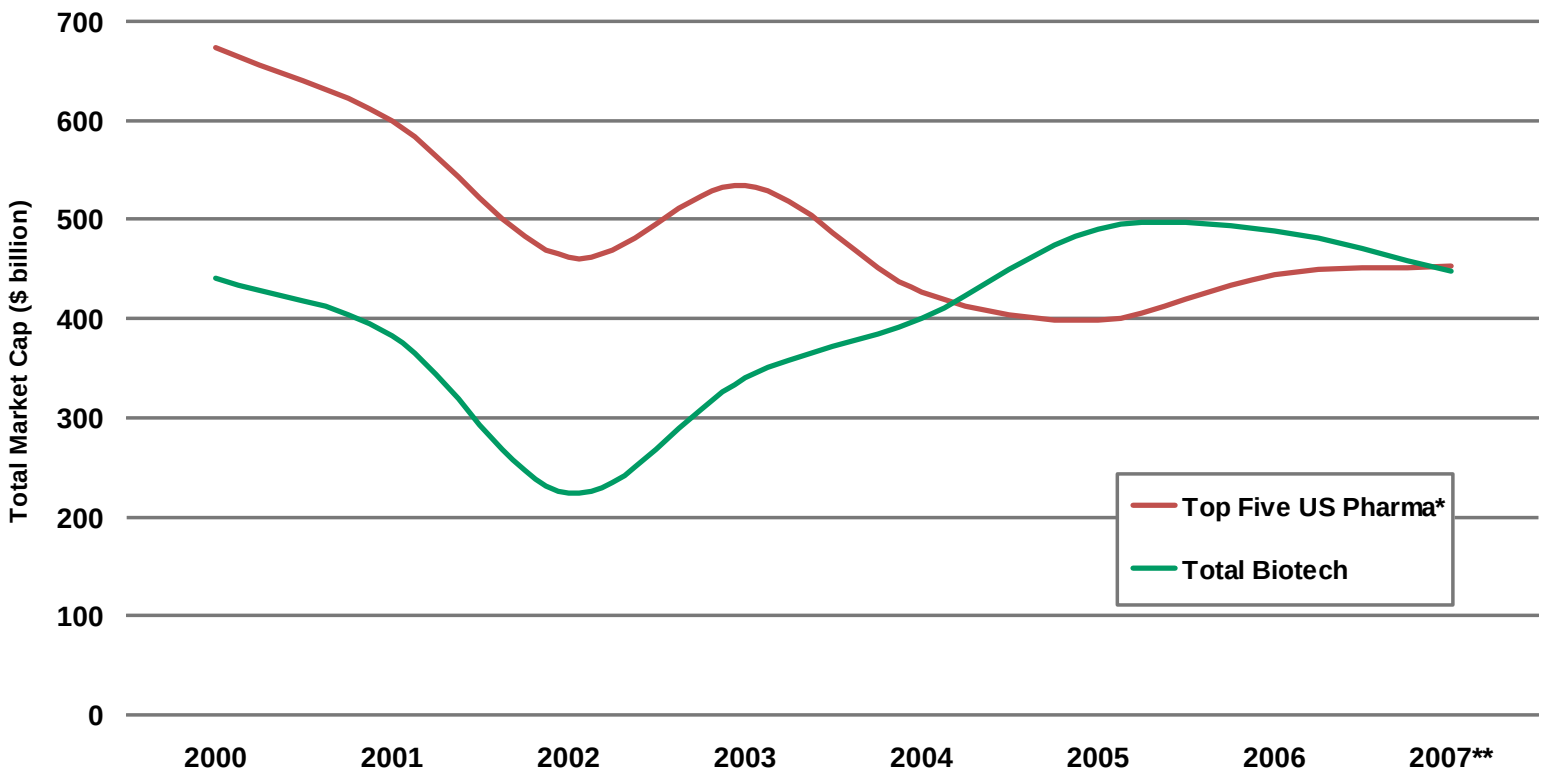
POSITION	BIOTECH 1986	BIOTECH 1991	BIOTECH 1996	BIOTECH 2001	BIOTECH 2006
1	Genentech	Amgen	Amgen	Amgen	Genentech
2	Cetus	Genentech	Genentech	Genentech	Amgen
3	ALZA	ALZA	Chiron	Elan	Gilead Sciences
4	Applied Biosystems	Centocor	ALZA	Shire	Celgene
5	Centocor	Chiron	Biogen	ALZA	Biogen Idec
6	Amgen	Genzyme	Genzyme	Biogen	Genzyme
7	Nova	Cetus	Genetics Institute	Chiron	Serono (ADR)
8	Chiron	Synergen	Centocor	Immunex	Shire (ADR)
9	Genetics Institute	Genetics Institute	IDEXX	MedImmune	Quest Diagnostics
10	Biogen	Diagnostic Products	Immunex	Millennium	MedImmune

Historical Biotech Market Cap 1997–2007



Source: Burrill & Company
** As-of Jun 30, 2007*

Top 5 US Pharma vs. Biotech Market Cap



** Pfizer, Merck, Lilly, Wyeth and Schering Plough*

***As of August 31, 2007*

US Biotech Financing 3Q '06 – 2Q '07

	2006		2007		
	3Q 06	4Q 06	1Q 07	2Q 07	Total
Public IPO	$49	$350	$955	$1,732	*$3,085*
Secondaries	$419	$2,734	$1,037	$1,578	*$5,768*
PIPEs	$480	$210	$370	$703	*$1,763*
Debt	$373	$4,737	$1,761	$5,501	*$12,372*
Private VC	$4,400	$4,050	$1,469	$1,033	*$10,952*
Other	$90	$422	$267	$663	*$1,442*
Total	*$5,811*	*$12,503*	*$5,859*	*$11,209*	*$35,382*
Partnering	$4,218	$7,333	$4,383	$4,012	*$19,946*
Total	***$10,029***	***$19,836***	***$10,242***	***$15,221***	***$55,328***

…and look at what happened during the last year…

So, what really happened during the last year ?

- Stem cells politically hot and the science is delivering
- Technology/platform companies rebounded
- BioFuels are BOOMING…
- Industrial biotech is finally happening
- Ag/animal health show progress
  - acreage is up
  - but “organics” and “natural’ are hot

So, what really happened last year?

- Increased interest in “wellness” not just sickness
- Personalized medicine makes real progress
- Regulatory concerns:
  - IVD/MIA “approvals”
  - FDA Critical Path
  - Theranostics
  - Biogenerics/biosimiliars/follow-on biologics
- Big pharma buys into the biotech pipeline

So, what really happened during the last year ?

- Reimbursement dynamics continue to dominate, especially in the US
- India/China make real progress (Malaysia, Korea, others do too)
- Industry raises $40 B in capital in US alone
- The last year has been a good year, not a great one

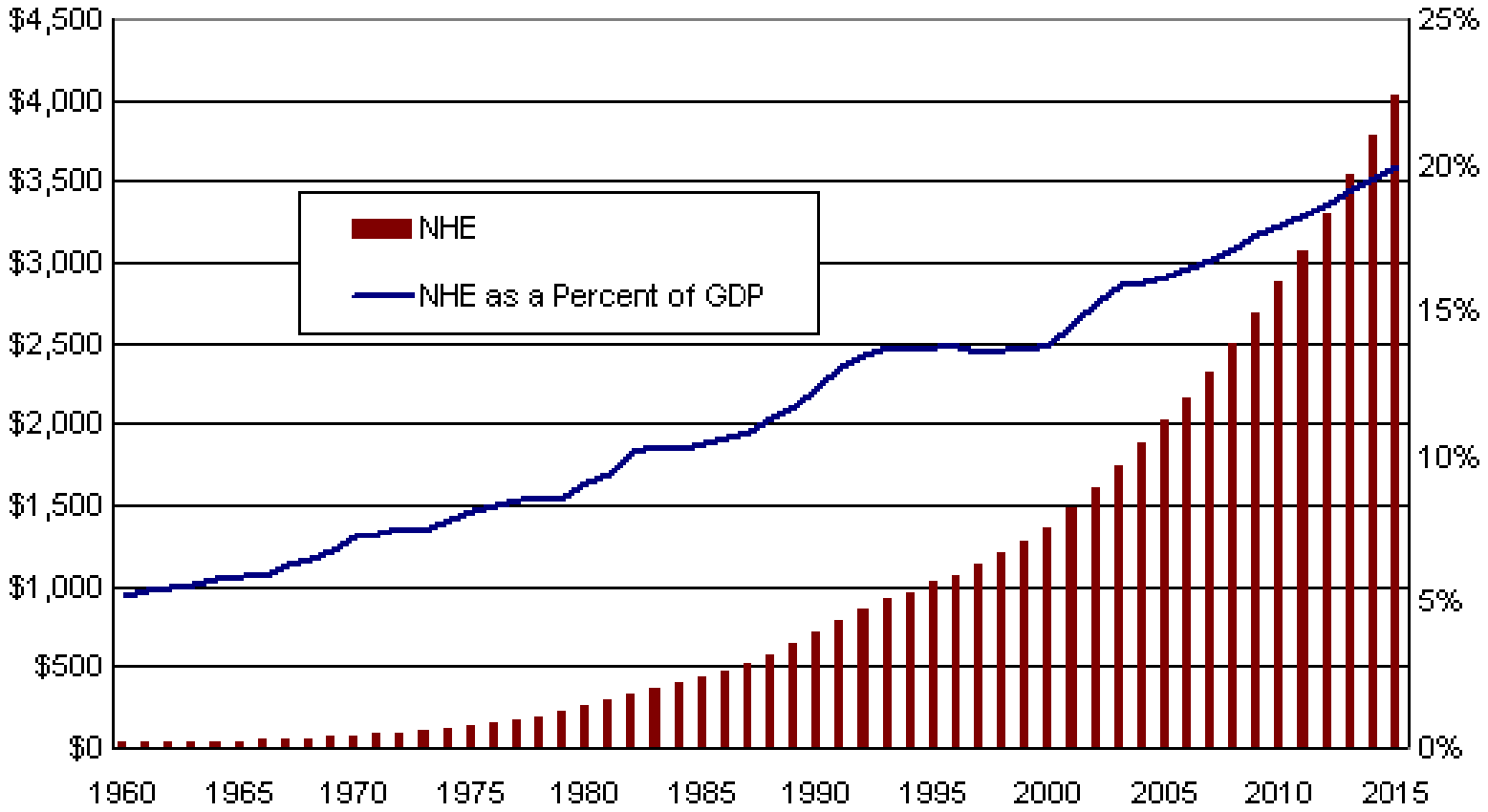
Transformation:

Sickness to wellness

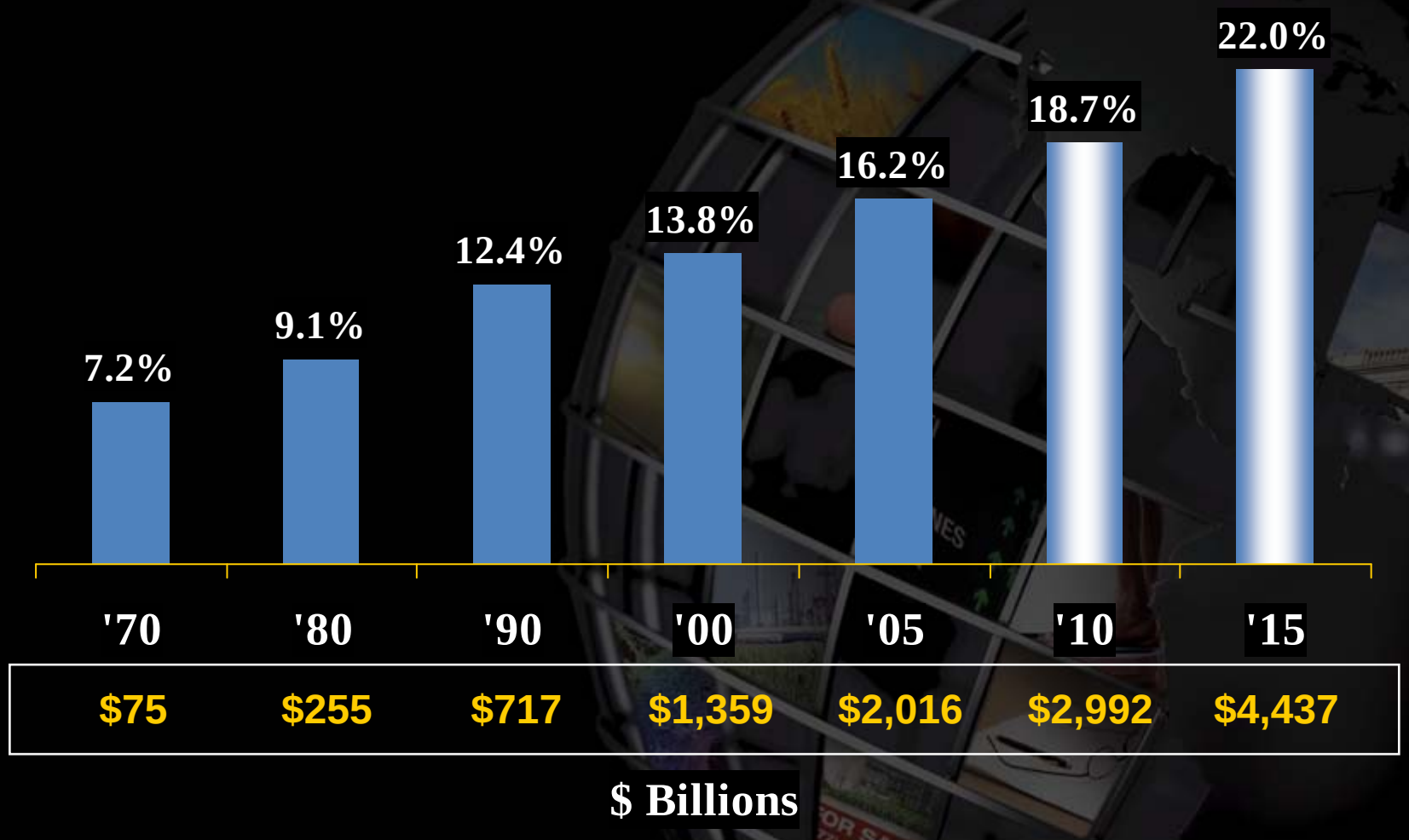
Healthcare Industry Dilemma…

- Rising Healthcare Costs
- Loss of Patent Protection for Blockbuster Drugs
- Need for Innovation; build vs. buy
- Reimbursement/Payment system changes – Medicare Part D
- Compulsory Licensing

Healthcare Costs Have Been Rising - For a Long Time

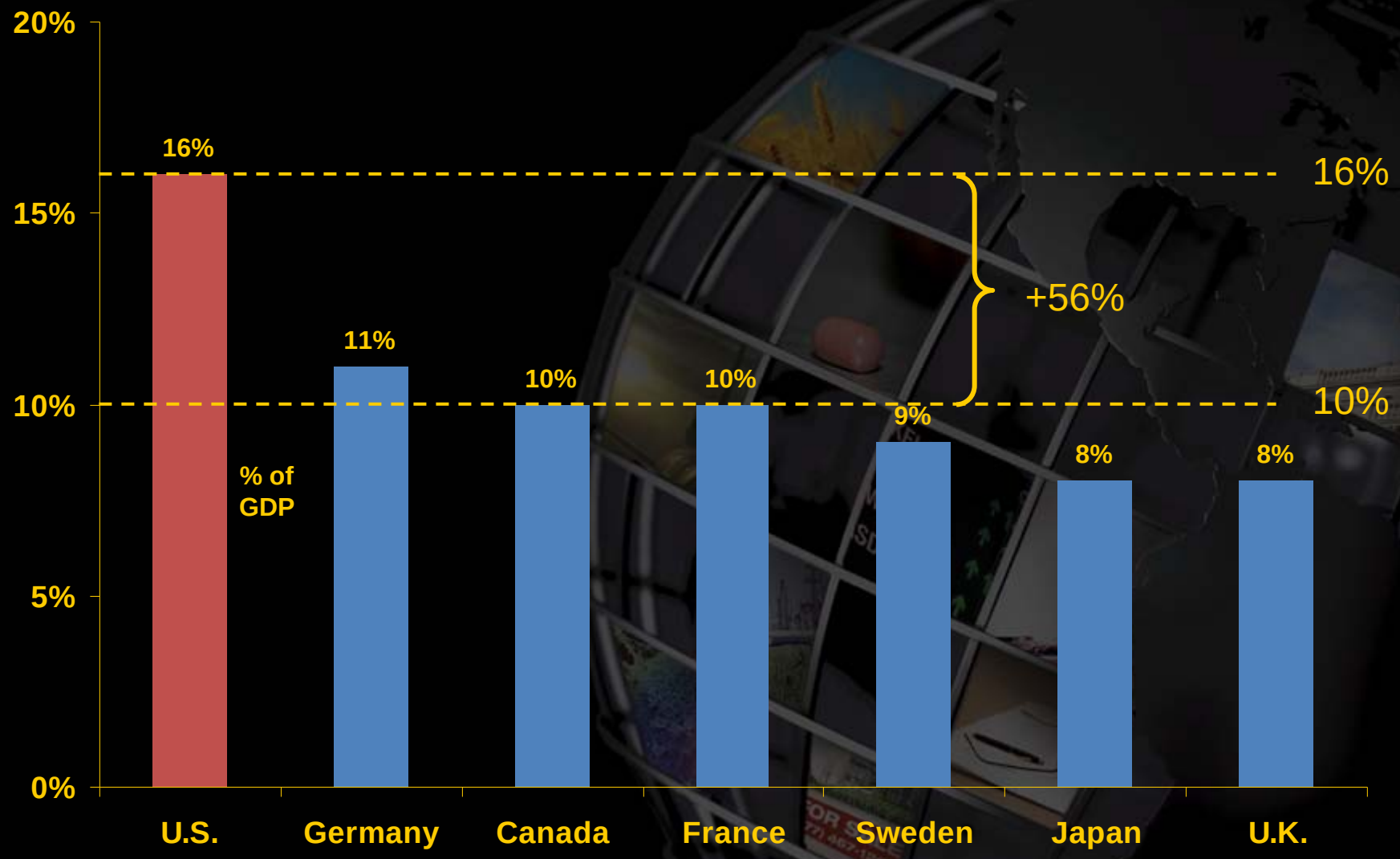


Health-Care Costs as a Percent of GDP



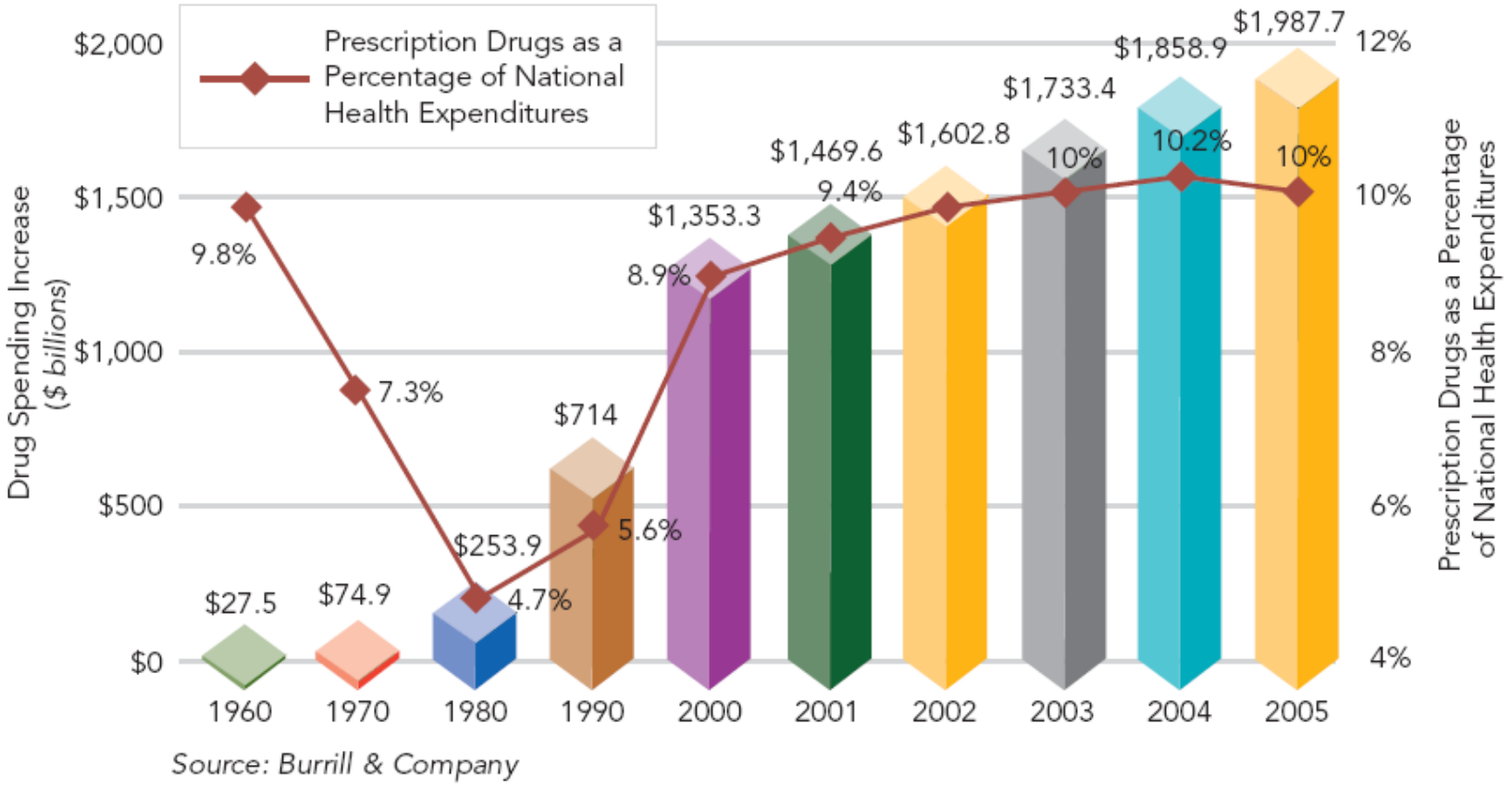
Source: Centers for Medicare and Medicaid Services, Office of the Actuary, Safeway analysis

The US spends more than anybody
Health Care Spending as a % of GDP

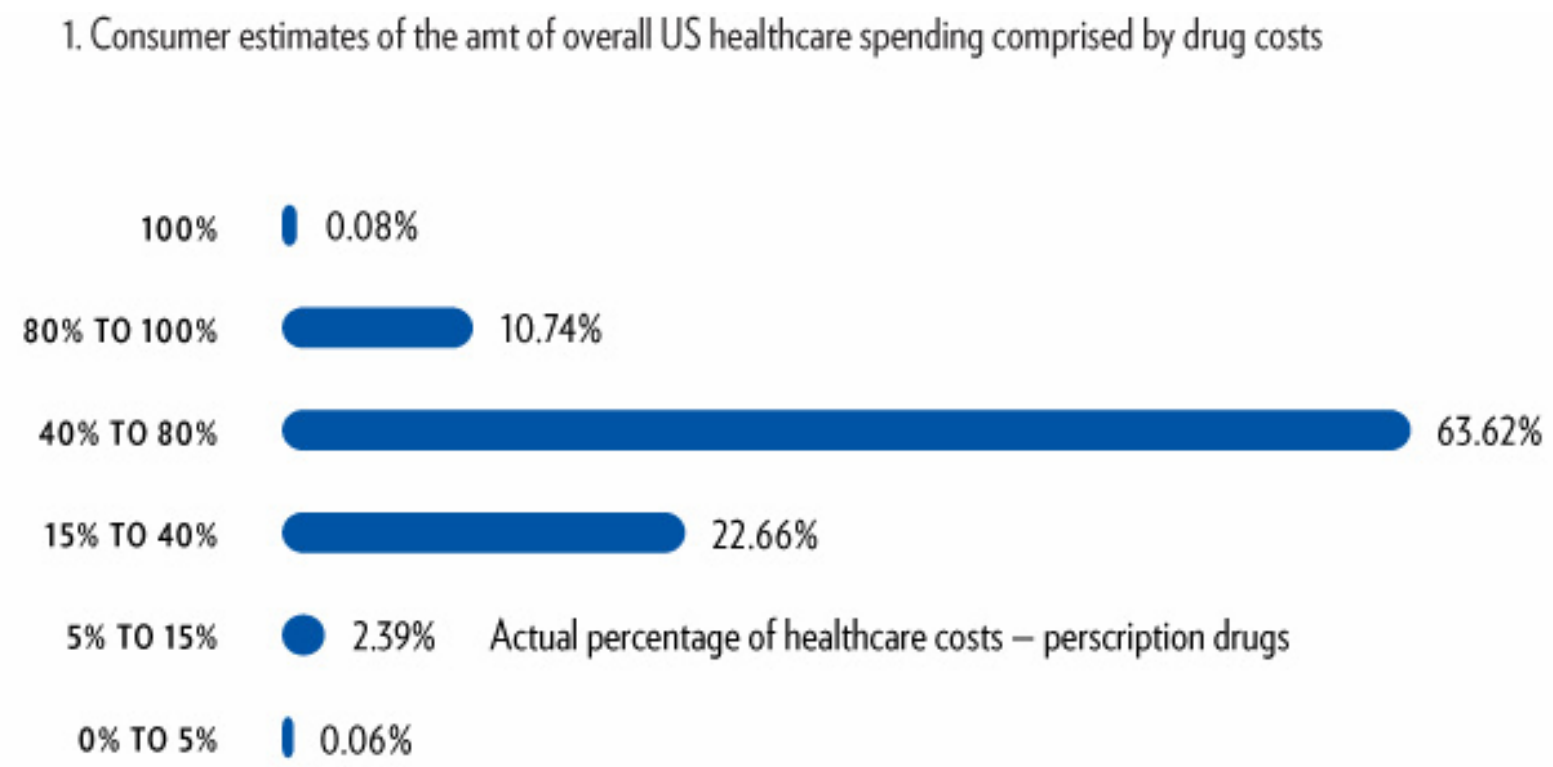


Source: Organization for Economic Cooperation and Development (OECD)

