Lost in Translation:
The Systematic and Comprehensive

IOM Roundtable on Translating Genomic-Based Research for Health
Beckman Center of the NAS&E
Irving, CA
December 3, 2012
Overall Healthcare Spend is High

Spend levels are high and increasing over time, with healthcare remaining a significant fraction of the economy.
Are We Getting Our Money’s Worth?

Healthcare Spend as % of GDP

Average Life Expectancy at Birth

Opportunity lies in improving cost effectiveness in medicine

Source: OECD 2007 data (most recent date to include data for all of the countries above)
NIH Launching New Translational Activities

President Signs Law Creating New Translational Center

— *Science, Dec 27, 2011*

Targeting the “re-engineering” of drug development to speed basic science to the clinic
Translational Research and The Myth of Technological Determinism

“Science Finds--Industry Applies--Man Conforms.”
Impedance Mismatch and Innovation

- Faster Better and Cheaper
  - Research
  - Discovery
  - Globalization
- “Impedance Mismatch”
  - Systems Biology
  - Translational Research
  - Molecular Medicine
  - Clinical Research
  - Clinical Development
  - Regulatory Regimes
  - Reimbursement Policy
  - ELSI
  - Scientific Literacy
Innovation and Market Transformation: Disrupting the Ecosystem
Health Care: A Fundamental Human Right and a “Big Business”
Externality is a harsh mistress

In economics, an externality (or transaction spillover) is a cost or benefit, not transmitted through prices, incurred by a party who did not agree to the action causing the cost or benefit. A benefit in this case is called a positive externality or external benefit, while a cost is called a negative externality or external cost.

http://www.wikipedia.org/
The Health Care Sector

- A “Big Business”, but access is considered part of the social contract
- Highly regulated and socially structured industry: market access and reimbursement
- Technology Enabled requiring large, long term and high risk R&D investments (diminishing returns)
- Capital Intensive
- Status Quo is not sustainable
- Fundamental change requires “generational altruism”
The High Cost of Uncertainty
The High Cost of Uncertainty

WILLINGNESS TO PAY

The High Cost of Uncertainty

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The High Cost of Uncertainty

Uncertainty can lead to mispricing of risk


Uncertainty can lead to mispricing of risk
We can’t solve problems by using the same kind of thinking we used when we created them.

— *Albert Einstein*
Consumer and Patient
Individuals are Picking Up More of the Bill

AVERAGE ANNUAL HEALTH INSURANCE PREMIUMS AND WORKER CONTRIBUTIONS FOR FAMILY COVERAGE

(2000–2010)

Opportunities will arise in empowering the patient as a consumer
“I don’t think it’s anything serious, but, just to be sure, I’m going to bill you as if it is.”
Patients are going to expect more data and transparency if they are picking up the tab.
Scientific Literacy and Social Policy
Rationally Irrational Behavior and Health Care
Medication Adherence Patterns

For every 100 prescriptions written by a physician, how many prescriptions are...

- Originally filled by the patient? 50 to 70
- Picked up by the patient? 48 to 66
- Taken according to the physician? 25 to 30
- Refilled by the patient? 15 to 20

Source: Foundation for Managed Care Pharmacy. Medication Adherence: Managing for Total Value
Nonadherence
America’s Other Drug Problem

- Noncompliance accounts for up to 11% of all hospital admissions and 40% of nursing home admissions

- 30–50% of chronic disease patients are non-adherent or poorly adherent and this correlates to 125,000 deaths yearly

- More than $290 billion in annual costs and 1/3 of hospitalizations are attributed to non-adherence

Source: Frost & Sullivan Whitepaper: Patient Nonadherence
Three Axioms:

• A treatment of the present and future that places a positive value on the long run.

• Recognition of all the ways in which “Health” assets contribute to economic well being.

• Recognition of the constraints implied by the dynamics of the natural life cycle and the limits of technology with respect to “health” assets.
Global Pharma Market Projected to Be More Than $1 Trillion by 2015

North America
Size: US$345–375B
Growth: 0–3%

Western Europe
Size: US$170–200B
Growth: 0–3%

Japan
Size: US$110–140B
Growth: 2–5%

Latin America
Size: US$72–82B
Growth: 11–14%

Middle East and Africa
Size: US$35–45B
Growth: 7–10%

Asia Pacific
Size: US$195–225B
Growth: 13–16%

Global Market
Size: $1,065–1,095B
Growth: 3–6%

Pharmerging Markets
Size: $275–325B
Growth: 13–16%

Note: Pharmerging Markets: China, India, Brazil, Russia, Mexico, Turkey, Poland, Venezuela, Argentina, Indonesia, S. Africa, Thailand, Romania, Egypt, Ukraine, Pakistan, Vietnam; growth defined as CAGR 2011–15
Source: IMS Health, Market Prognosis, April 2011

Pharma growth is driven by emerging market demand
Wireless Technology Speeds Health Services in Rwanda

Rwandan health ministry workers can keep electronic track of disease.
Big Data and Mobile
A New Era of Data and Connectivity

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We’re all aware of the approximately two billion people now on the Internet [and] also upward of a trillion interconnected and intelligent objects and organisms — what some call the Internet of Things. All of this is generating vast stores of information... reaching 35 zettabytes in 2020.

— Samuel Palmisano, Chairman IBM
Sensors, Sensors Everywhere

The Borg

Modern Man?

Lots of data being generated
Crowdsourcing and the Power of Community

Source: Nature Aug 5, 2010
Changing Dynamics of Transparency and Privacy

Disruptions: Privacy Fades in Facebook Era

“Hey! Elbows off the table.”
Social Networking

The Tipping Point

How Little Things Can Make a Big Difference

Malcolm Gladwell

“A fascinating book that makes you see the world in a different way.” —Fortune

The Tipping Point + The Social Media Network

CONNECTOR
connects people to each other

MAVEN
connects people through sharing knowledge

SALESMAN
uses knowledge to engage and persuade
“Super Hero Skills”
Adopting Alternative Research Models
“The School of Athens:

Raphael 1510