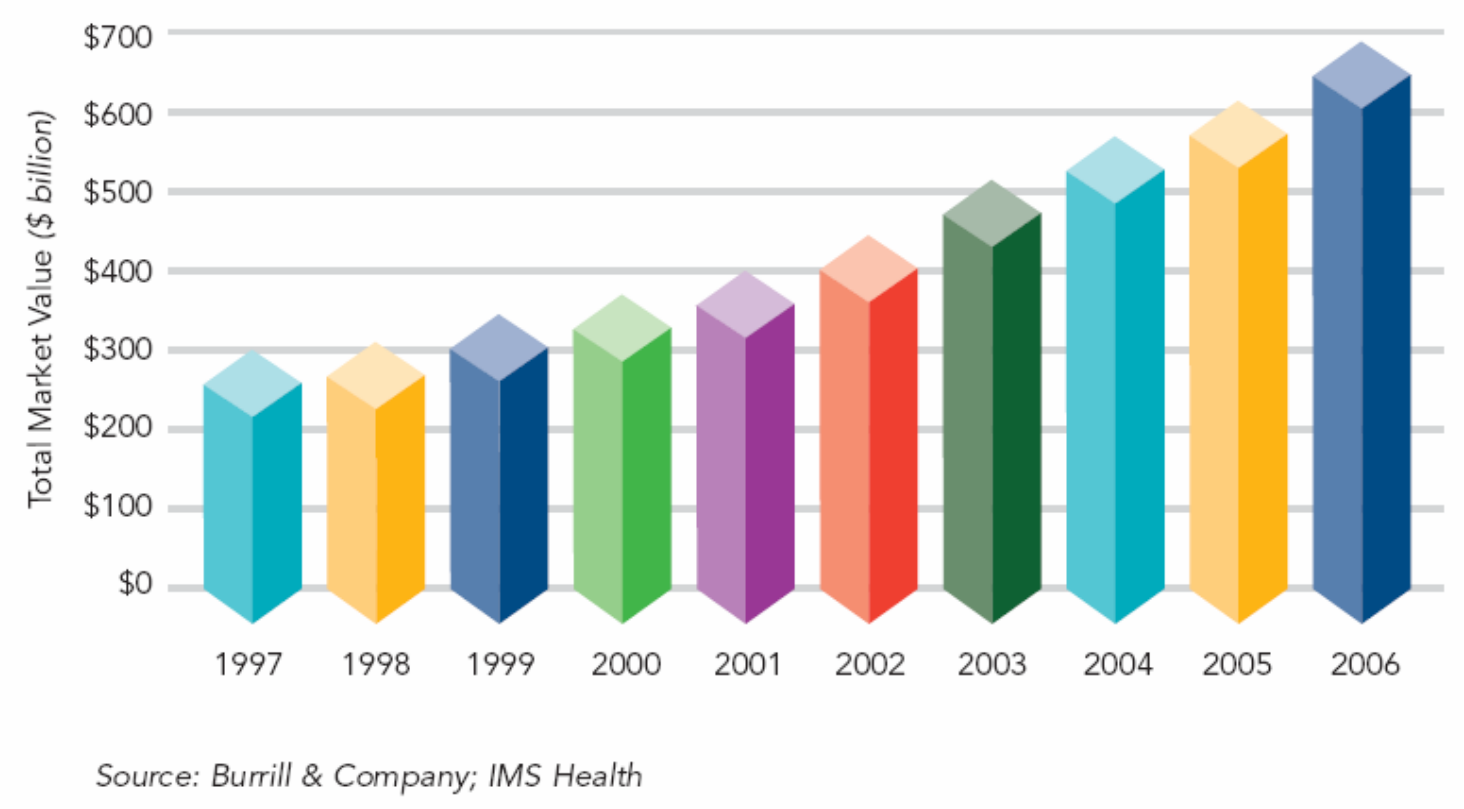
Prescription Drug Costs as Percentage of Healthcare



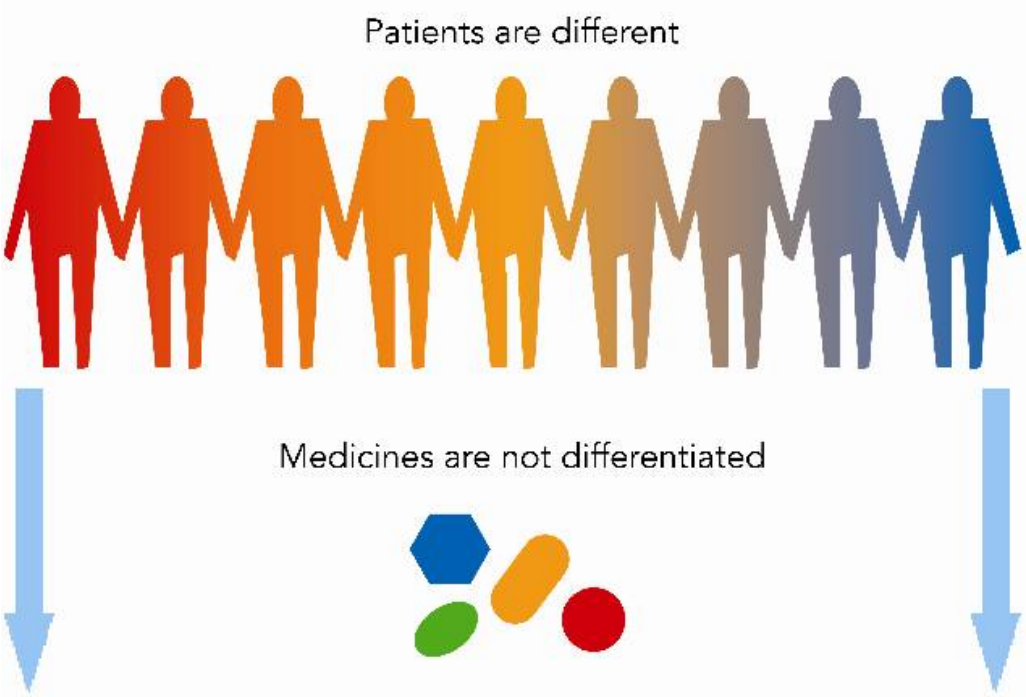
Estimate of overall US healthcare spending on prescription drugs (by general public)



Worldwide Global Pharmaceutical Sales



Today's medicine challenge: One size doesn't fit all



~ 30% of patients do not benefit from medicines[1]
(100,000 deaths and 2.2 million nonfatal events from ADR in the US in 1994)

[1]JAMA 1998, 279: 1200

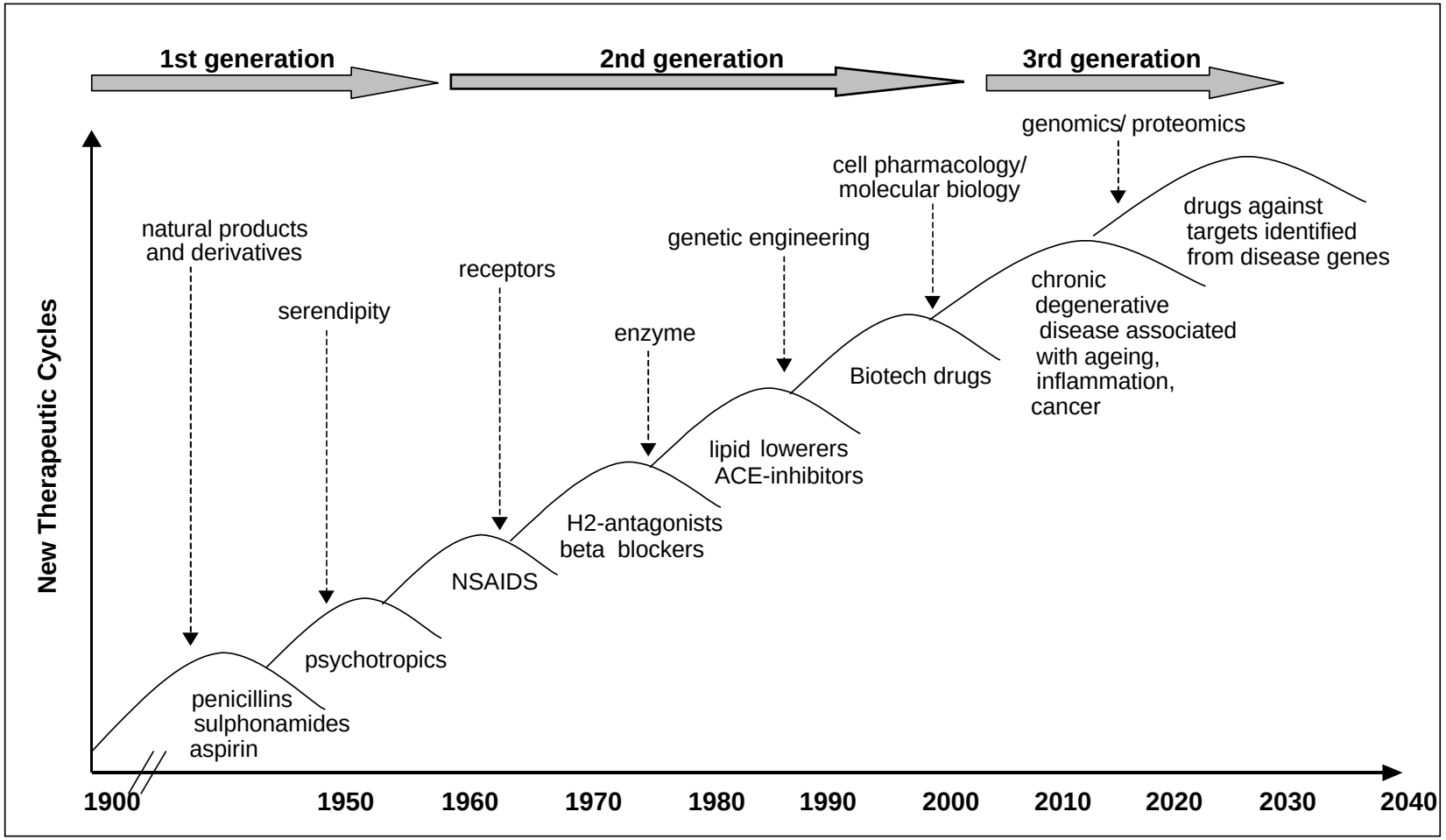
Source: Bayer HealthCare Diagnostics and Burrill & Company

Pharmacogenomics Shapes the Healthcare Business in 2000+

PAST	FUTURE
Disease definition by symptoms	Mechanism
Uniformity of disease	Heterogeneity
Uniformity of patients	Variability
Universal treatment	Individualized therapy
Sickness	Predictive/preventative care (wellness)

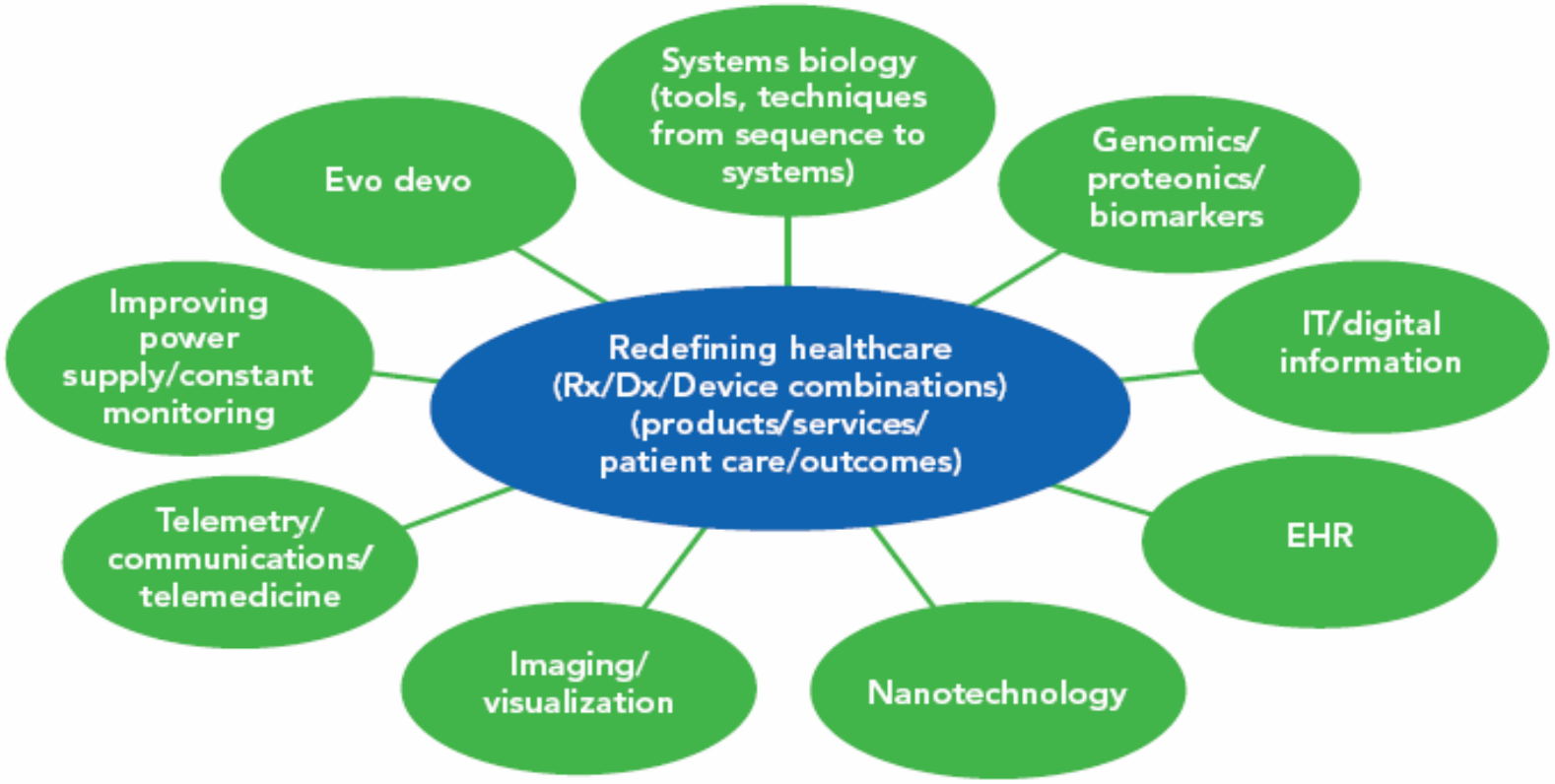
Source: Bayer HealthCare Diagnostics and Burrill & Company

140 Years of Drug Discovery Technology



Source: CMS, Lehman Brothers research

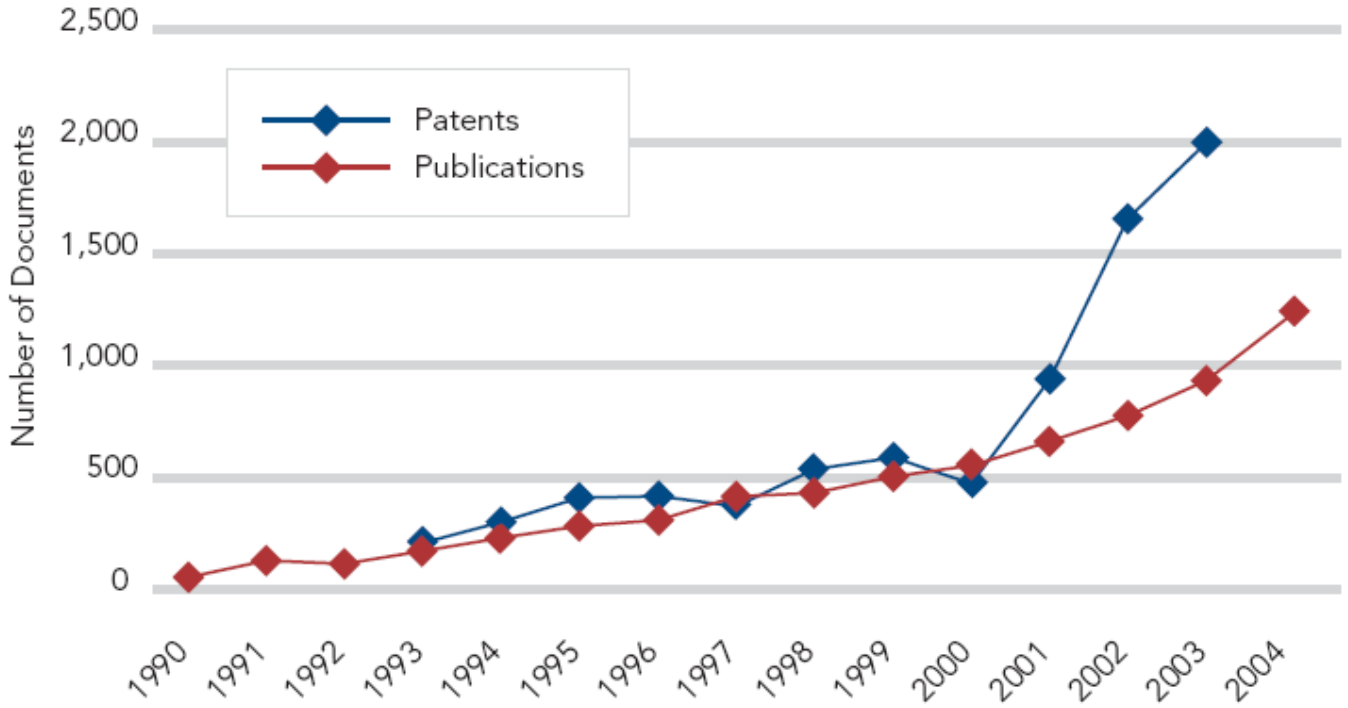
Confluence of Technology, Tools, and Knowledge



Source: Burrill & Company

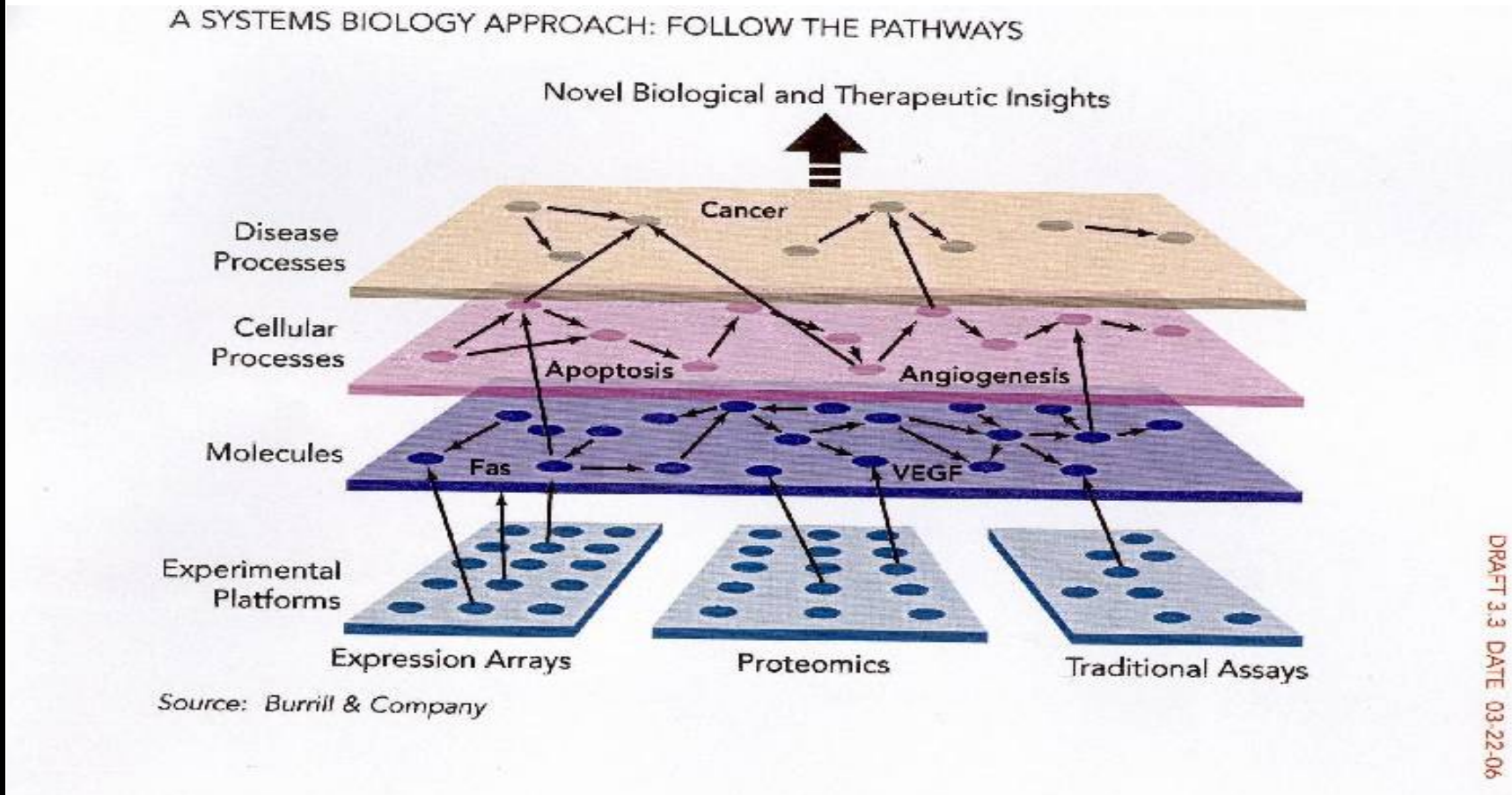
Nanomedicine Patents and Publications on the Rise

Two-thirds of publications and just under half of the patents are outside the US

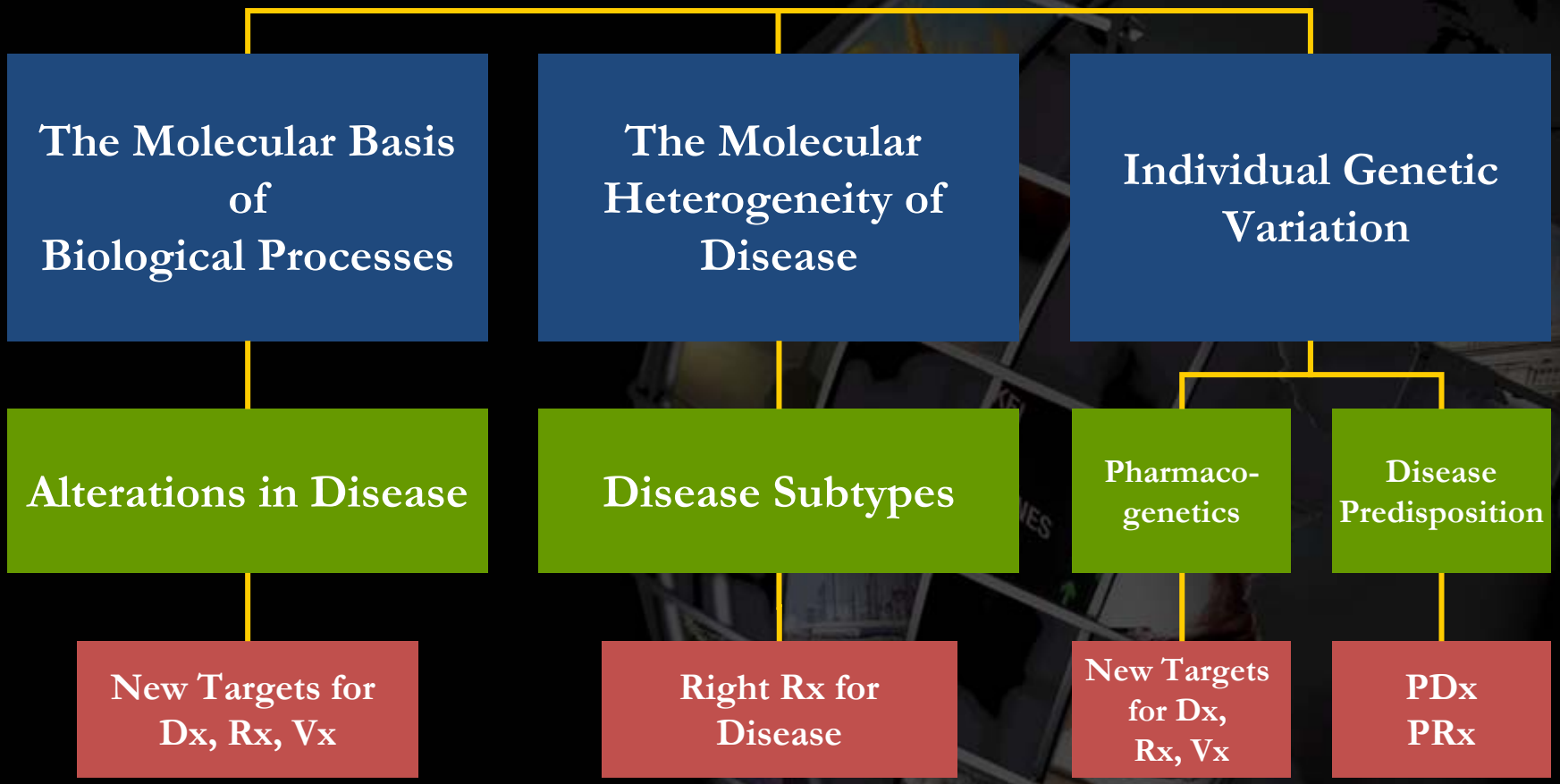


Source: Nature Biotechnology

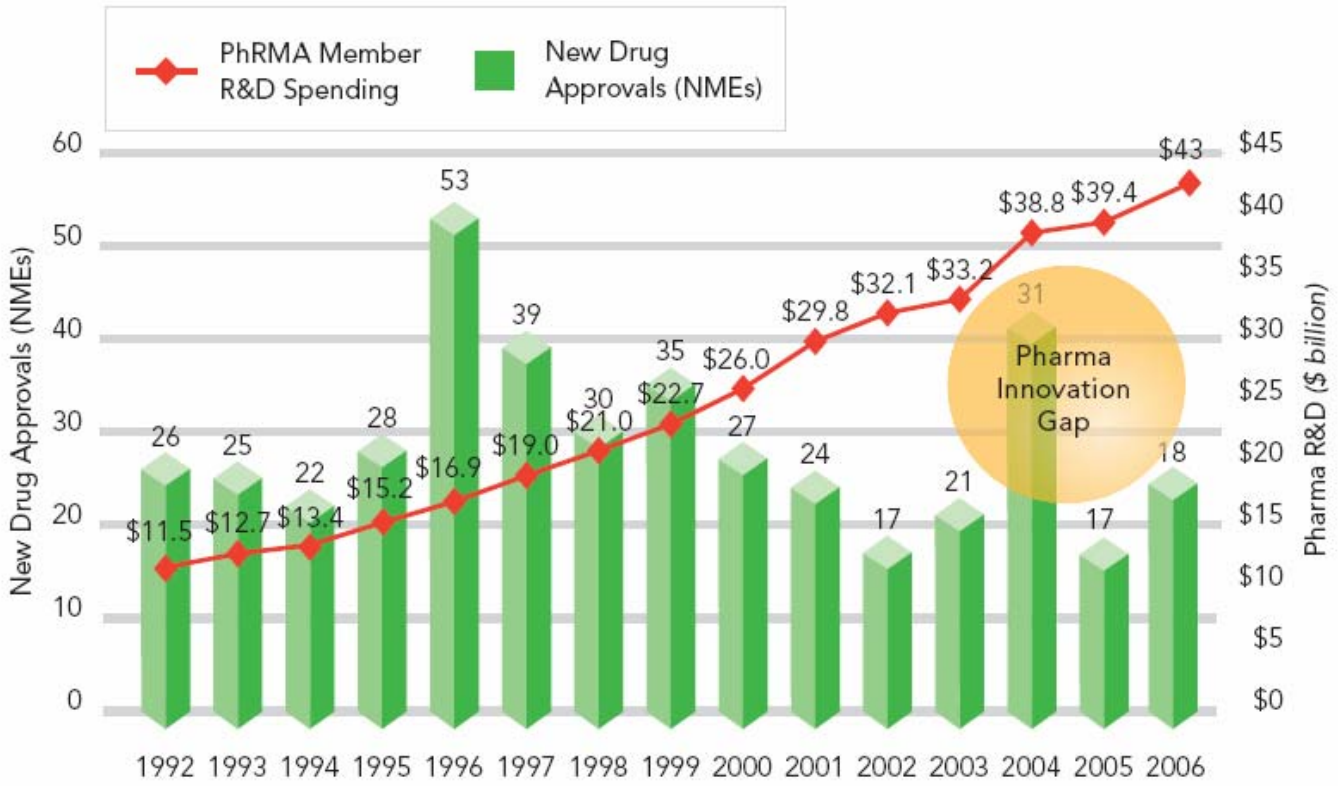
A Systems Biology Approach – Follow the Pathways



Analyzing the Molecular Profiles (Biosignatures) of Body Functions in Health and Disease



Innovation Gap Getting Wider



Source: Burrill & Company; US Food and Drug Administration

This Confluence of Healthcare Technology is bringing us…

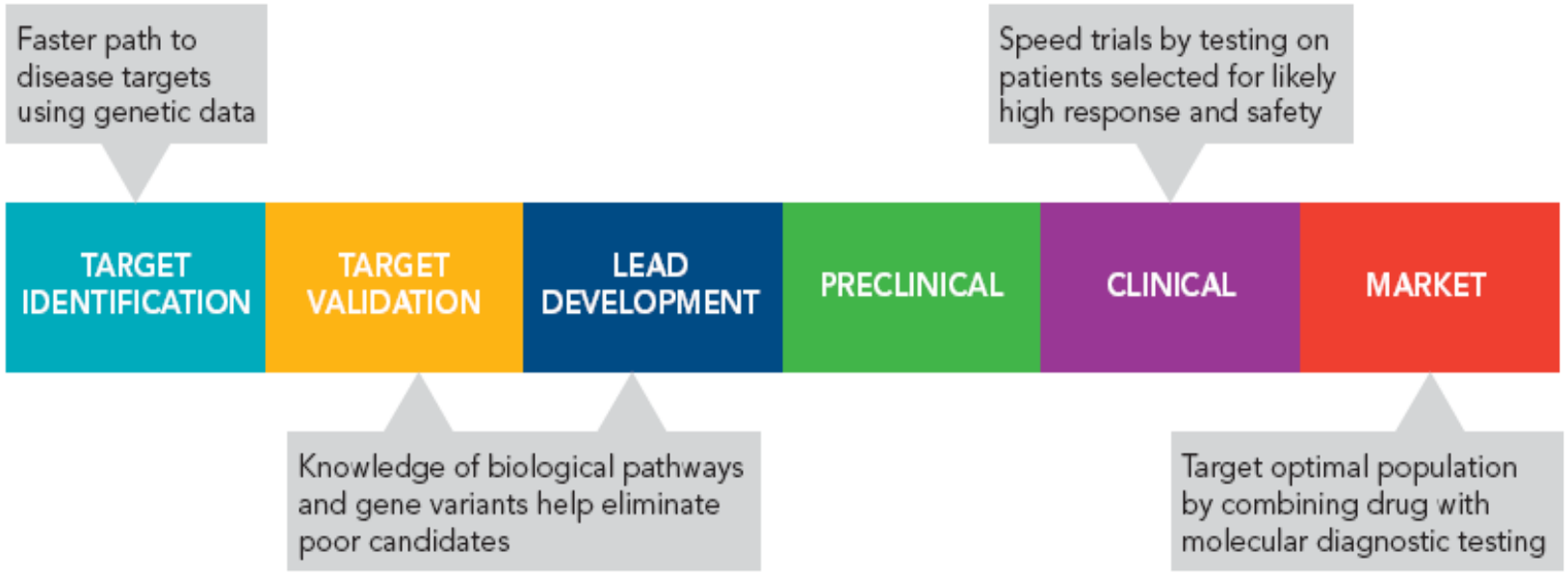
- Targeted therapies (mutation specific), personalized medicine
- Drug/device combinations (drug eluding stents)
- Molecular diagnostics/Algorithm based diagnostics
- Non-invasiveness
- Non-hospital based with constant monitoring…
- Increased predictions and prevention

…that's changing the healthcare economy

- Better outcomes/patients living longer
- Costs going up/more patients treatable…
- …But, US system leaves 25-45m uninsured/underinsured
- Consumer healthcare is here to stay (copays ⬆), individuals empowered and informed

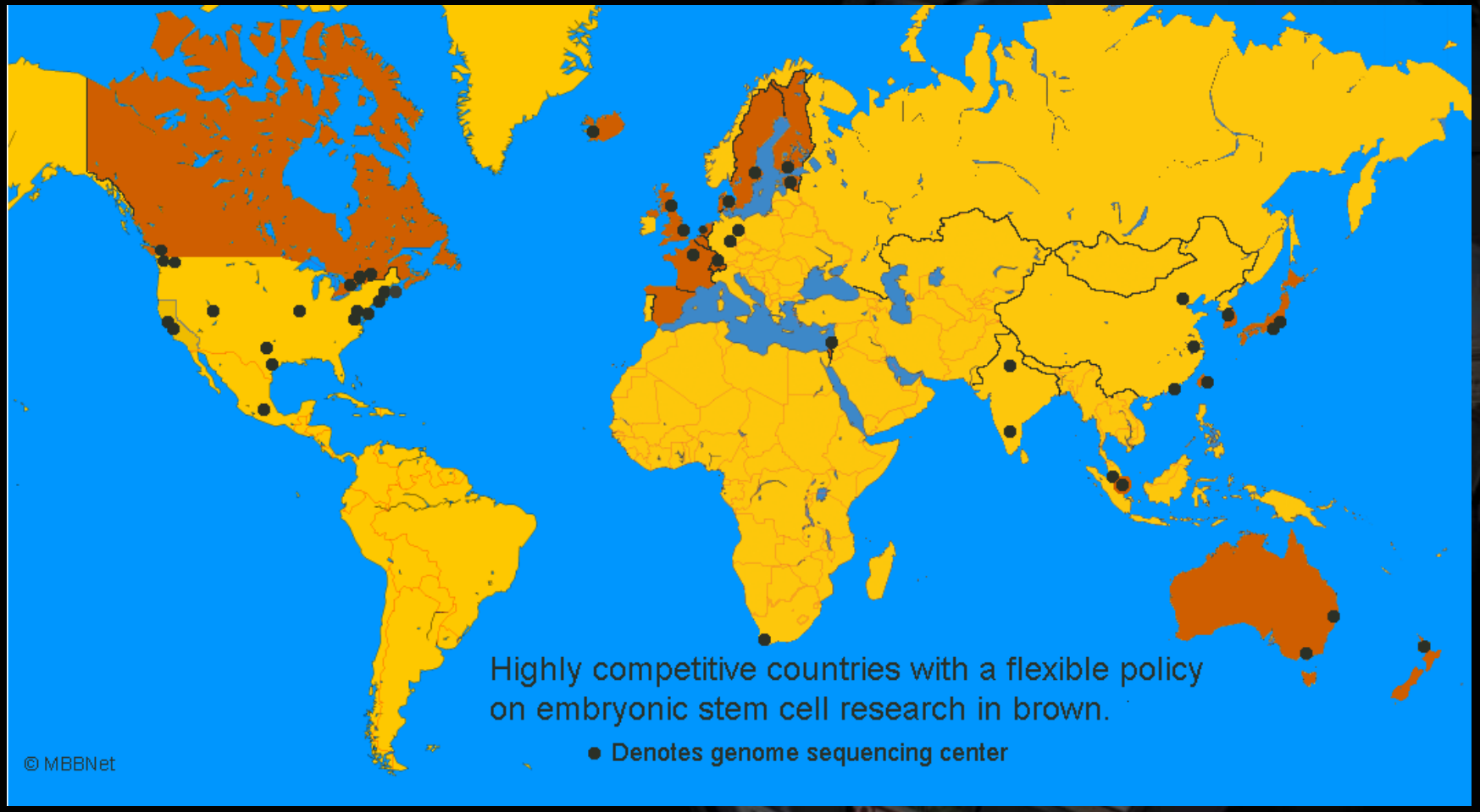
Safer, More Effective Drugs

Identify disease targets, speed clinical trials, and advance more drugs that are safe and effective for specific populations.



Source: Personalized Medicine Coalition

International :
Where is Stem Cell Research Happening



What's happening in Stem Cells?

- Stem Cells linger in scientific & business cloudy environment
  - Advanced Cell Therapeutics creates embryonic stem cells without destroying embryo
  - US political football with limited federal funding
    - Alternative development strategies, some research moves off-shore (Asia, UK)
  - Increased State funding initiatives
    - CIRM gets State of California support for bond anticipation notes, initiates grants
    - Other state initiatives- Missouri/Maryland/Wisconsin/NY/Mass all make progress

Some Stem Cell – Advances 2007

- Human nerve stem cells transplanted into rats' damaged spinal cords have survived
- Found: Stem Cells Responsible for Pancreatic Cancer
- Mother's Stem Cells Passed to Baby—Suggests Possible Way to Treat Diabetes
- Stem Cell Lines Generated from Amniotic Fluid
- Multipotent Adult Progenitor Cells (MAPCs) Regenerate Blood in Mice
- Treatments for Alzheimer's and Multiple Sclerosis
- Regeneration and repair of periphery nerves
- Repair damaged heart muscle and improve cardiac function
- Stem-cell transplantation for refractory or relapsing lymphomas

Stem Cell – Tourism

China	Proving successful with spinal cord injuries
Mexico	Live cell injections
Holland	Repair to optic nerve, Anti-aging stem-cell injections composed of umbilical cord blood
Russia	Anti-aging injections of stem cells from aborted fetuses into thighs, buttocks and stomach
Thailand	Inherited blood disorders, and cancers of the blood, like leukemia and lymphoma
Dom Rep	Fetal stem-cell injections

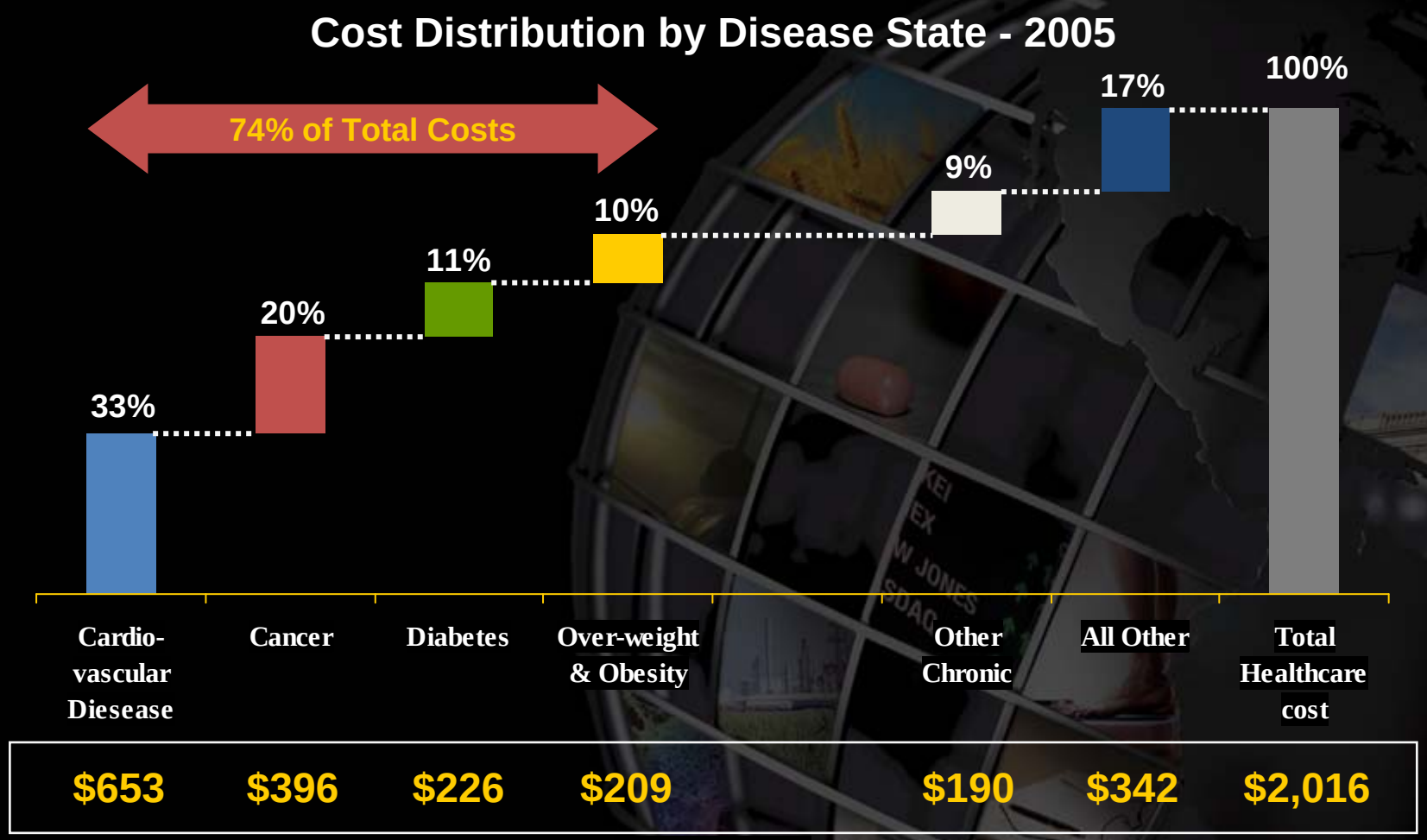
Who Is Financing Stem Companies?

- **Federal Government**
  - Specific stem cell types (Bush administration)
  - Switch to all stem types? (Democratic administration 2008?)
- **State Government (All stem cell types?)**
  - California (CIRM), Mass, NJ, Wisconsin, others
- **Disease Advocacy Groups**
  - Parkinson's
  - JDRF
  - Cancer
- **Philanthropists**
  - Bloomberg donation to John Hopkins
  - Gates Foundation
  - Others
- **Celebrity Charitable Organizations**
  - Michael J. Fox Foundation
  - Reeve Foundation
- **Private Equity Investors (principally VCs)**
- **Public Equity Investors**
- **Foreign Governments**
  - BRIC, (Brazil, Russia, India & China) UK, Singapore, Korea & Sweden

Transformation:

New Diseases / New Markets

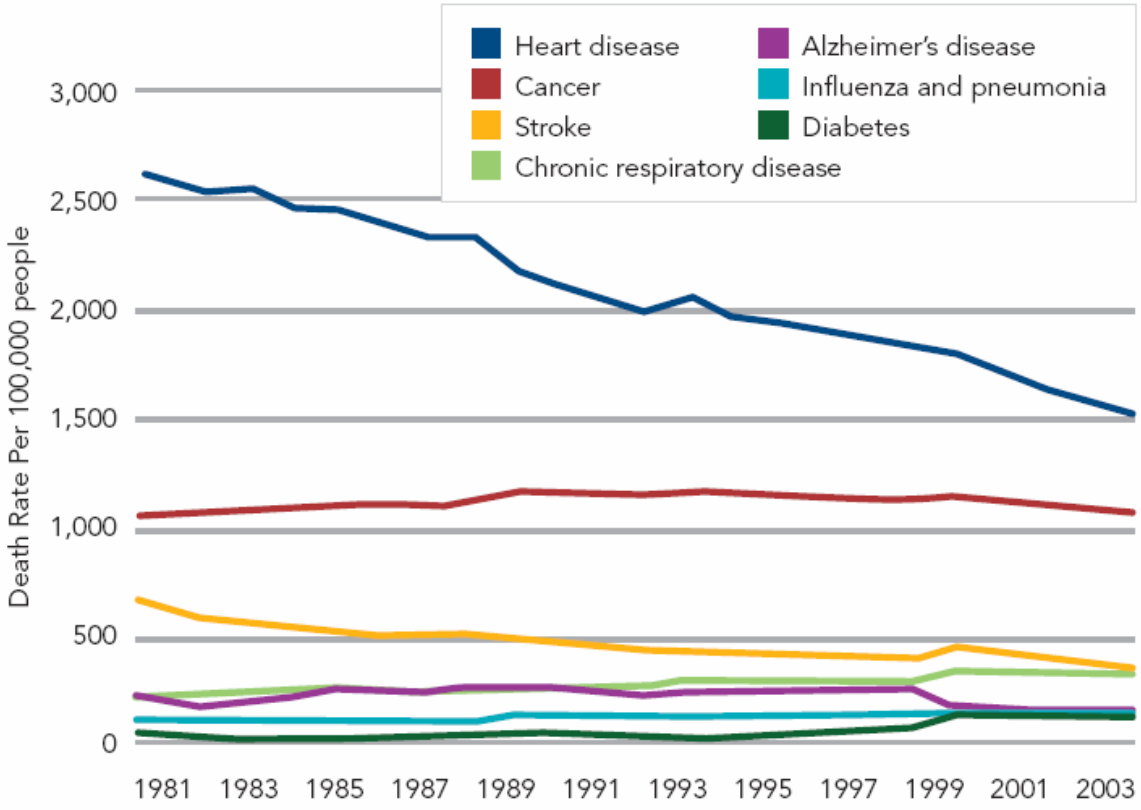
"Big Four" Chronic Conditions Dominate Health-Care Costs



Source: CDC, US Dept of Health & Human Services

Efforts Against Heart Disease, Not So For Cancer

Death rate for selected causes among people age 65 and over

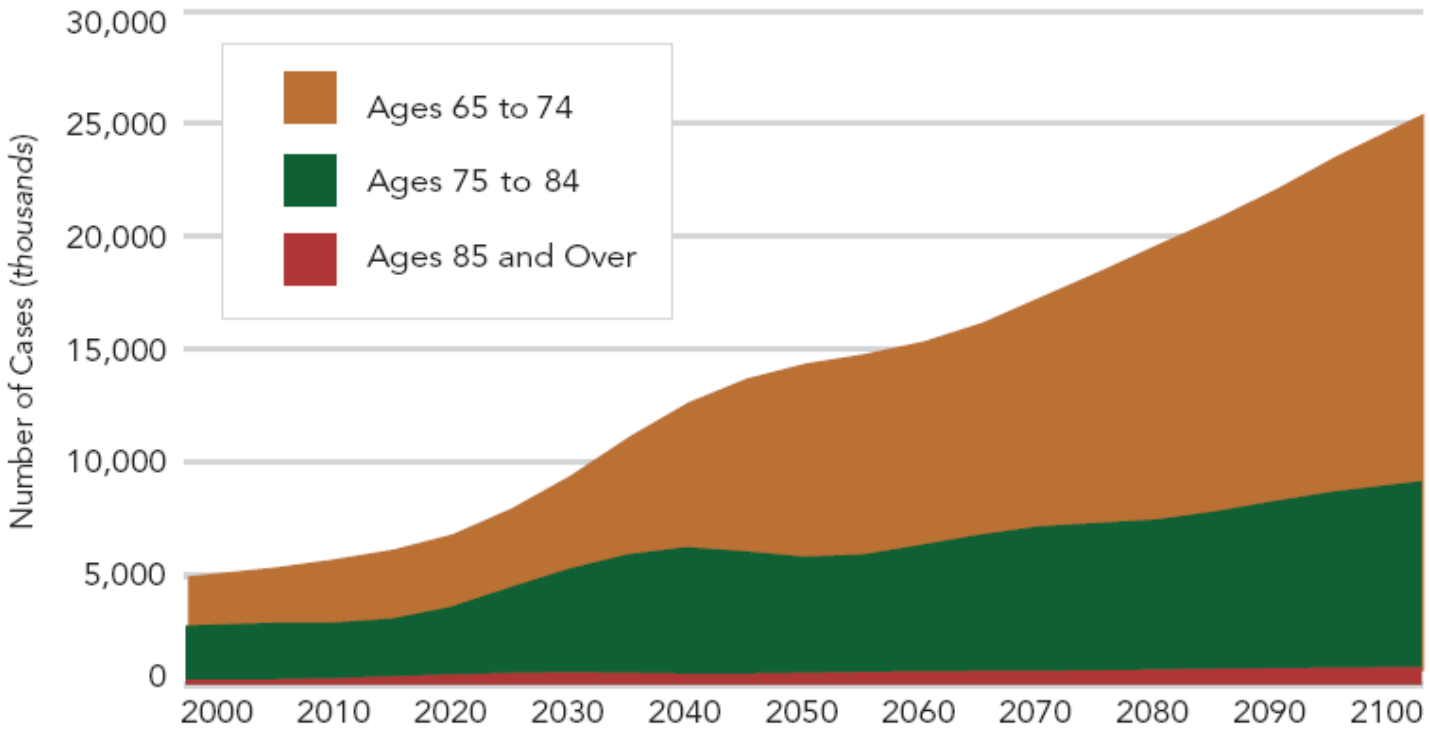


Source: Centers for Disease Control and Prevention

Big “new” markets

- Obesity/diabetes/metabolic disease
- Alzheimer's/memory
- Anti-aging
- Anti infectives (antibiotic resistance)
- Wellness (preventative/predictive cure)

Projected Alzheimer's Disease Prevalence, 2000 to 2100



*PhRMA projections calculated by applying current prevalence rates to population projections.

Source: US Census Bureau; Hebert et al

Aging . . . Is it a disease?

- About 1.4 million Americans are in their 90s, and another 64,000 are 100 years old or older
- Baby boomers represent 30% of the total US population
- Per person, seniors consume about five times the drugs of their working-age counterparts

By 2030, 20% of US population will be over 65 years of age…

Medicines in Development for Older Americans*

DISEASE	PRODUCTS IN DEVELOPMENT
Alzheimer's Diseasse/ Dementia	27
Bladder/Kidney	9
Depression	19
Diabetes	48
Epilepsy	7
Eye Disorders	23
GI Disorders	23
Lung/Respiratory	52
Musculoskeletal	6
Osteoarthritis	11

DISEASE	PRODUCTS IN DEVELOPMENT
Osteoporosis	20
Pain	41
Parkinson's Disease	17
Prostate	6
Rhumatoid Arthritis	38
Sepsis	3
Sexual Dysfunction	15
Skin Conditions	14
Sleep Disorders	11
Other	17

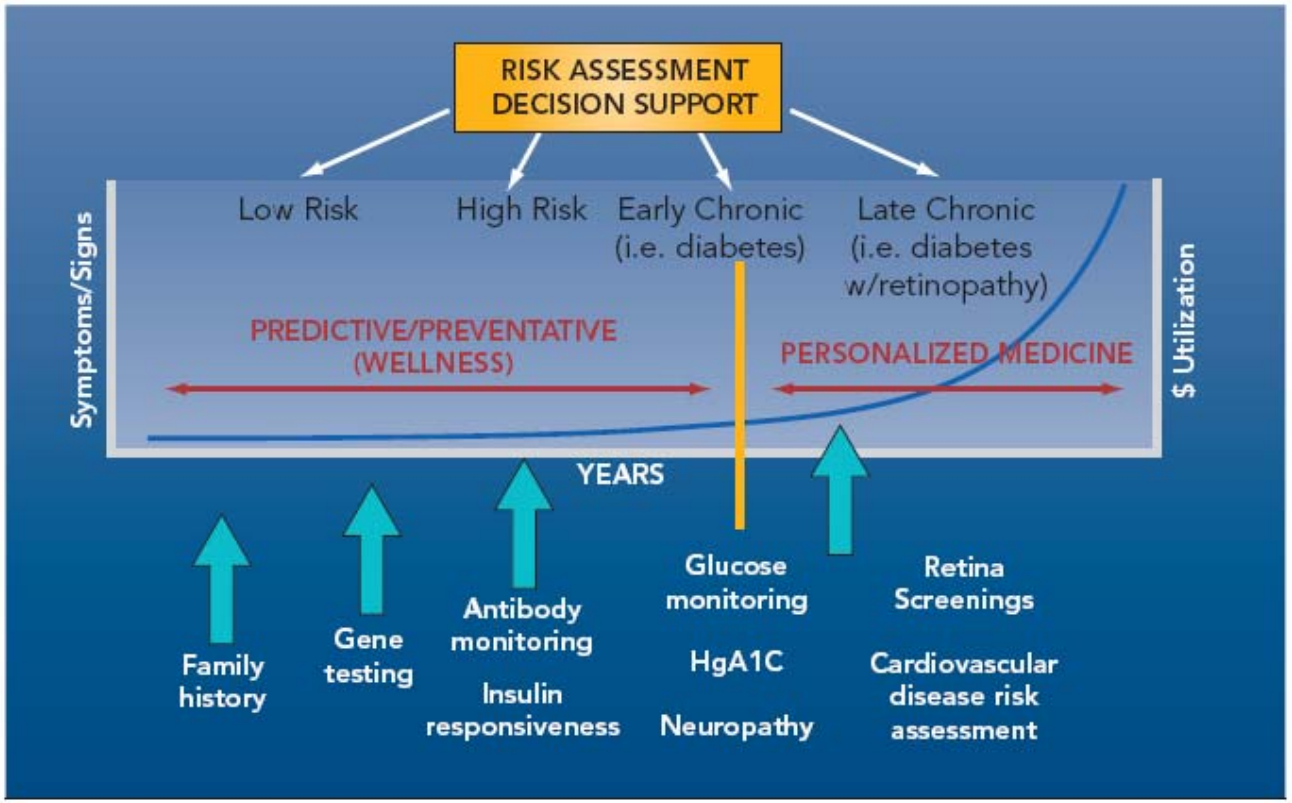
** Some medicines are listed in more than one category*

Chronic Disease

- 125 million Americans have 1 or more chronic conditions (e.g. congestive heart failure, diabetes)
- Chronic diseases account for 75% of all health care expenditures
- Current costs for chronic diseases is approaching $1 trillion
- These expenditures are not delivering what is possible

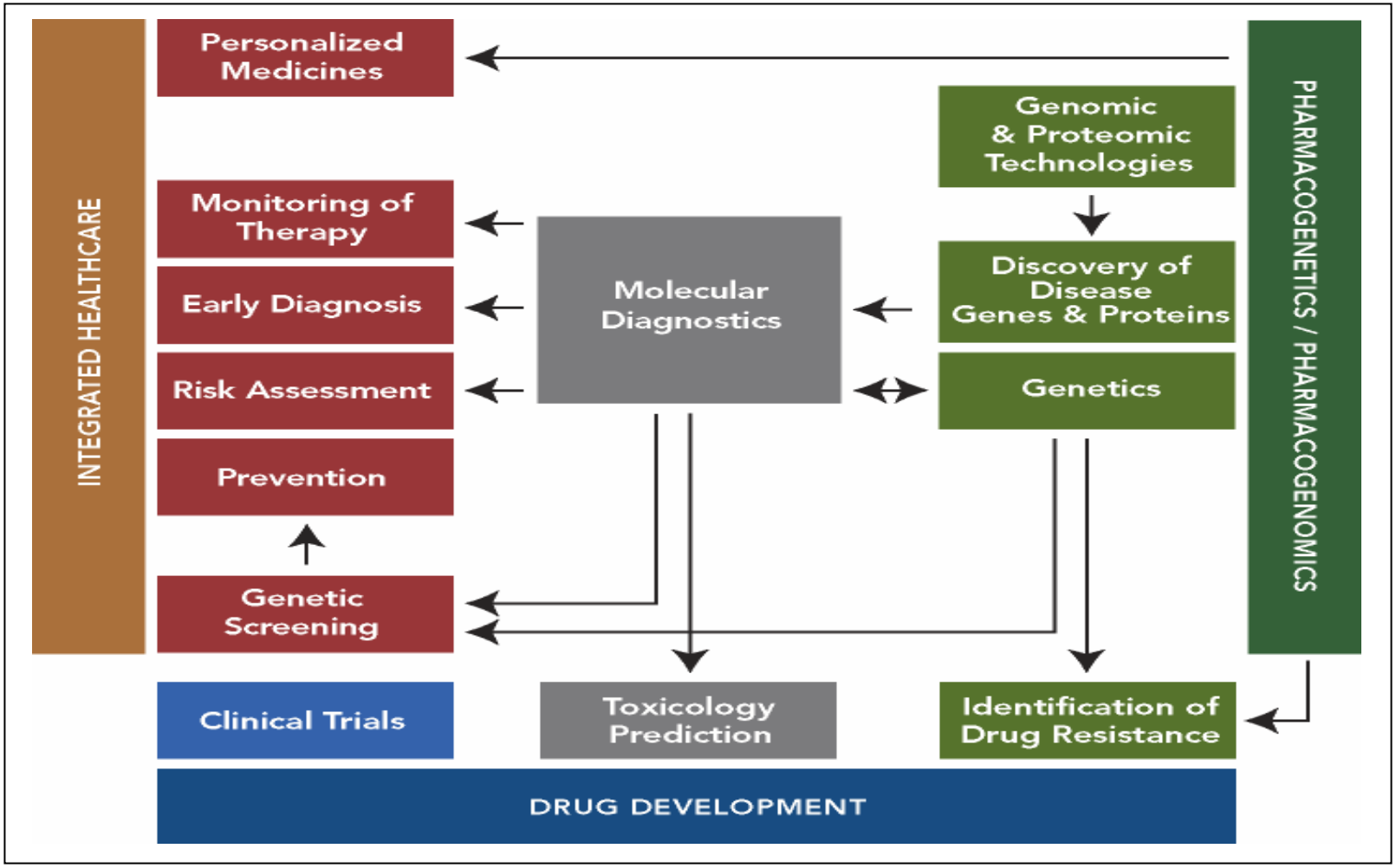
Stratifying Into Risk Categories

Diabetes Type 2: What's Becoming Possible?

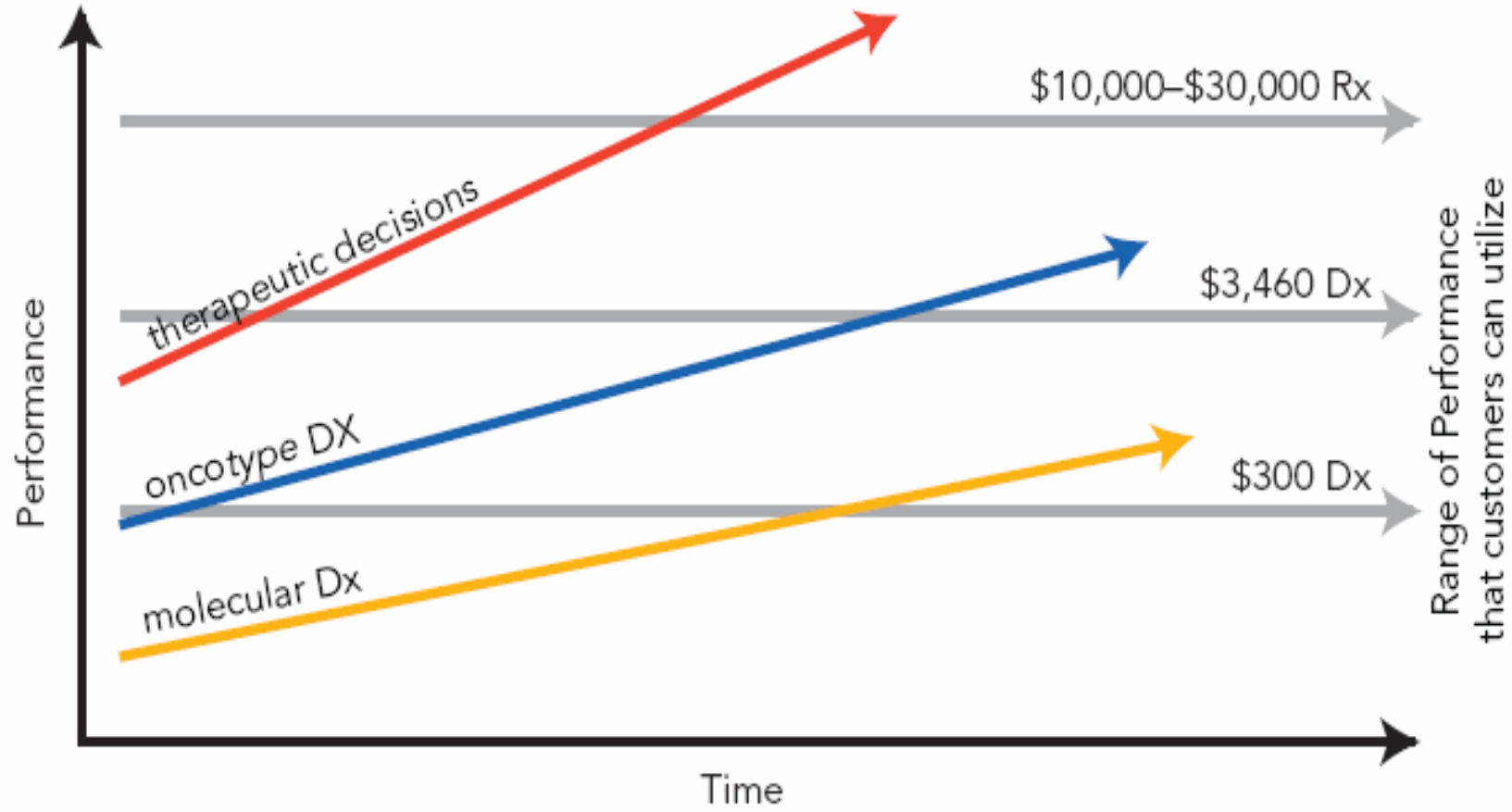


Source: Burrill & Company

MDx is at the Center of the New Dx World

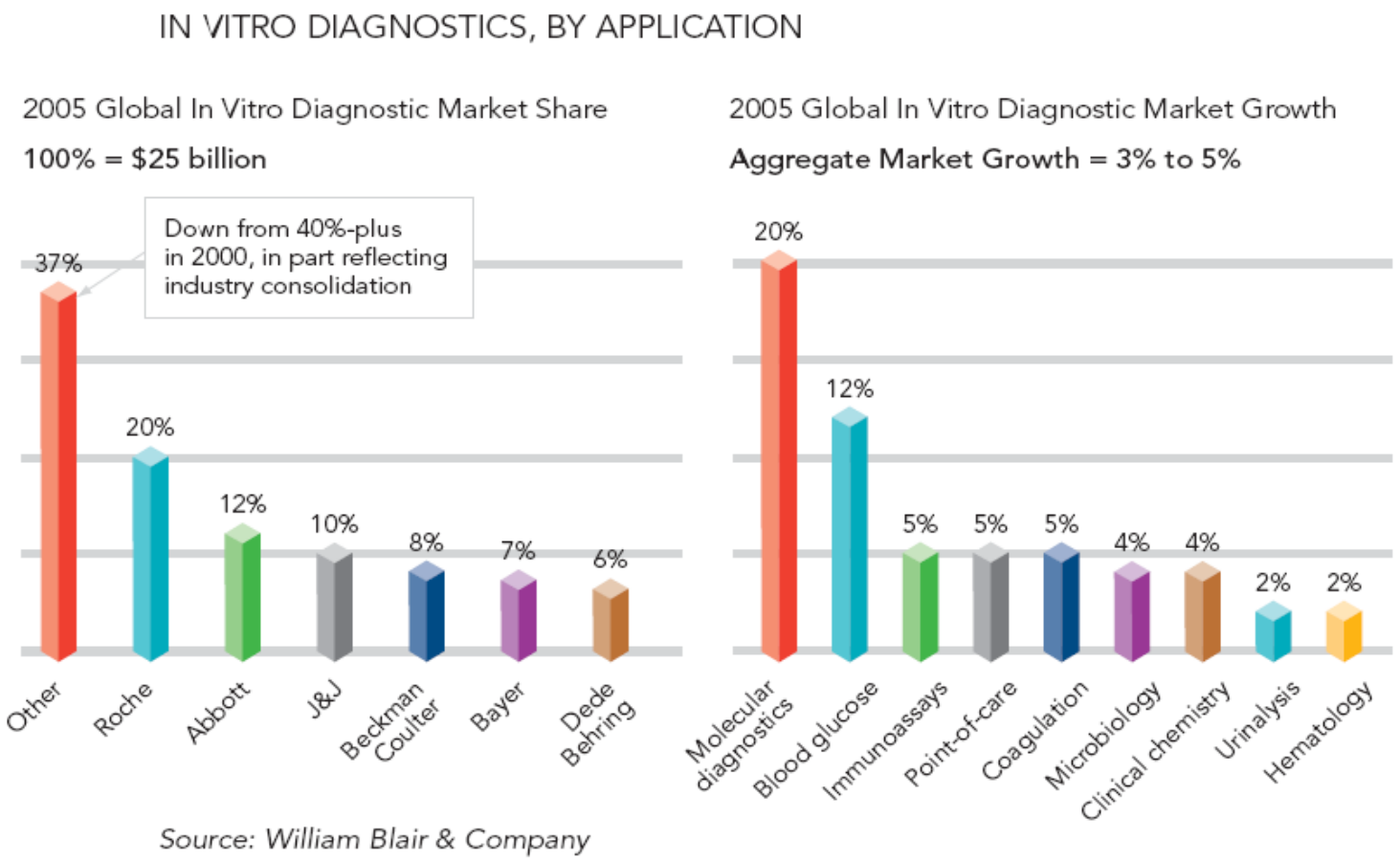


Diagnostic Innovation Makes Impact on Cancer Therapy

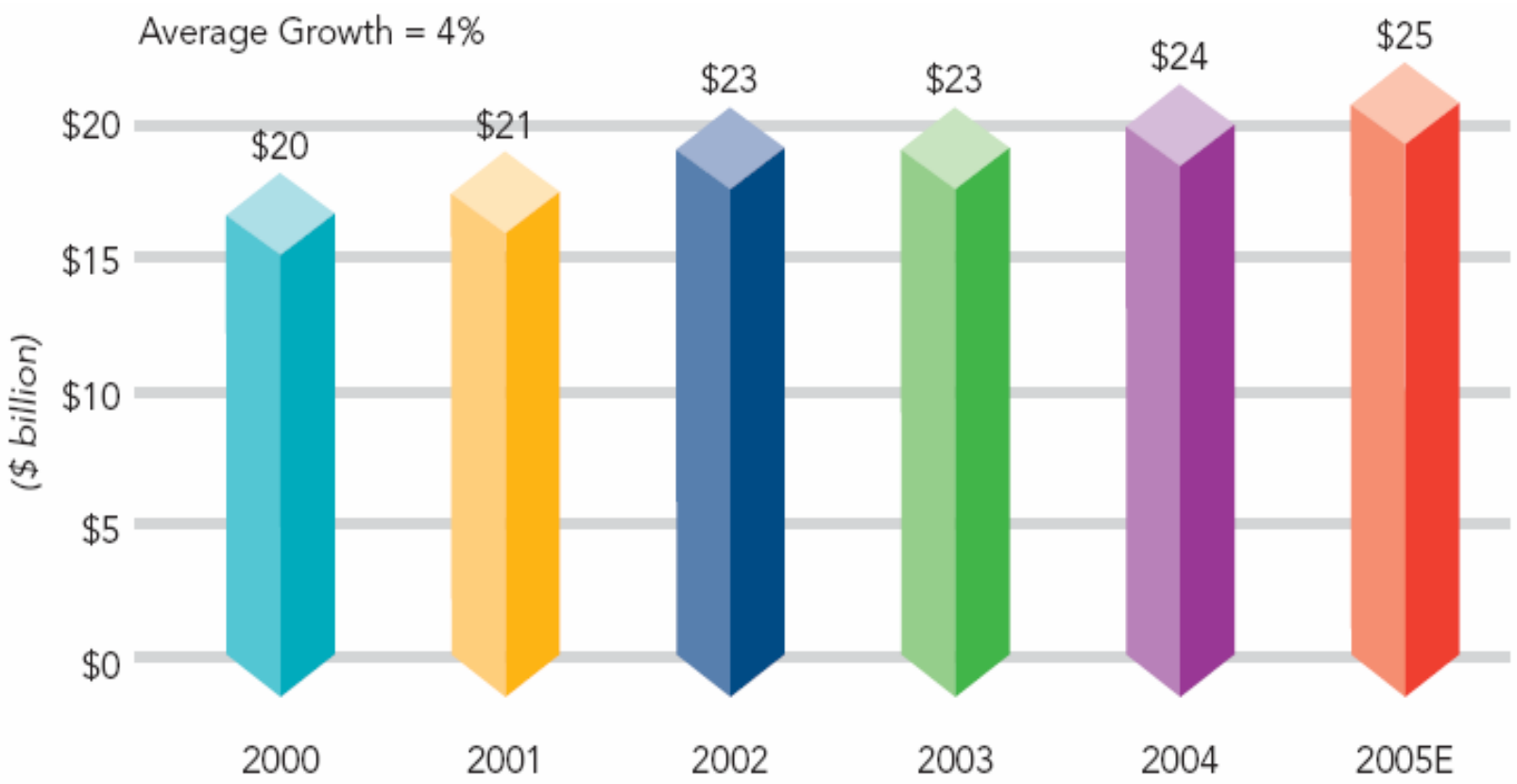


Source: Genomic Health

In Vitro Diagnostics, By Application



Worldwide In Vitro Diagnostics Market



Source: William Blair & Company

Genomic Health on a Tear

Source: Burrill & Company

Molecular Diagnostics and Personalized Medicine

"Genomic Health's vision is to enhance the lives of patients with cancer by applying genomics to individualize treatment decisions."

- Launched 2000
- Product OncotypeDx, a genomic-based test that looks at known expression biomarkers in the tumor tissue and predicts the likelihood of cancer recurrence for women with ER-positive, node-negative breast cancer
- The test is used by a woman and her doctor to determine necessary and appropriate follow-up treatment, including chemotherapy for each patient

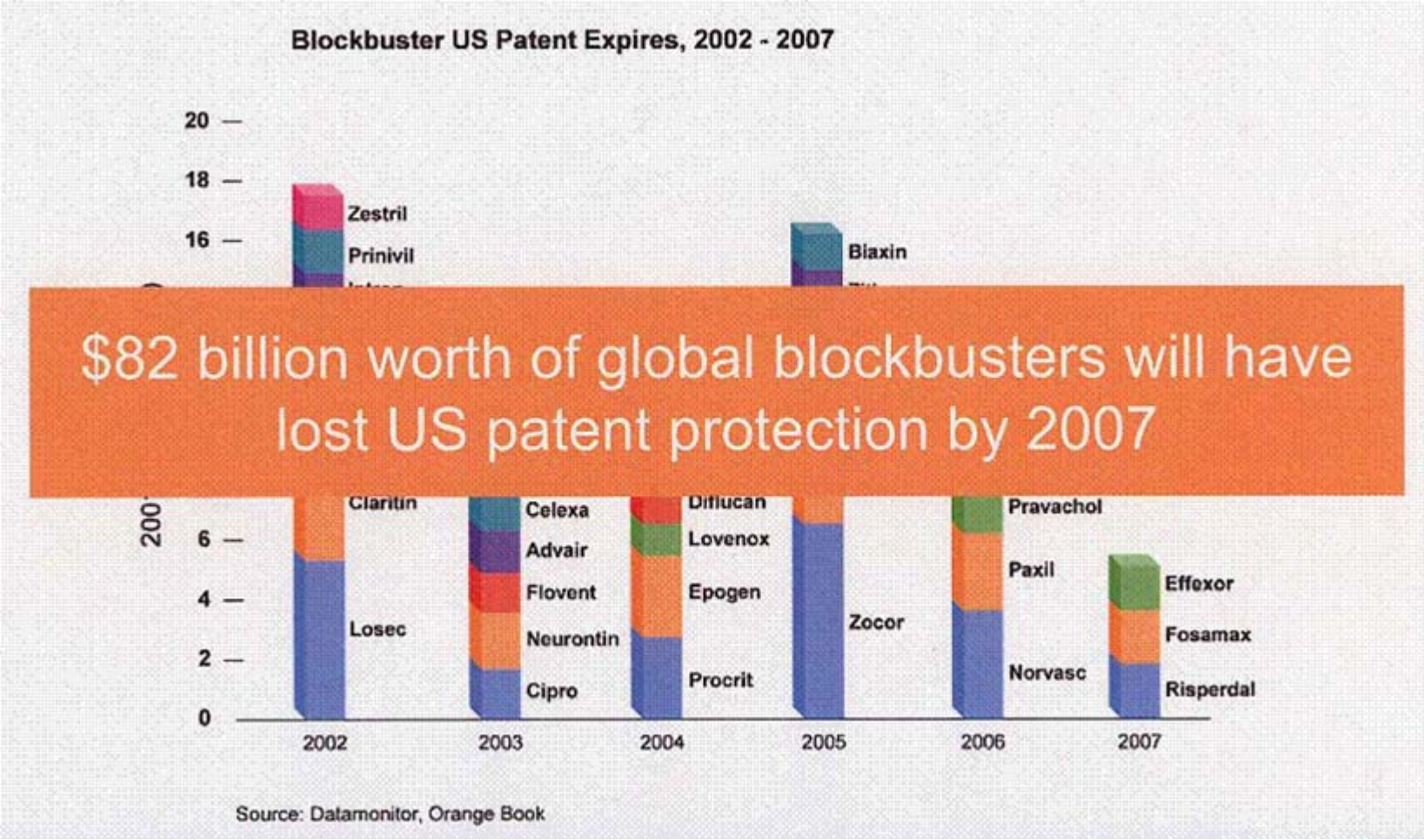
Transformation:

Governments are our Partners
…and are increasingly involved

On The Regulatory/Patent/Policy Front…

- Patent reform (PTO proposals to restrict claims examined in a single application and limit continuation applications)
- FDA resources – PDUFA authorization
  - follow-on biologics (biogenerics)
  - drug safety
  - theranostics
  - food safety (pet food)
- Biofuels – renewable and alternative energy sources through use of biotechnology
- Medicare Prescription Drug Price Negotiation Act – Non-interference (proposal to require Medicare interference)
- Sarbanes Oxley compliance – reducing the burden on small companies
- SBIR eligibility
- Agbio/ GMO's
- Stem cell research – federal funding

Looking Forward, Patent Exposure is Set to Increase Significantly



$82 billion worth of global blockbusters will have lost US patent protection by 2007

Big pharma revenue off patent in the next four years

Company	Share of Revenues (%)
AstraZeneca	38*
BMS	30
GSK	23
Eli Lilly	22
Merck	22
Novartis	14
Pfizer	41
Sanofi-aventis	34
Average:	***28***

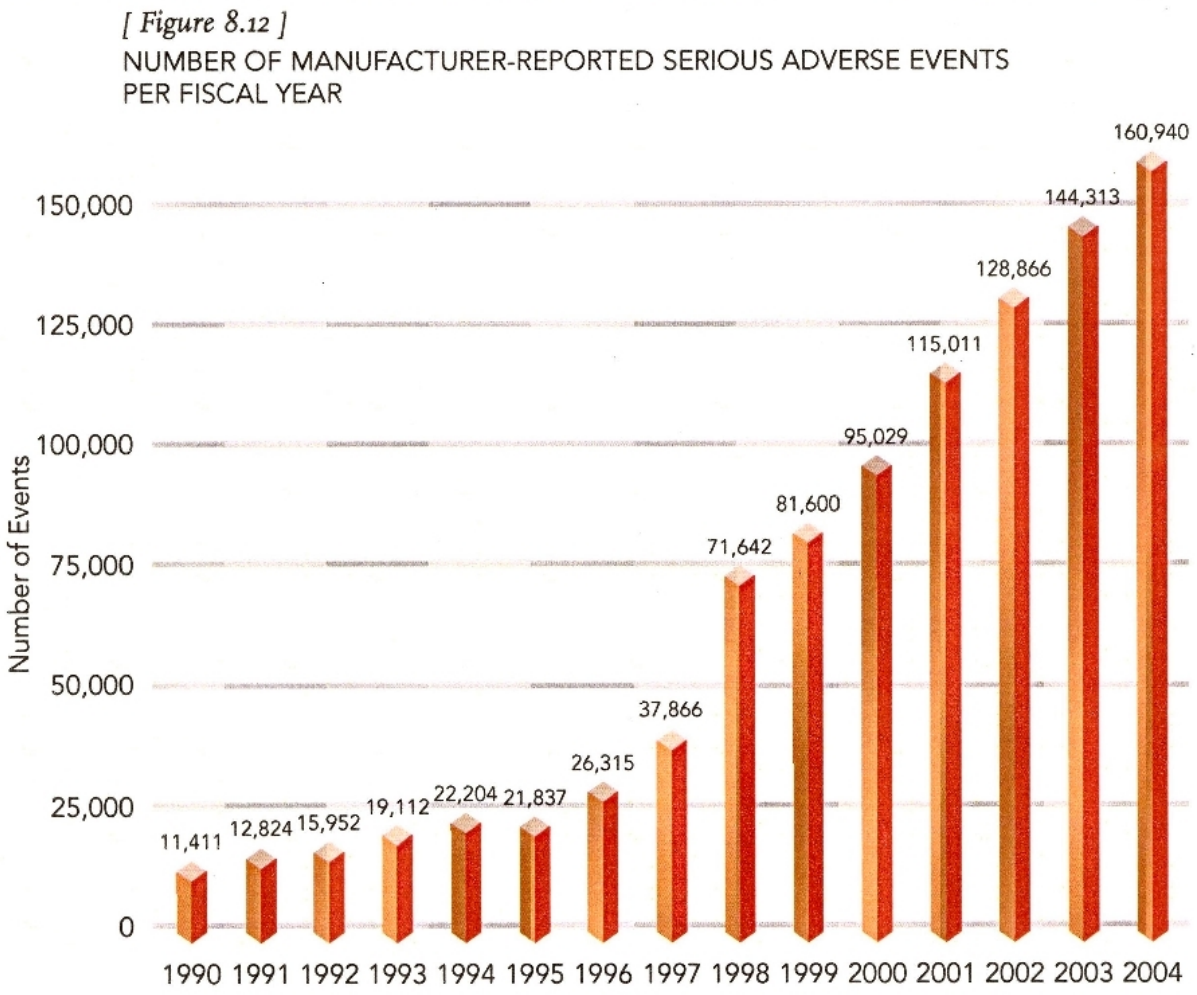
Source: AXA Framlington
*Notes: *Value of products losing patent protection as a percentage of total company sales over next five years*

Biogeneric Status of Biotech Drugs

BRAND	ACTIVE SUBSTANCES	MARKETER	YEAR OF APPROVAL	2005 SALES ($M)	GENERICS UNDER DEVELOPMENT
Neupogen	Filgrastim	Amgen	1991	$3,500	Yes
Procrit	Epoetin alpha	Ortho Biotech	1990	$3,000	Yes
Epogen	Epoetin alpha	Amgen	1989	$3,000	Yes
Enbrel	Etanercapt	Immunex	1998	$2,700	No
Remicade	TNF alpha	JNJ (Centocor)	1998	$2,200	Yes
Rituxan	Anti-CD20 Mab	Genentech	1997	$1,500	No
Avonex	Interferon beta-1a	Biogen	1996	$1,500	Yes
Intron A	Interferon alpha-2b	Schering Plough	1995	$900	Yes
Betaferon	Interferon beta-1a	Schering AG	1995	$682	Yes
Humulin	75% human insulin isophane suspension, 25% human rec. insulin	Eli Lilly	1992	$630	Yes

Source: IMS Healthcare, Burrill & Company

Manufacturer Reported Serious Adverse Events Per Fiscal Year

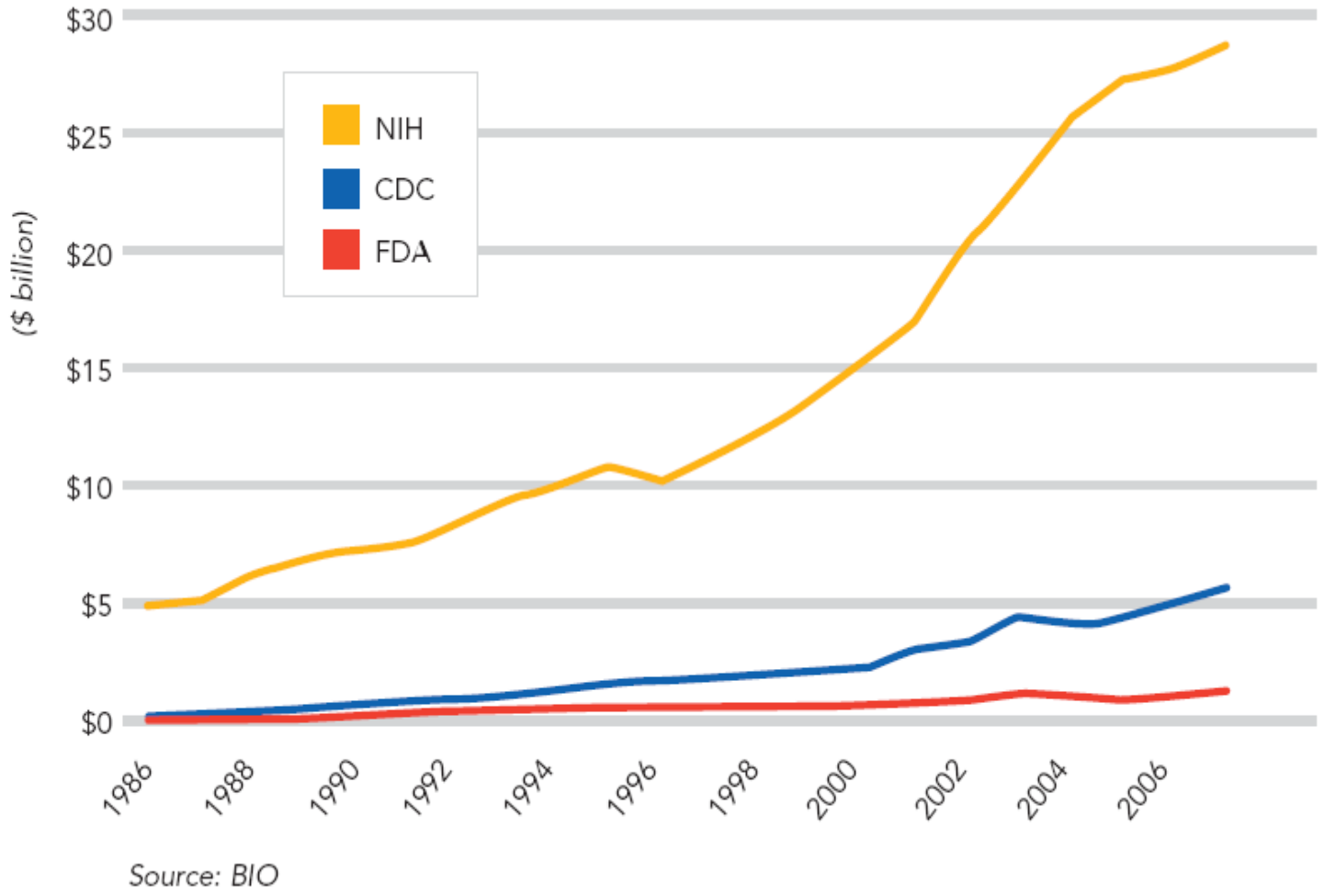


Pulled from the Market

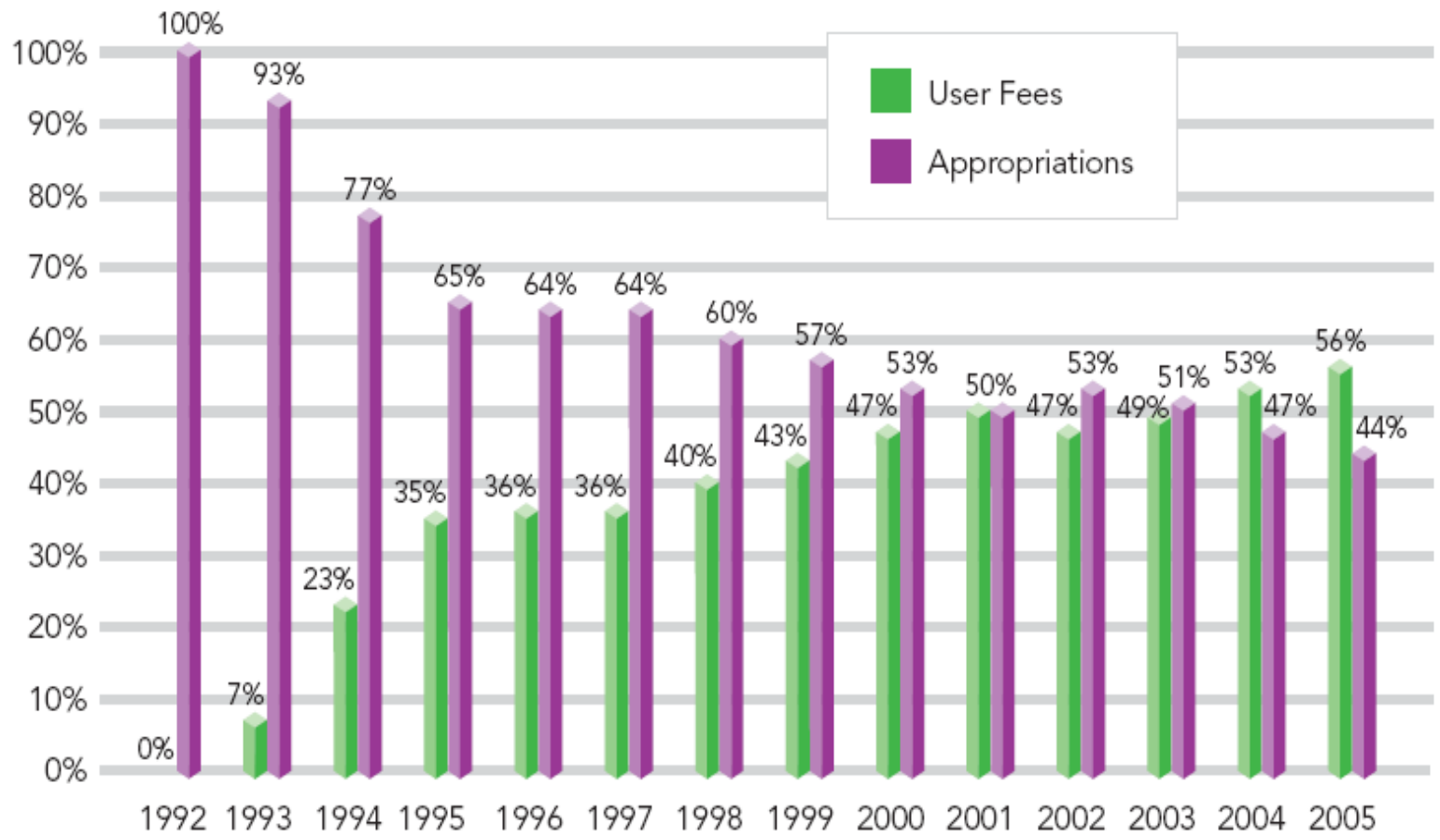
Date Approved	Drug Name	Use	Risks	Date Withdrawn
2004	Tysabri	Multiple Sclerosis	Rare, frequently fatal demyleinating disease of CNS	2005
2001	Bextra	Pain reliever	Heart attack/stroke; fatal skin reactions	2005
1999	Vioxx	Pain reliever	Heart attack/stroke	2004
1997	Baycol	Cholesterol	Severe muscle damage, to muscle, that is sometimes fatal	2001
1999	Raplon	Anesthesia	Inability to breath	2001
1993	Propulsid	Heartburn	Fatal heart rhythm abnormalities	2000
1997	Rezulin	Type 2 diabetes	Severe liver toxicity	2000
1988	Hismanal	Antihistamine	Fatal heart rhythm abnormalities	1999
1997	Raxar	Antibiotic	Fatal heart rhythm abnormalities	1999
199[illegible]	[illegible]sor	High blood pressure	Dangerous interactions with other drugs	1998
199[illegible]	Duract	Pain reliever	Severe liver damage	1998
1985	Seldane	Antihistamine	Fatal heart rhythm abnormalities	1998
1973	Pondimin	Obesity	Heart valve abnormalities	1997
1996	Redux	Obesity	Heart valve abnormalities	1997

Blockbuster drugs pulled from the market gave investors concern

FDA Funding Lagging

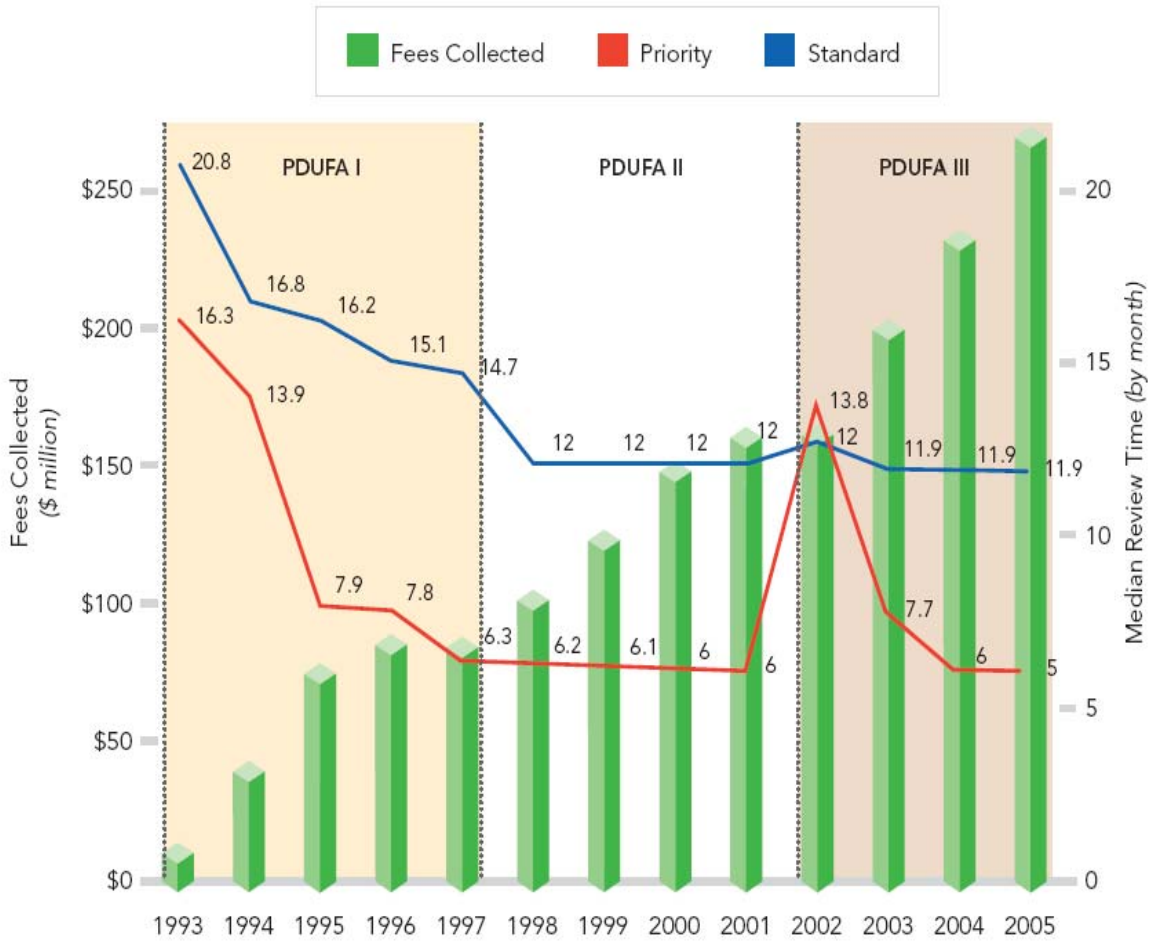


An Eroding Appropriations Base



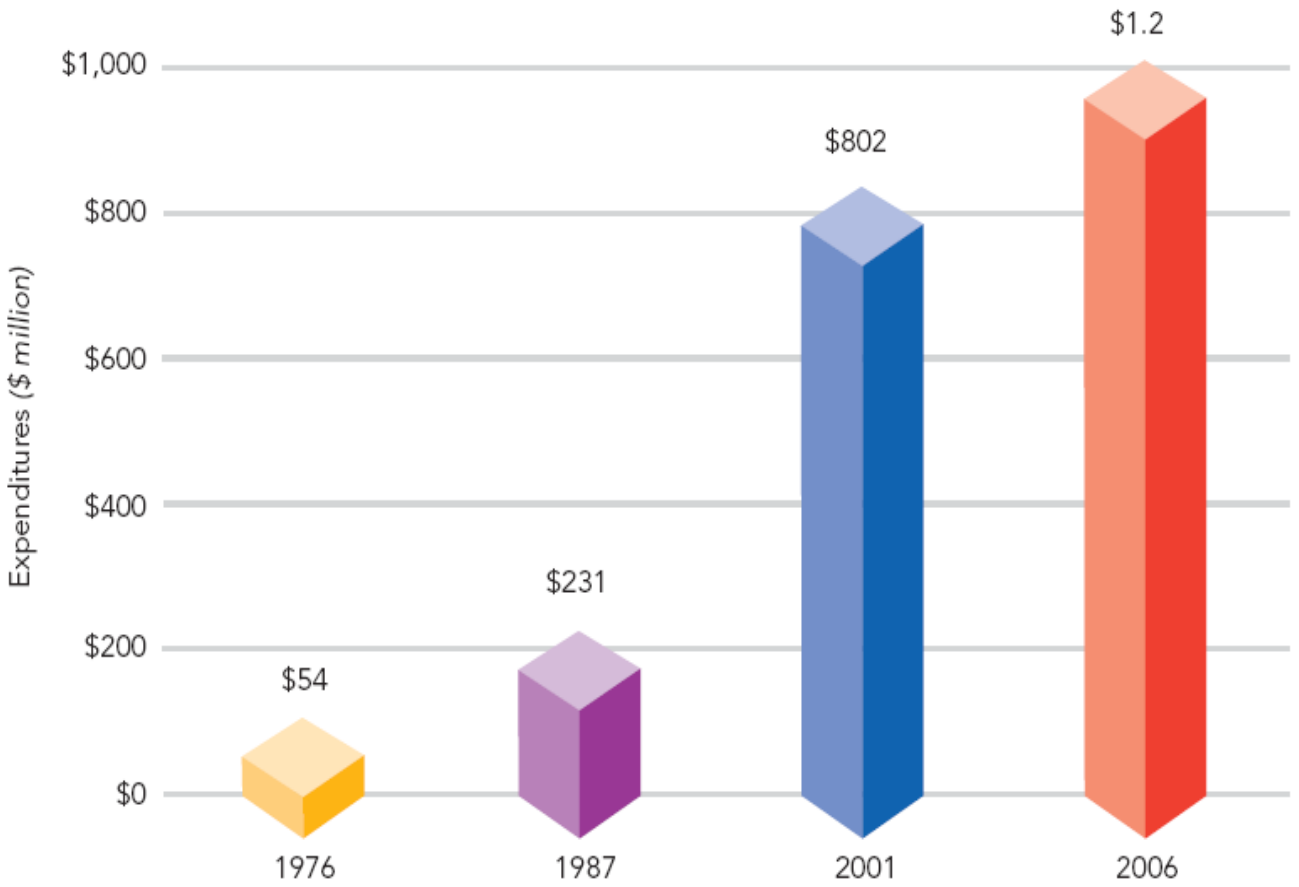
Source: BIO

Review Times Have Leveled



Source: BIO

The Cost of Developing a New Drug Has Greatly Increased



Source: Tufts Center for the Study of Drug Development

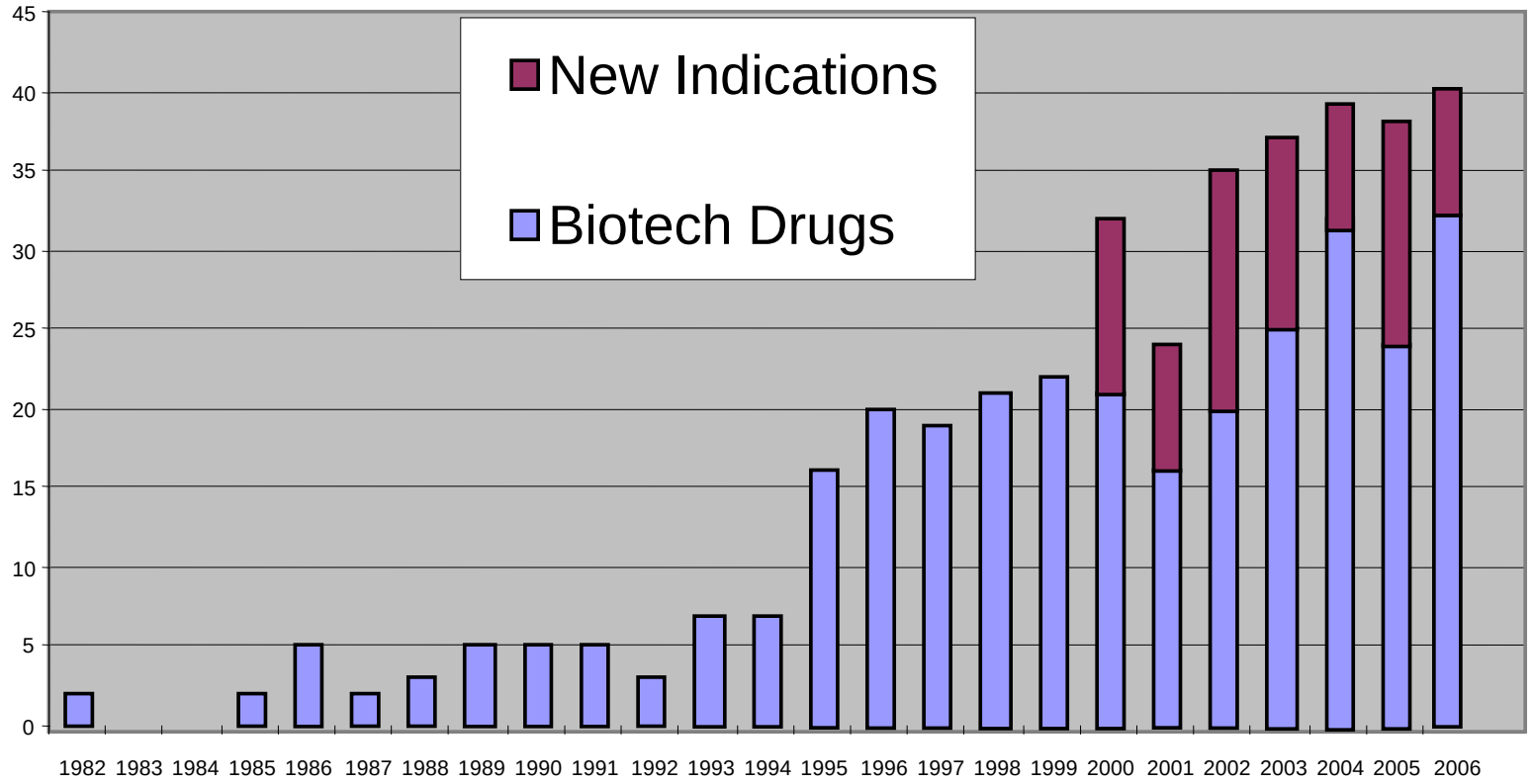
Critical Path - Accomplishments

- Better evaluation tools (Biomarkers and disease models)
- Streamlining clinical trials
- Harnessing bioinformatics
- Moving manufacturing into the 21st century
- Products to address urgent public health needs
- At-risk population

Major Government Initiatives in Biotechnology

- EU/Eastern Europe/Scandinavia
- China
- India
- Japan
- Malaysia
- Singapore
- UAE/Dubai and Kuwait
- Israel
- Various Latin American Countries (esp. Chile/Brazil)
- Australia/New Zealand

Number of Products Approved — 1980–2006



Transformation:

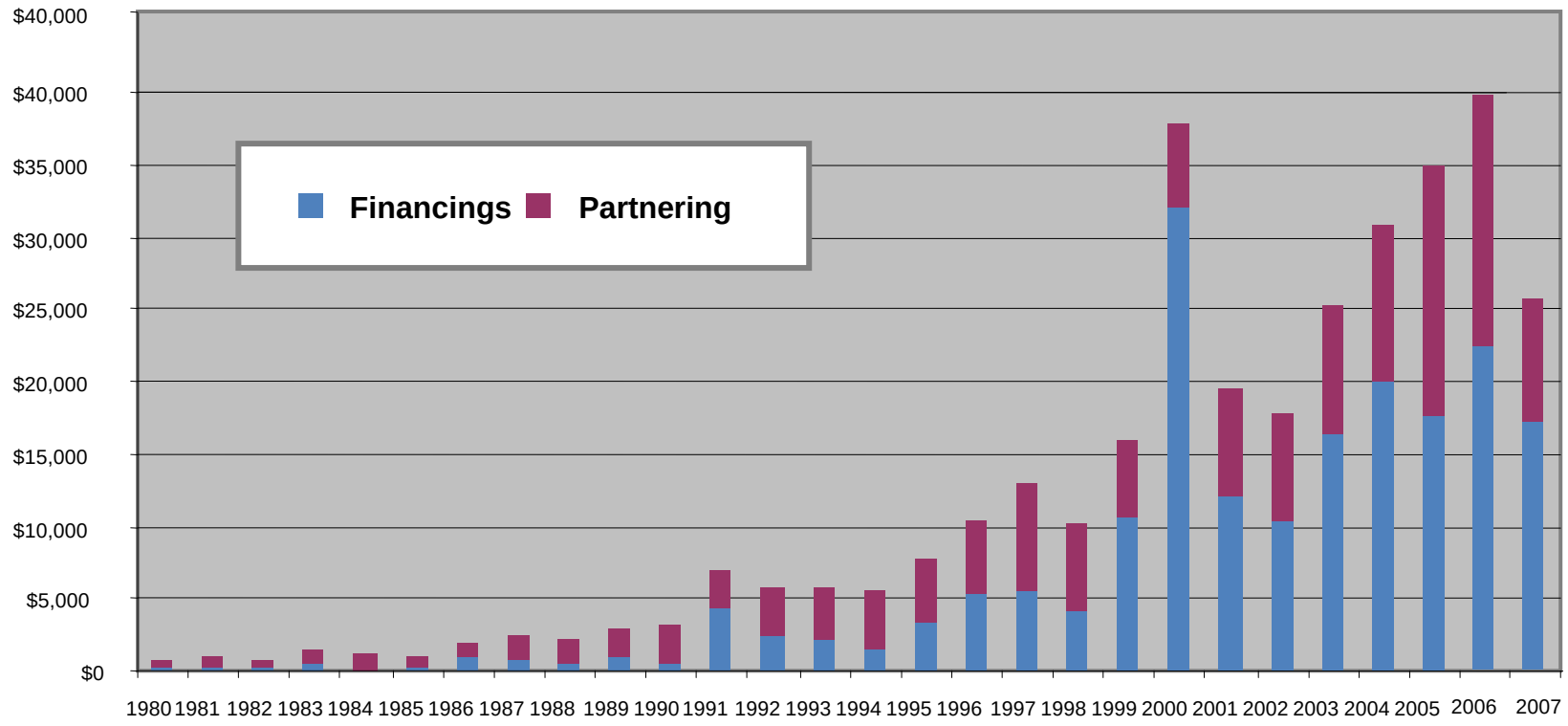
Local Financial Markets to Global Arbitrage

US Biotech Industry Financings 2002-2007

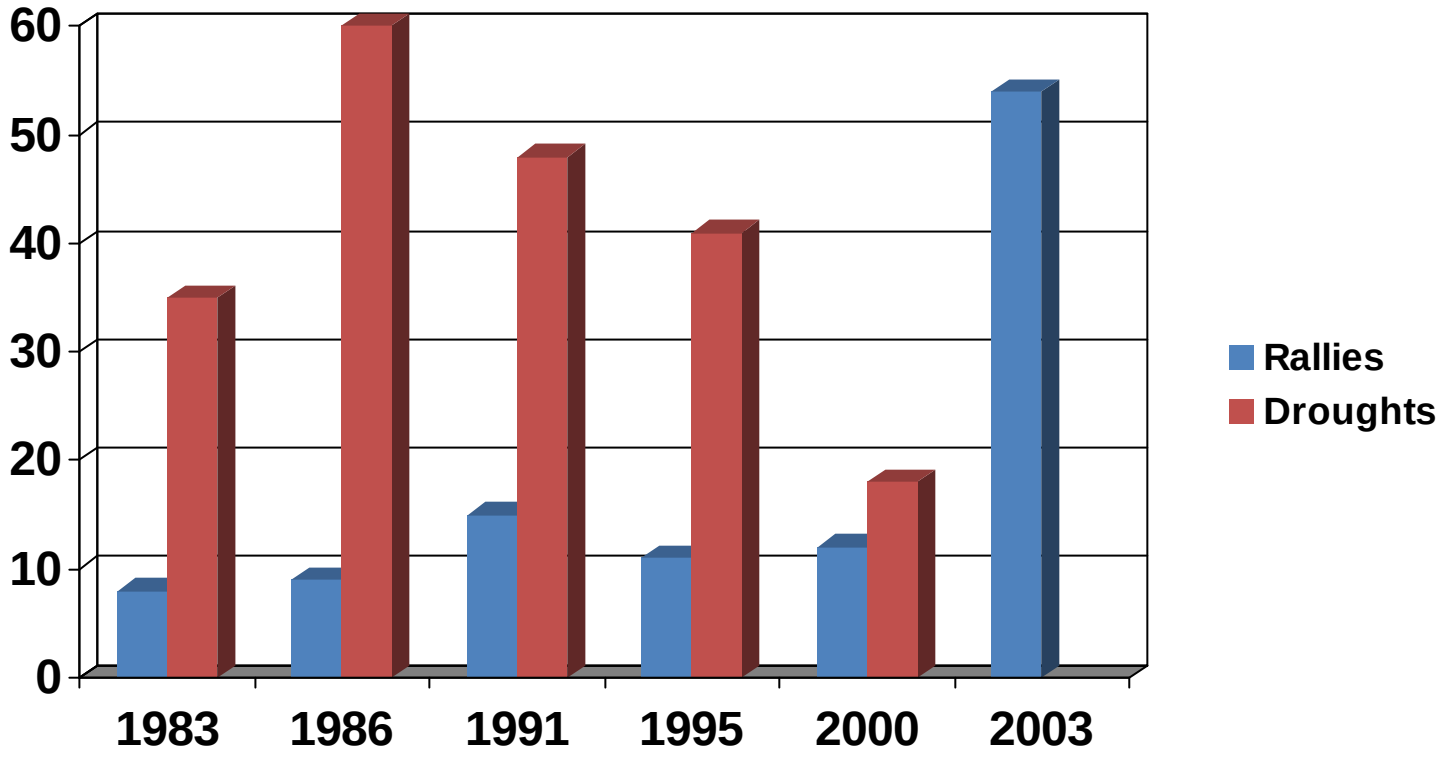
	2002	2003	2004	2005	2006	1H 07
Public						
IPO	$ 445	$ 456	$ 1,701	$ 819	$ 920	$ 2,686
Follow-on	979	$ 3,536	$ 3,388	$ 4,194	$ 5,766	$ 2,615
PIPEs	1,007	$ 2,051	$ 2,417	$ 2,376	$ 2,027	$ 1,073
Debt	5,251	$ 7,170	$ 8,418	$ 5,565	$ 13,978	$ 7,262
Private						
VC	$ 2,688	$ 2,841	$ 3,733	$ 3,518	$ 4,236	$ 2,502
Other	$ 178	$ 294	$ 269	$ 1,114	$ 425	$ 930
Total	***$10,548***	***$16,348***	***$ 19,927***	***$ 17,586***	***$ 27,352***	**$ 17,068**

Source: Burrill & Company

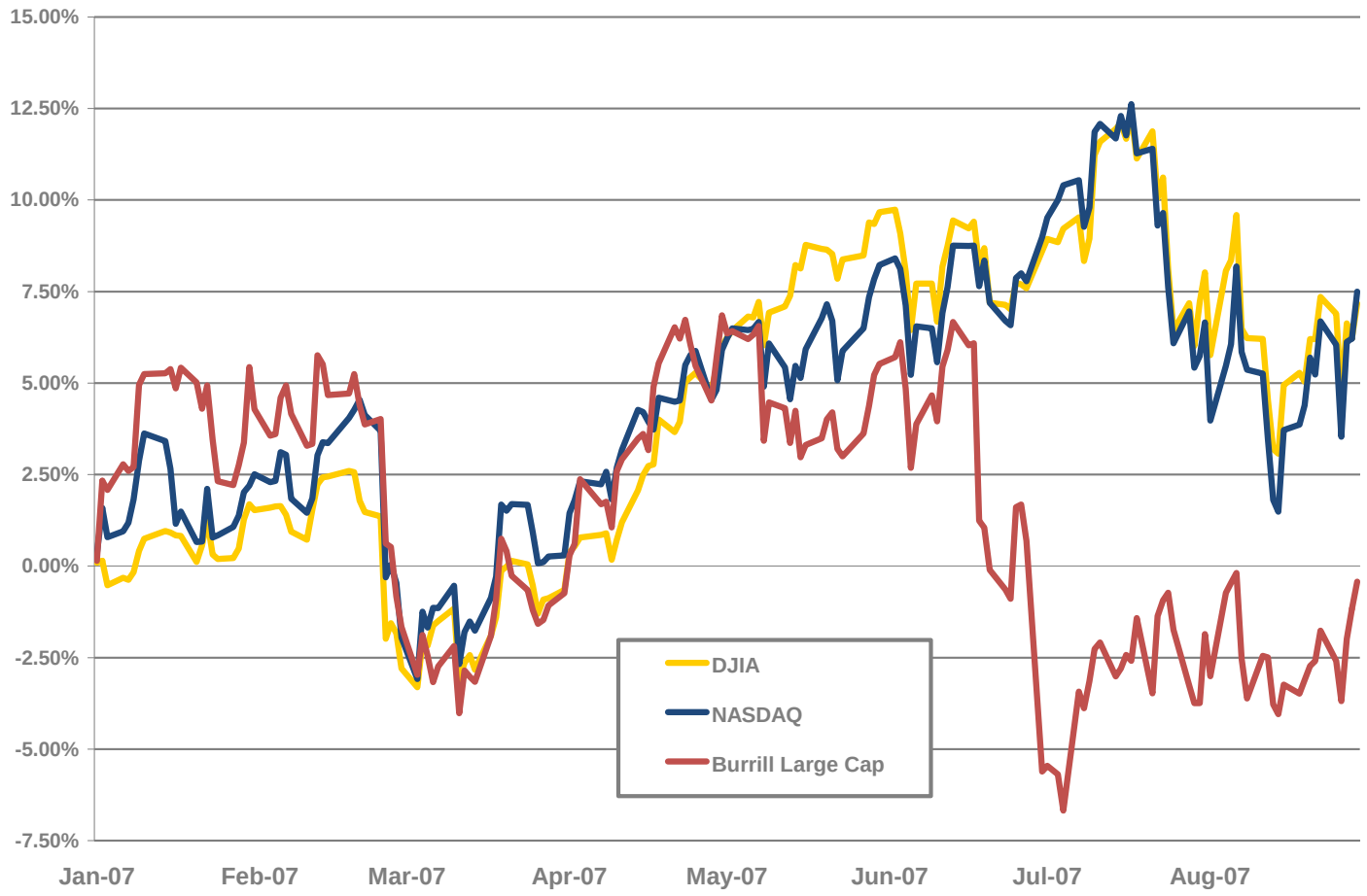
Capital Raised 1980-2007



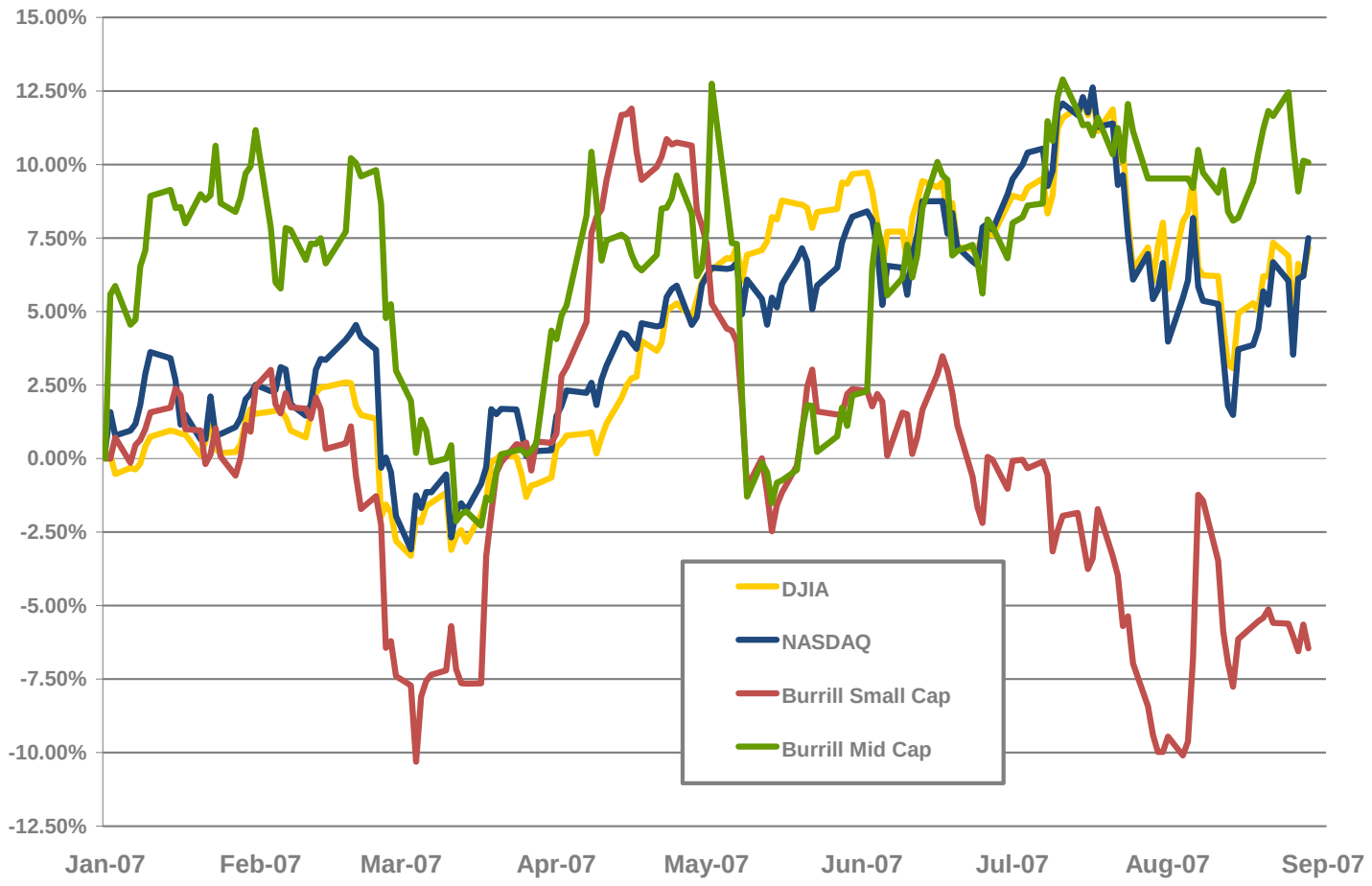
Biotech's Five Cycles
Length of Rallies/Droughts in Months



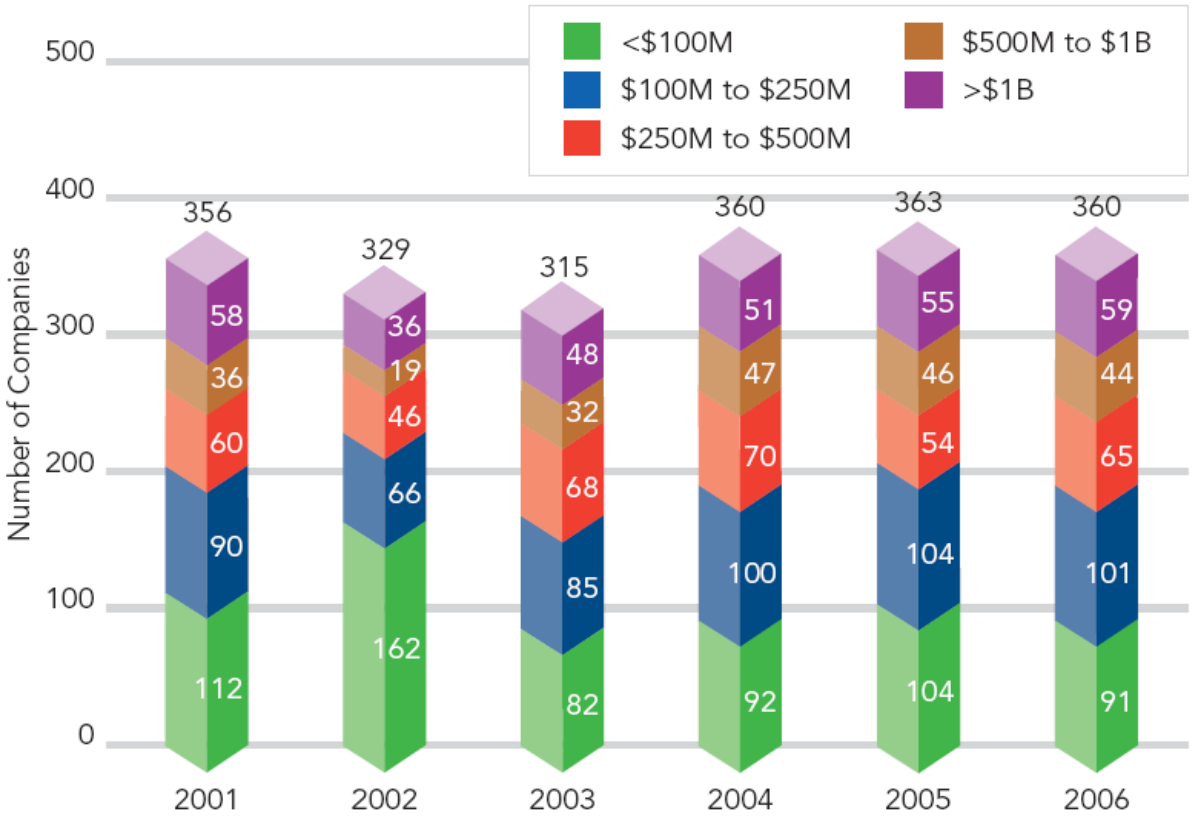
Burrill Large Cap Index vs. NASDAQ, DOW



Burrill Small, Burrill Mid-Cap Indices vs. NASDAQ, DOW

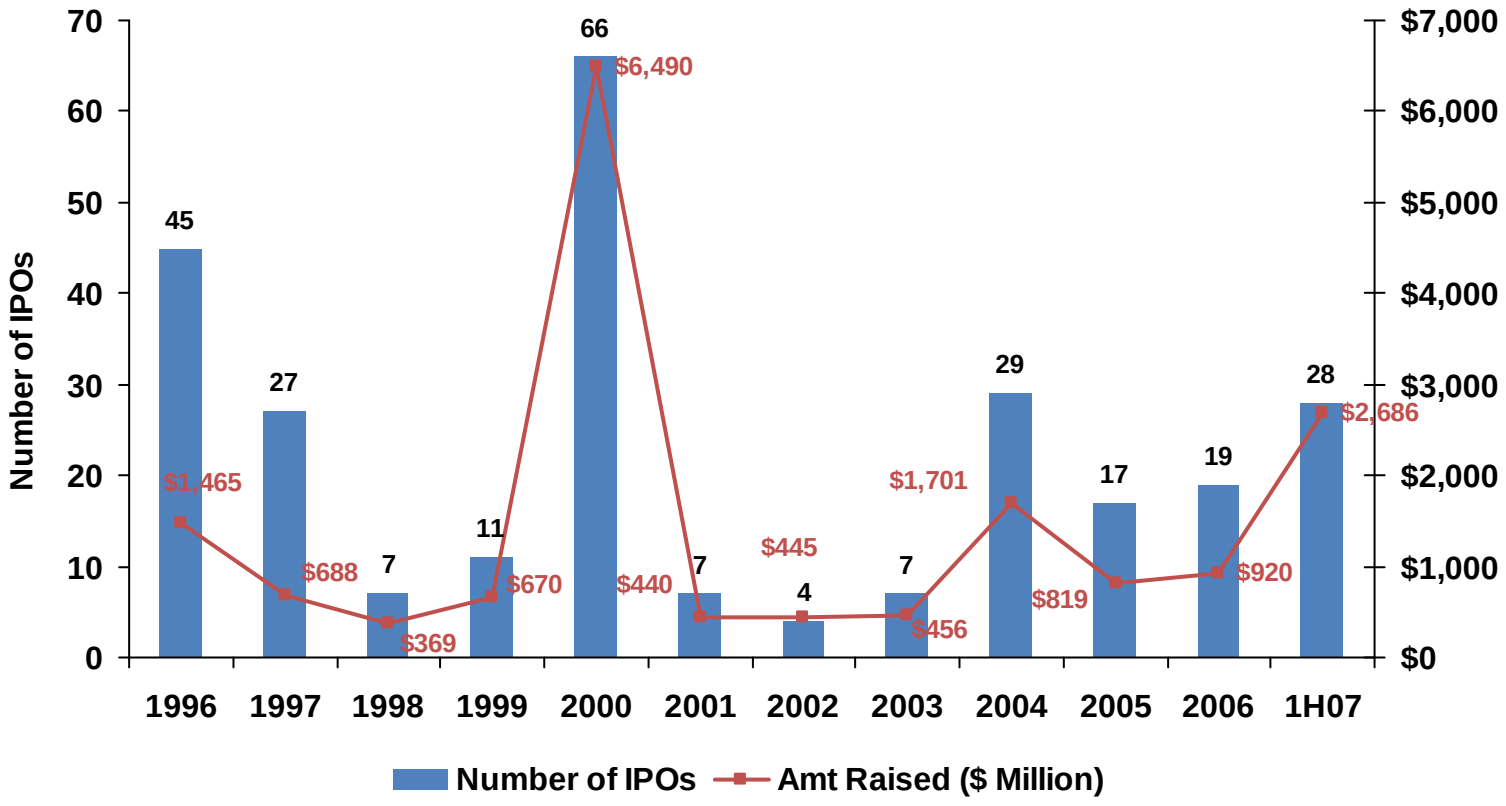


Billion-Dollar Club

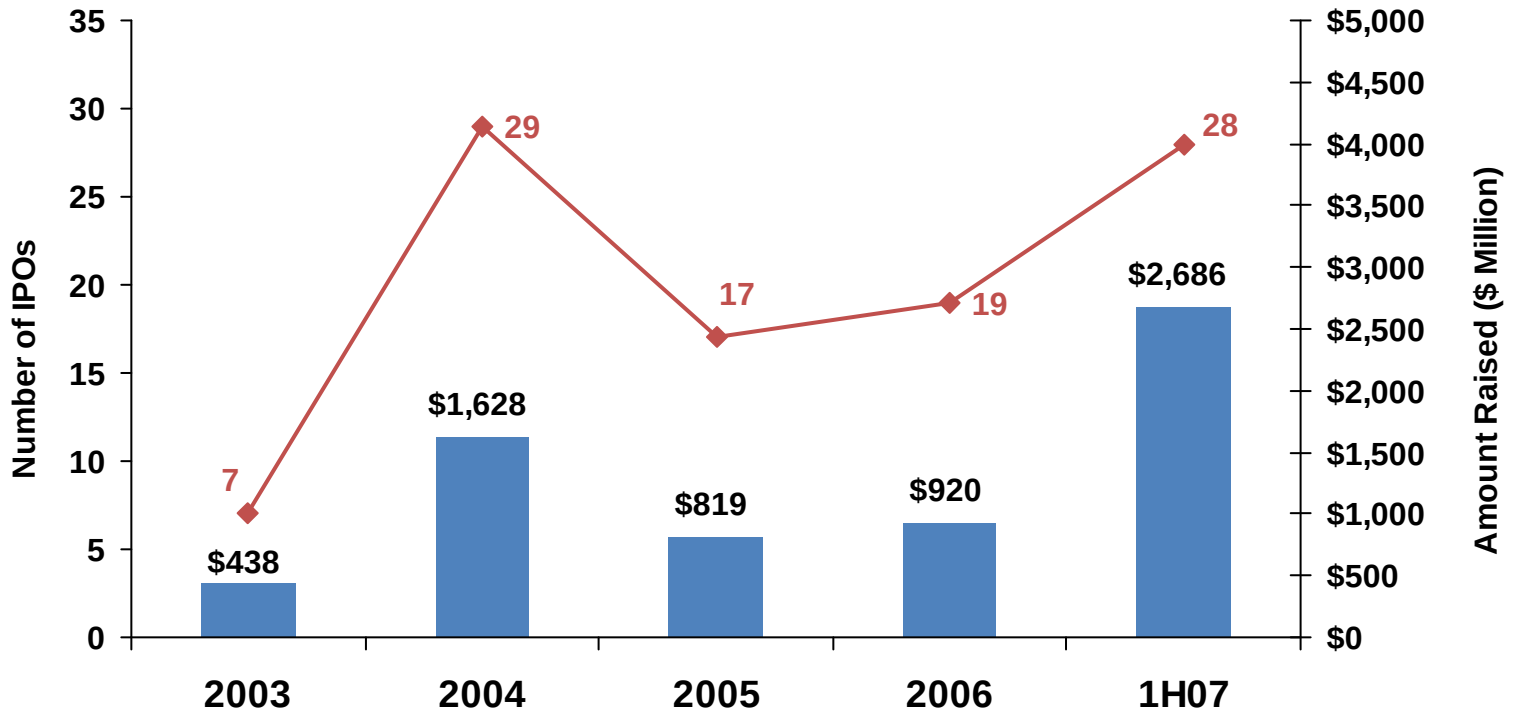


Source: Burrill & Company

IPOs – Not What They Used to Be!



IPOs – Not What They Used to Be! (Continued)



Source: Burrill & Company

2007 to-date Life Science Financing Overview

Initial Public Offerings:

- 20 offerings with proceeds of at least $20.0m
- $1.7b total proceeds raised
- $79.59m average deal size
- The share price of issuing companies increased 6.06% on average 5 days post pricing
- The share price since time of offering has decreased -5% on average (as of 9/17/07)

Finance and Capital Markets

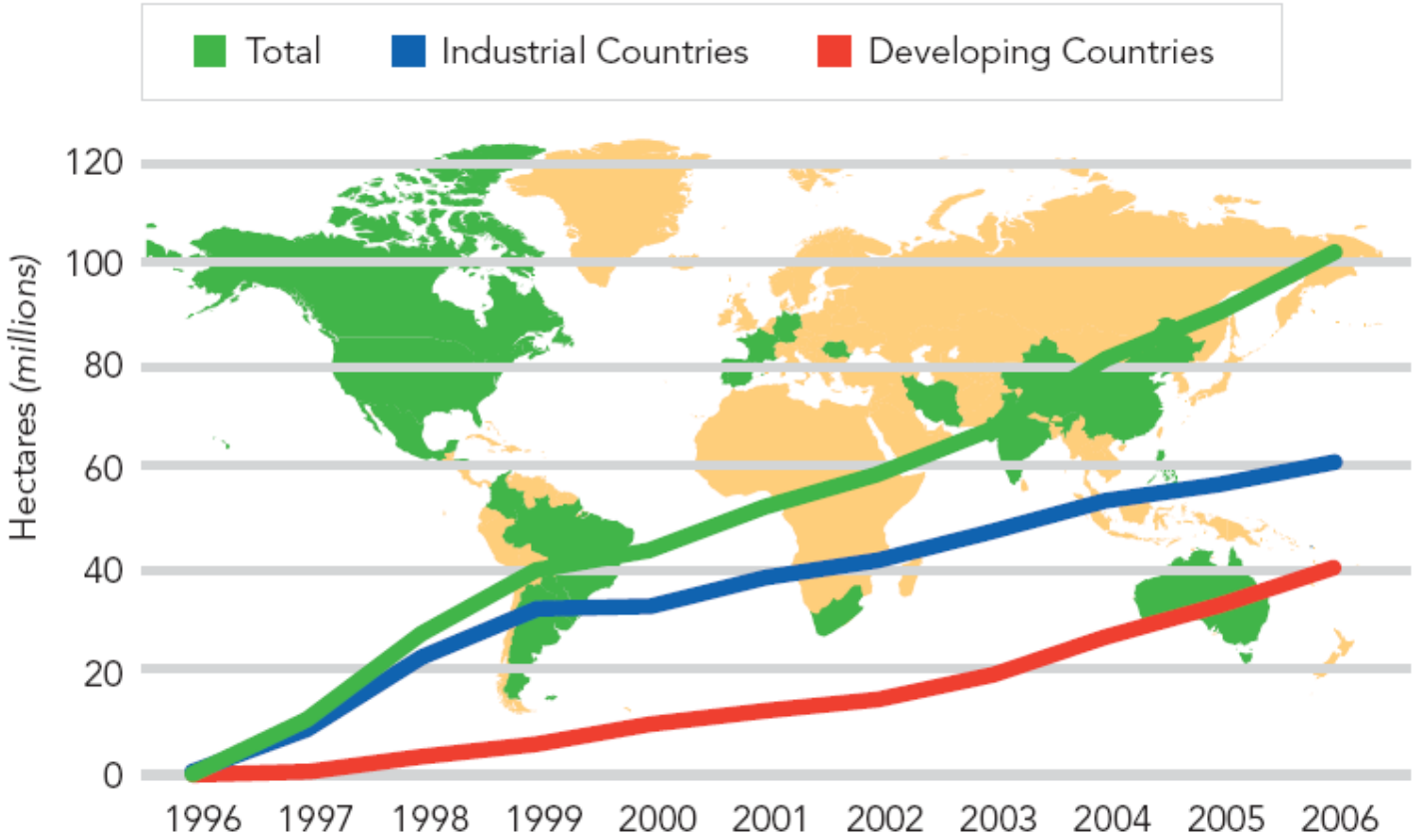
The global financial markets have created additional opportunities for companies to look outside their borders for financing

- Europeans on NASDAQ/NYSE
- Chinese on NYSE
- Americans on AIM/Euronext/SWX
- Other markets are available
  - Mothers (Tokyo)
  - DFX (Dubai)
  - Hong Kong

Transformation:

Fossil Fuels to Biofuels

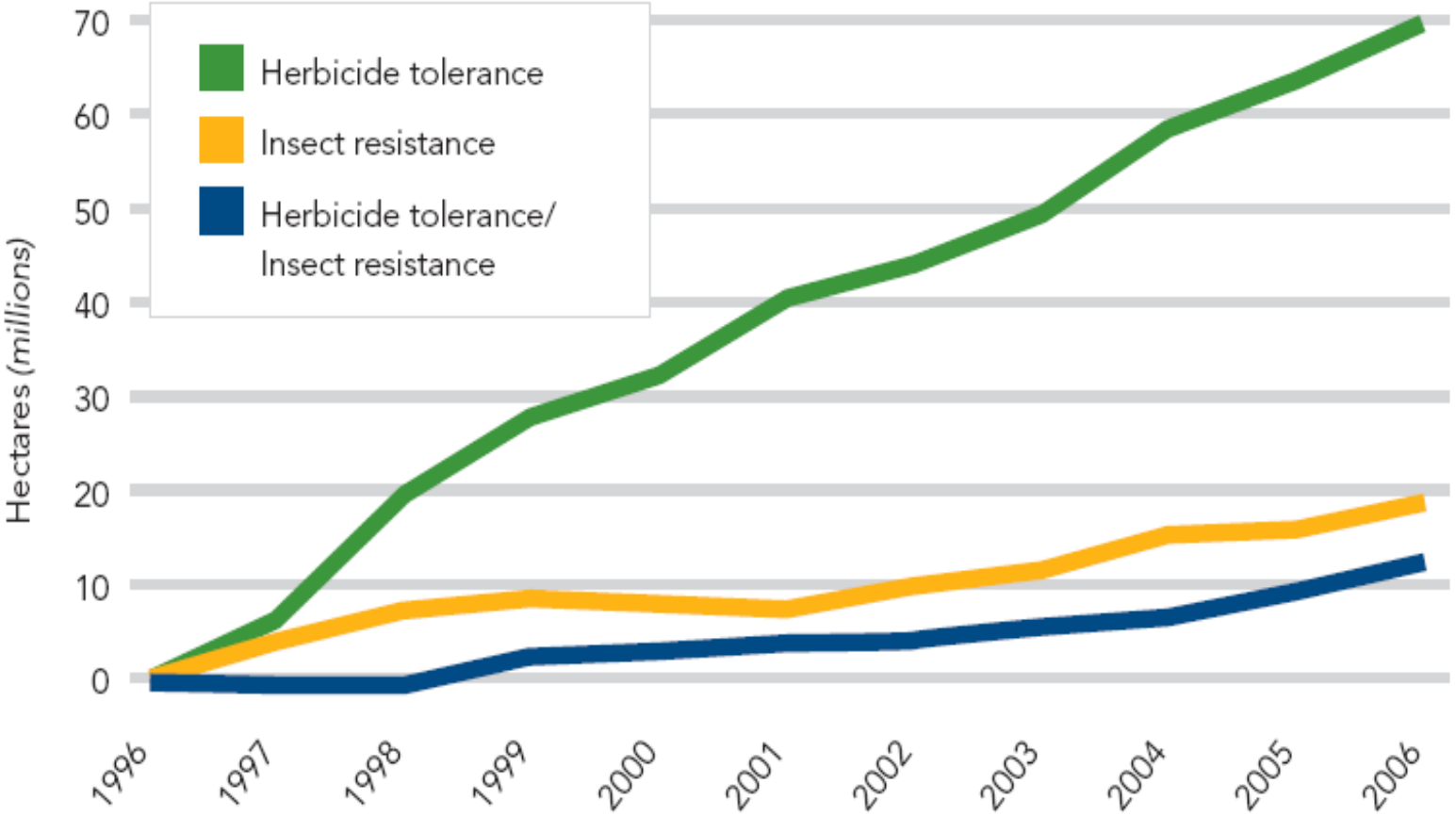
Global Area of Biotech Crops, 1996 to 2006



Note: Increase of 13%, or 12 million hectares (30 million acres between) 2005 and 2006.

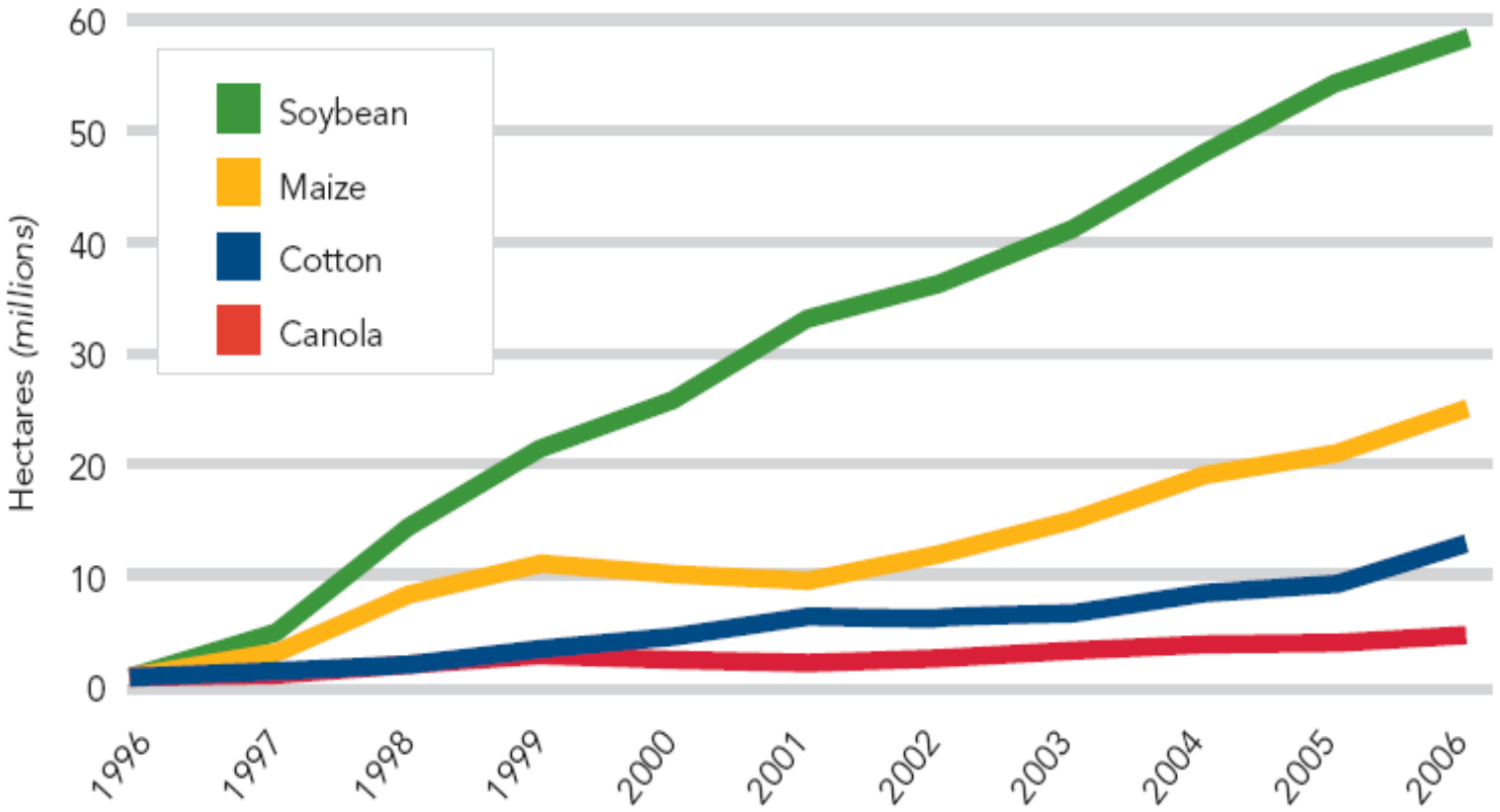
Source: Clive James

Global Area of Biotech Crops 1996 to 2006 by Trait



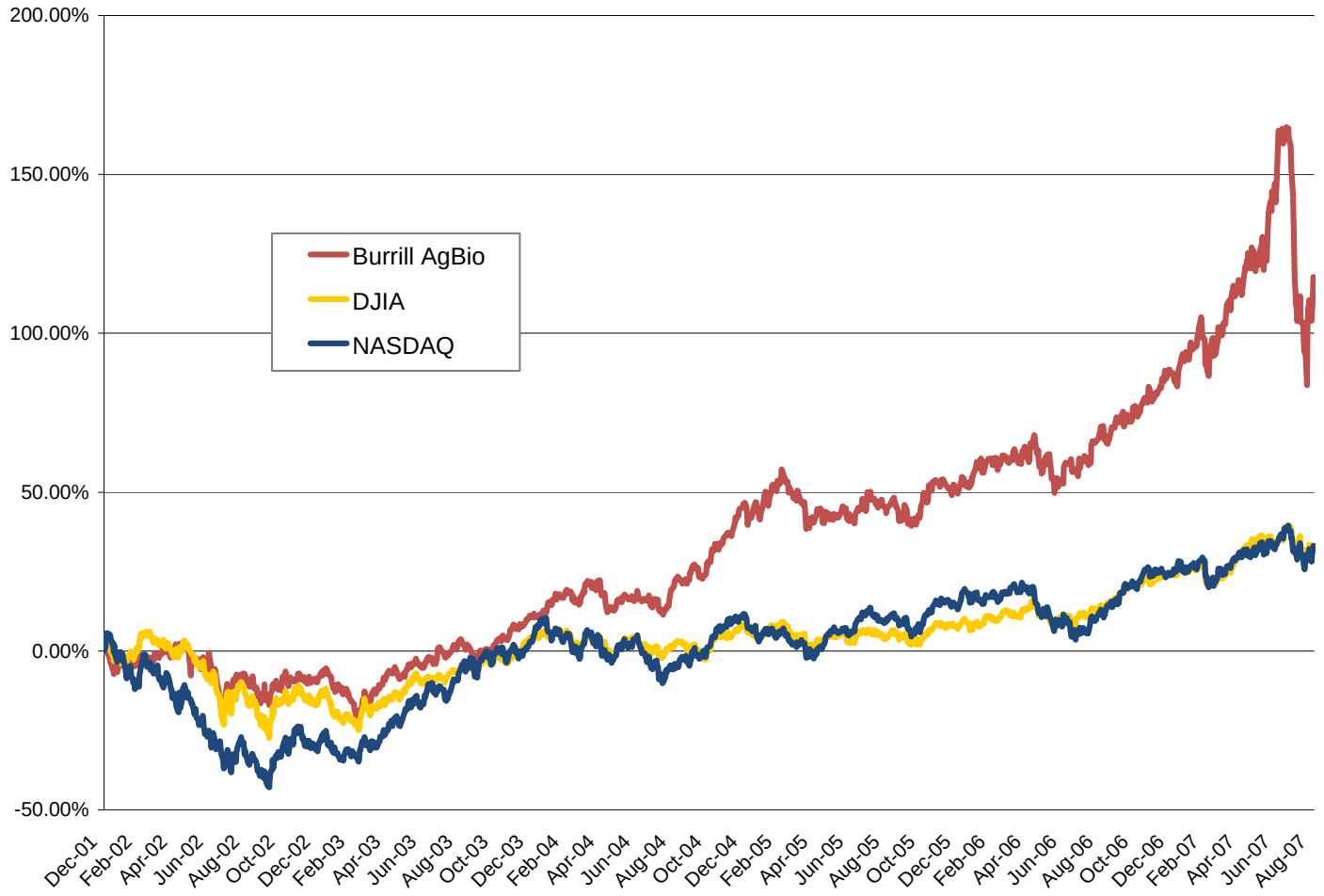
Source: Clive James, 2006

Global Area of Biotech Crops 1996 to 2006 By Crop



Source: Clive James

Burrill Agbio Index 2002 to 2007

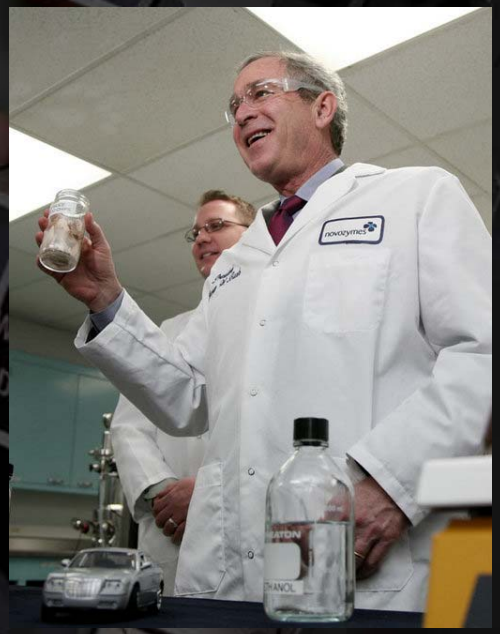


Designing Crops to Harvest Fuel

Europe has a policy for setting aside 3% to 14% surplus farmland for cultivation of biofuel- crops

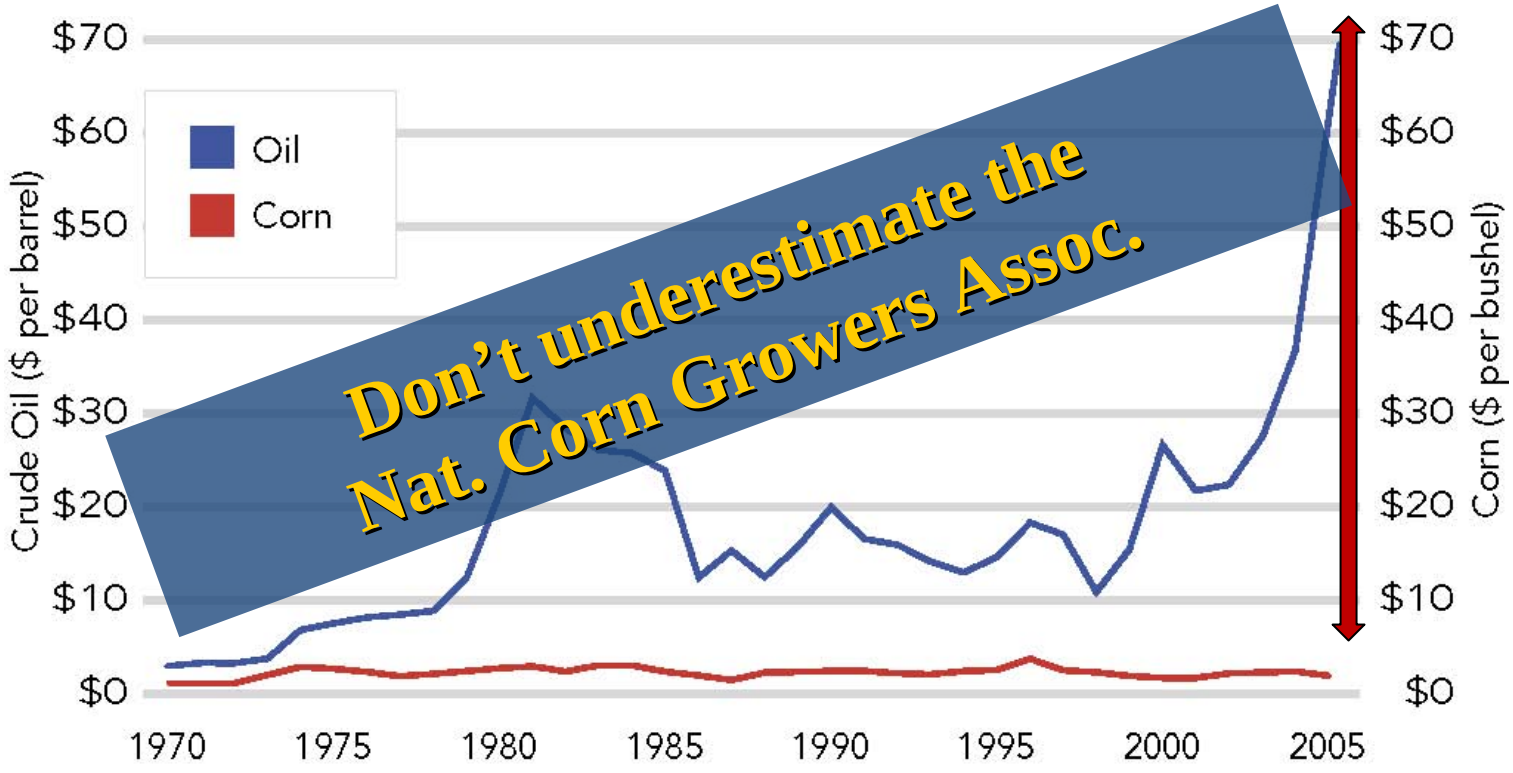
2005 State of the Union

"Cellulosic Ethanol"



Many of the Drivers Aligned

Cost of crude oil escalated dramatically !



Loss of Energy Security

- Geopolitical unrest wherever oil is produced
- Extreme weather demonstrated the vulnerability of the US supply

Green Become Politically and Economically Correct

- Global Climate Change gained momentum
- Critically important market pull has developed
  - WalMart “Sustainability 360”
  - Government purchase policies

The Perfect Storm

Enabling Policy

Ready technologies

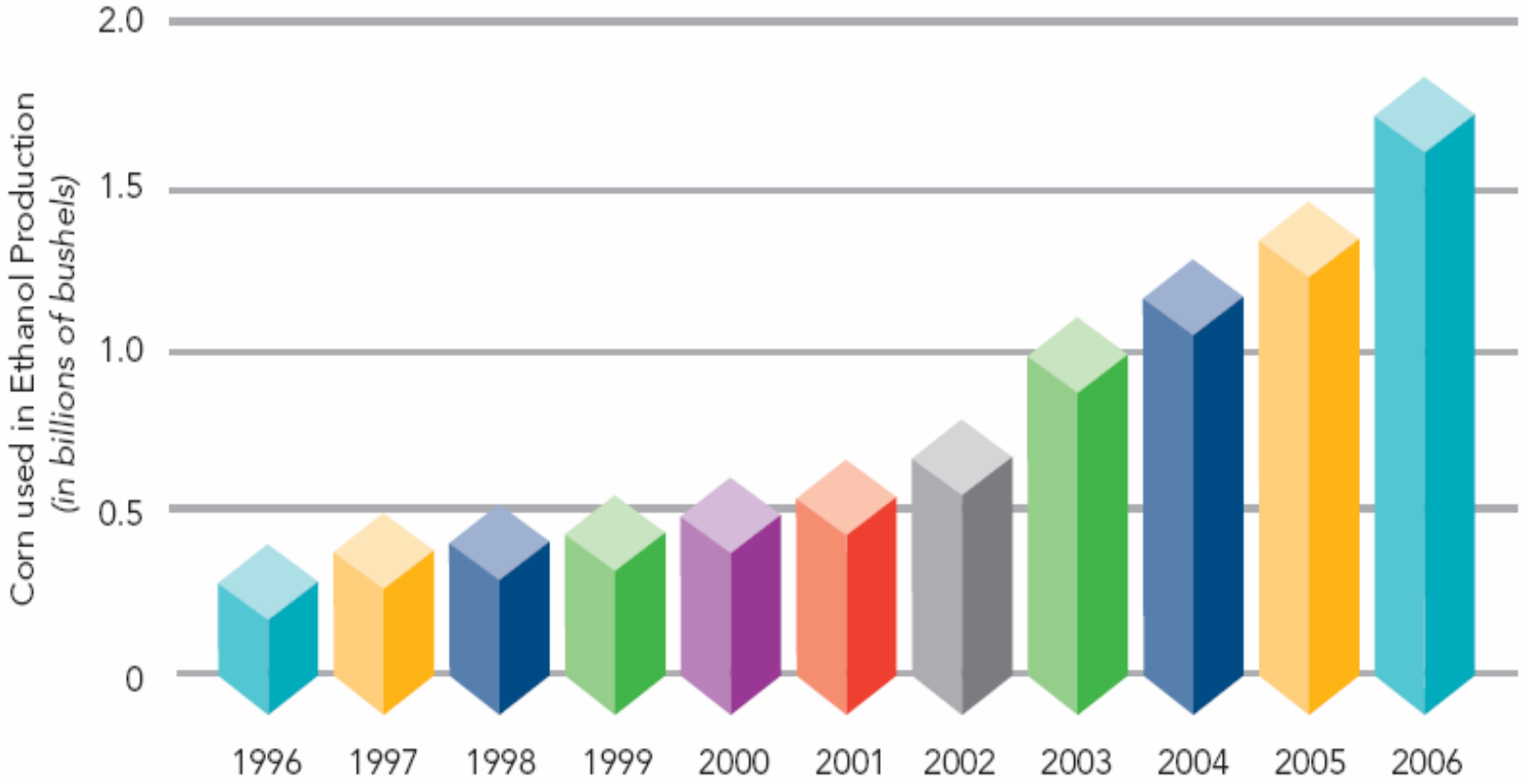
Accelerated Biobased Economy

Economic Pressure
Market Pull

What has happened since?

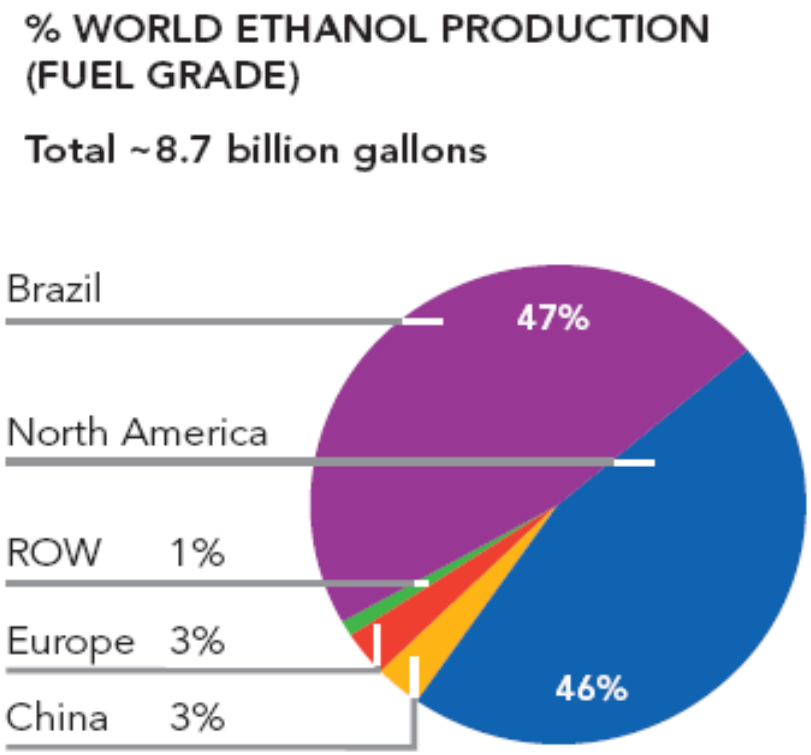
- Ethanol plant construction exploded (All corn based)
  - Now have 113 in operation, 77 under construction
  - Production at 5 billion gallons, potential for 12B
- Price of feed grains
  - $2 historically, topped $4.20 today
  - 20% of corn crop today, 50% in two years !
  - 13% of soybeans going to biodiesel
- Investments
  - $2.9 B in Cleantech up 78%
  - $2.1 B energy related, up 74%

Corn Used in Ethanol Production



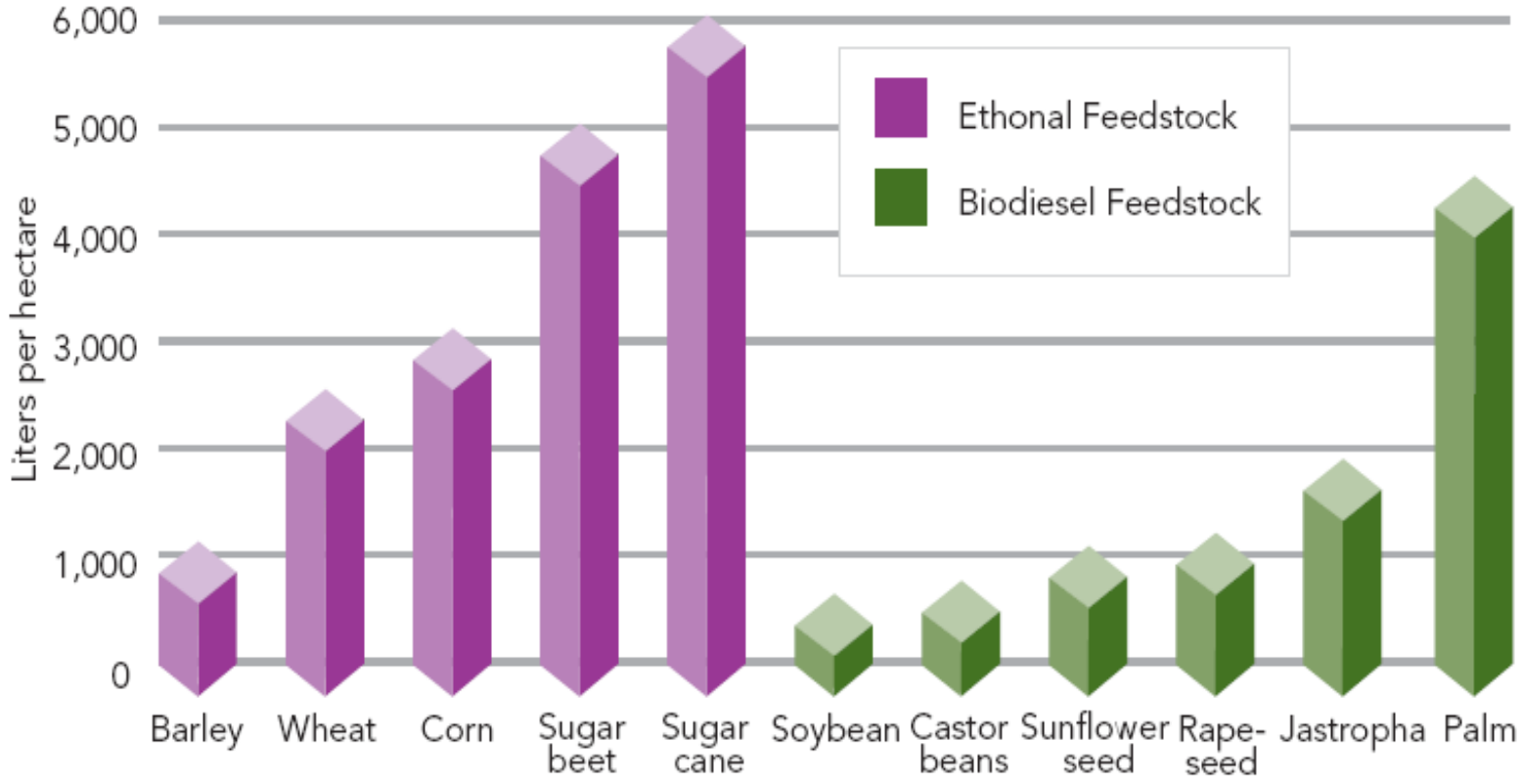
Source: Federal Reserve Bank of Chicago; National Corn Growers Association via Renewable Fuels Association

World Ethanol Production



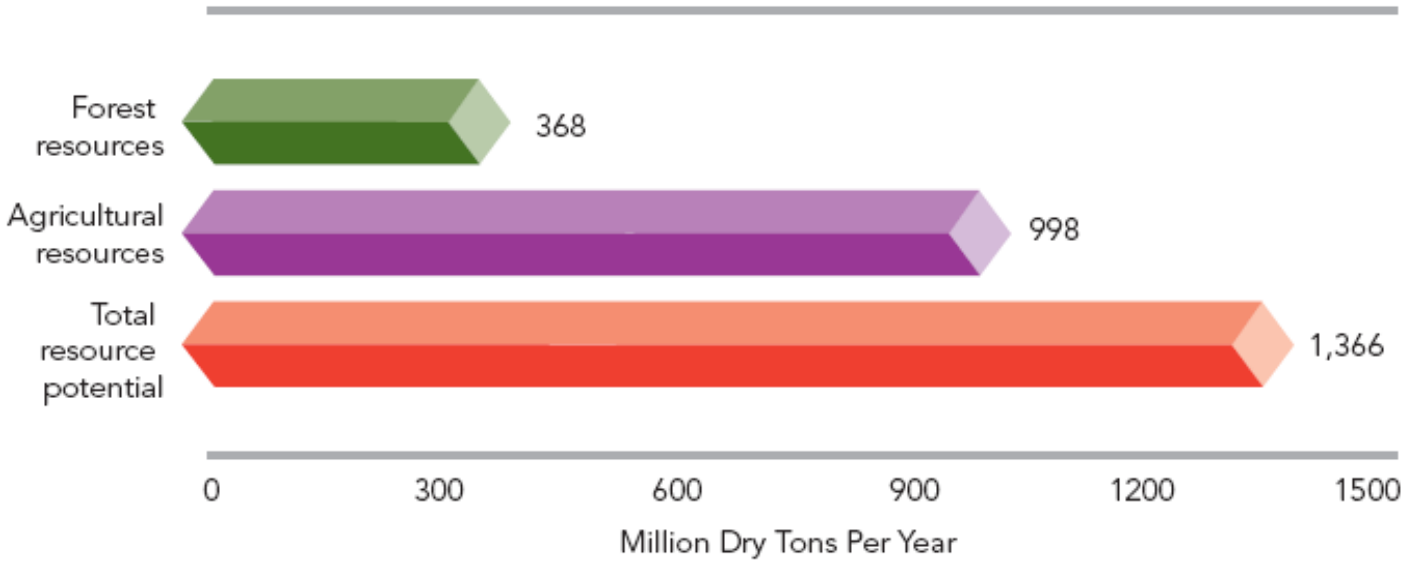
Source: F.O. Licht 2006 Data

Biofuel Yields of Selected Ethanol and Biodiesel Feedstock



Source: Worldwatch Institute

Annual Biomass Resource Potential From Forest and Agricultural Resources

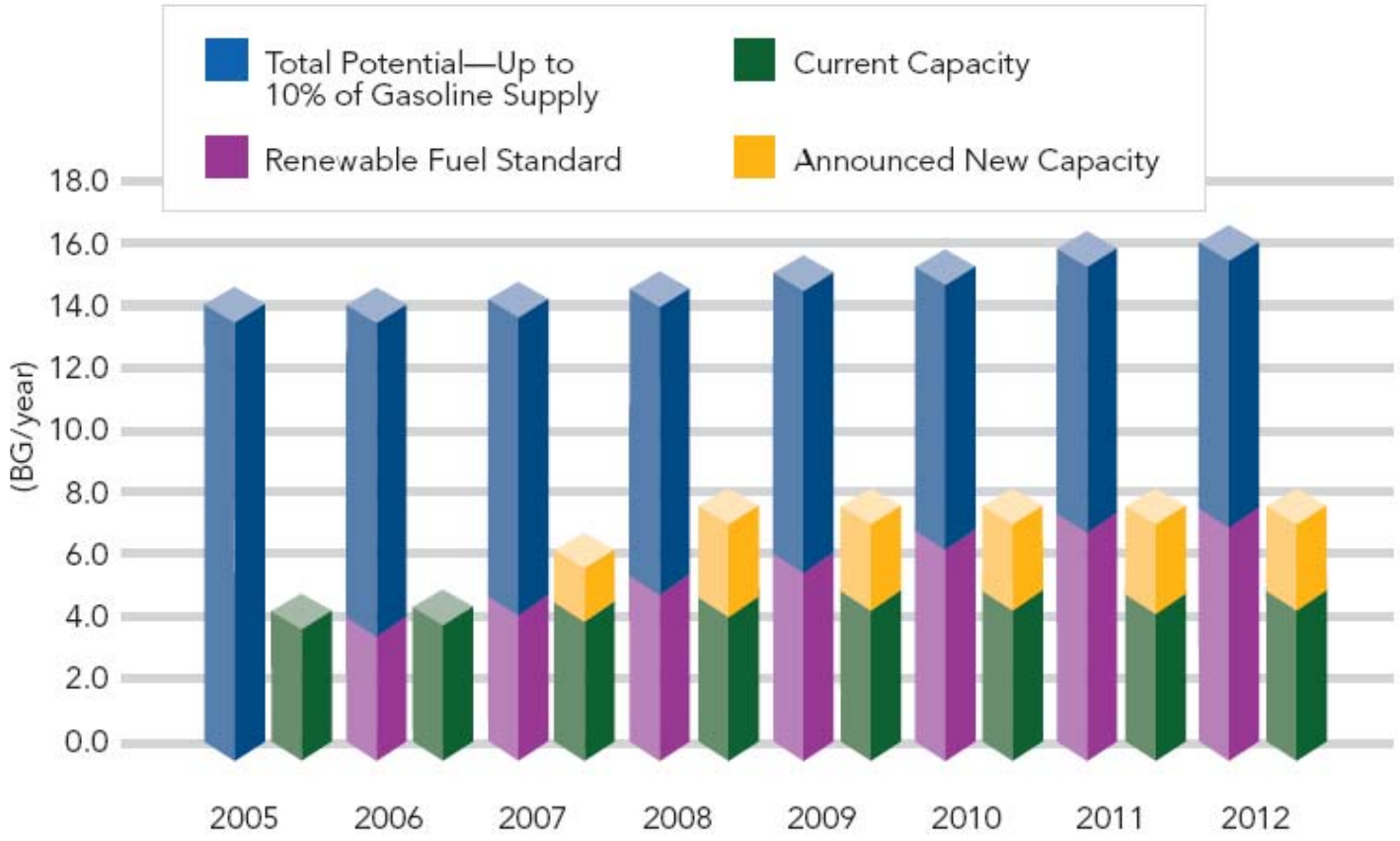


Source: Worldwatch Institute

Implications

- Unprecedented energizing of rural America
- Price of corn
  - Feed costs: poultry, beef, and swine
  - Sales of pickup trucks, farm equipment and new kitchens
  - Land values
  - Food costs: Meat, HFCS
- Price of oil declining
  - Little effect up to 10% of fuel use or 15 billion gallons.

US Ethanol Potential Demand Outstrips Capacity



Source: ADM

It's Not Just About Energy

The technology is ready for prime time in commercially relevant timelines

The $1 Trillion chemical industry is expected to grow by $500 billion in ten years – 50% from Biotechnology

Non-biofuel products in the market

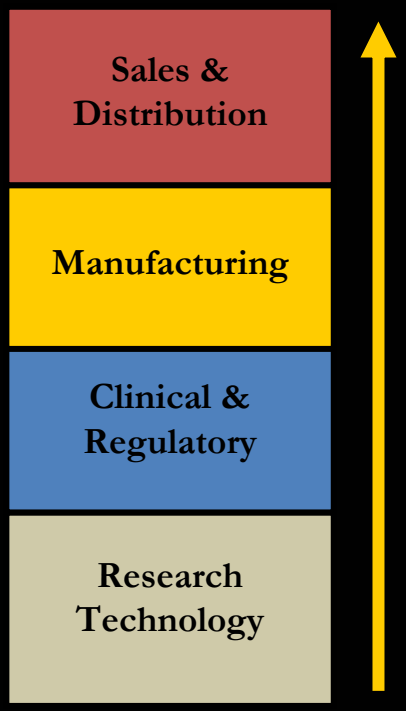
- Plastics – NatureWorks, Serona, Metabolix
- Enzymes – Detergents, bioprocessing
- Specialty chemicals -
- Biomaterials - emerging

Transformation:

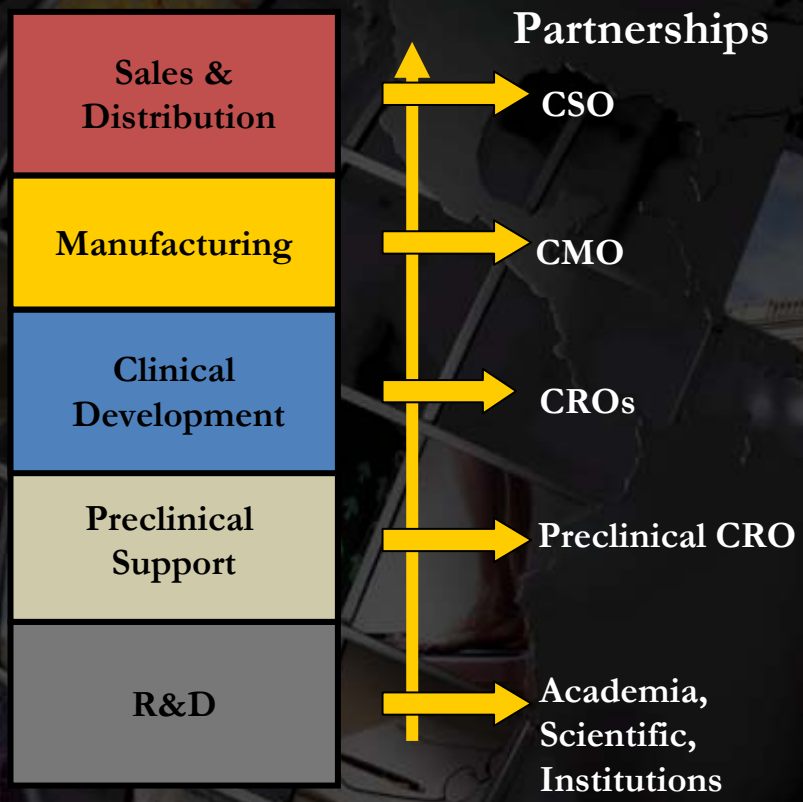
FIPCO's to VIPCO's

Changing Business Models

FIPCO (Fully Integrated Pharma Co.)



VIPCO (Virtually Integrated Pharma Co.)



Biotech's Globalness Begins Day 1

- Science/technology
- Intellectual property/patents/FTO
- People
- Communications
- Competition
- Capital
- Markets—diseases know no borders

Even the smallest biotech is a global player from Day One

So the predictions for 2007…

The Predictions for Biotech in 2007

- Heated debate on healthcare - campaign trail for the 2008 presidential election
- Sales of products will continue to increase, but reimbursement becomes more challenging
- Despite stricter regulatory oversight, more products to the marketplace
- Regulators
  - Raising the bar for innovation, theranostics
  - Pharmacovigilence is the name of the game
  - Drug safety will continue to be a major issue

The Predictions for Biotech in 2007 (continued)

- Congress aiming to add power to Medicare to negotiate what it pays for drugs
- Congress may reduce the capital gains differential (bad for the capital raising side of the industry)
- Both big Pharma and big Biotech will be competing for companies with advanced product pipelines
- We will see US biotechs accessing capital overseas…international companies accessing capital in non-local markets

The Predictions for Biotech in 2007 (continued)

- Biotech's globality increases with US dominance continuing to decrease
- US research engine faces challenging times
- Non-health care aspects of biotech also becoming less dominant as industrial, biofuels, ag increase in importance
- Clusters are redefined away from geography to virtual clusters (diseases, markets, unique industry segments)
- Business models continue to evolve

The Predictions for Biotech in 2007 (continued)

- Biofuels boom
- Ag/Animal Health continue to progress
- "Capital Markets" more robust than 2006 in the US
  - 30 IPO's in the 2007
  - 2007 $40+ billion will be raised by the US biotechs
  - MKT Cap will reach an all time high of $575B
  - Of the 60 IPO's completed by 2006, most all trading above offer price by end of 2007

The Future of Life Sciences:

What does our world look like 15 years from now?

- Drug discovery in silico / adaptive trials in market place
- Personalized health record (including genotype) on smart card / walk-in clinics and consumerization of healthcare
- Wellness care – pre-symptomatic Dx and preventive medicine
- Products are combination of Dx/delivery/device/Rx
- Spare parts – regenerative medicine
- Governments are big customers
- Business models change
  - Today's pharmas are tomorrow's "distributors" (outsource innovation/ development/manufacturing)
  - Biotech's virtually integrated
- "Biotechs" dominates innovation / pharmas are distributors

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G. Steven Burrill, CEO
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