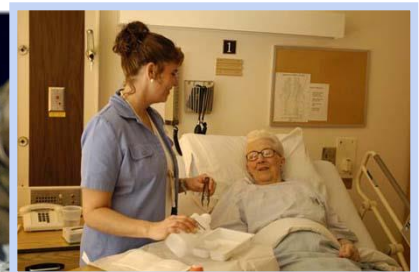




INSTITUTE OF
HEALTH ECONOMICS
ALBERTA CANADA

Innovation – Incremental or Big Leaps? December 2008 Dr. Lorne Tyrrell



The Four Pillars of Health Research

- Biomedical Research-source of discovery innovation
- Clinical Research!!!
- Health Services/Systems Research
- Social, Cultural, Environmental and Population Health Research

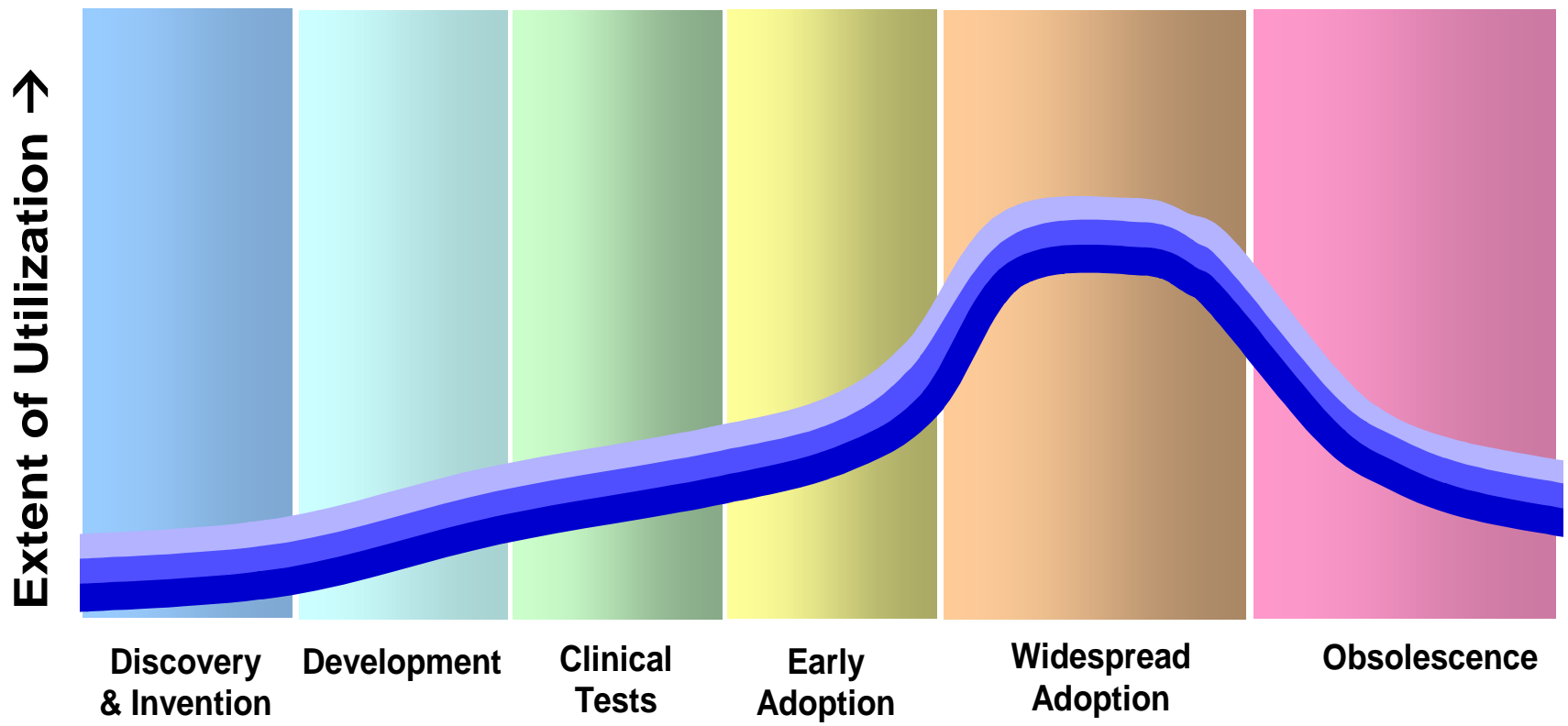
Innovation Changes Outcomes

- AIDS-Fatal to Stable Disease in less that 20 years.
- Gleevecin Chronic Myeloid Leukemia
- Peptic Ulcer Disease-H. Pylorus and antibiotics
- Brain and body imaging
- Today-Gene therapy for a congenital form of blindness
- Stem cell research and promise

Road to Success-long and costly

- Discovery research-identify new targets and approaches-this is the basis of innovation.
- Applied research-screening systems
- Cell culture systems
- Animal models
- PK and Toxicology studies
- Product selection
- Phases I, II, III
- New Product

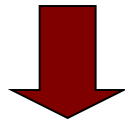
Context: Health Technology Life Cycle Long Process



Ref: Janet Joy, Director Innovation, Vancouver Coastal Health Authority

Context: Health innovation different than other industries – many intermediaries assessing ‘value’

Normal market conditions

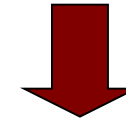


End user - **CONSUMER**

Decision maker - **CONSUMER**

Payer - **CONSUMER**

Health Care



End user - **PATIENT**

Decision maker - **PRESCRIBER**

Payer – **THIRD PARTY**

Value of innovation – who determines?

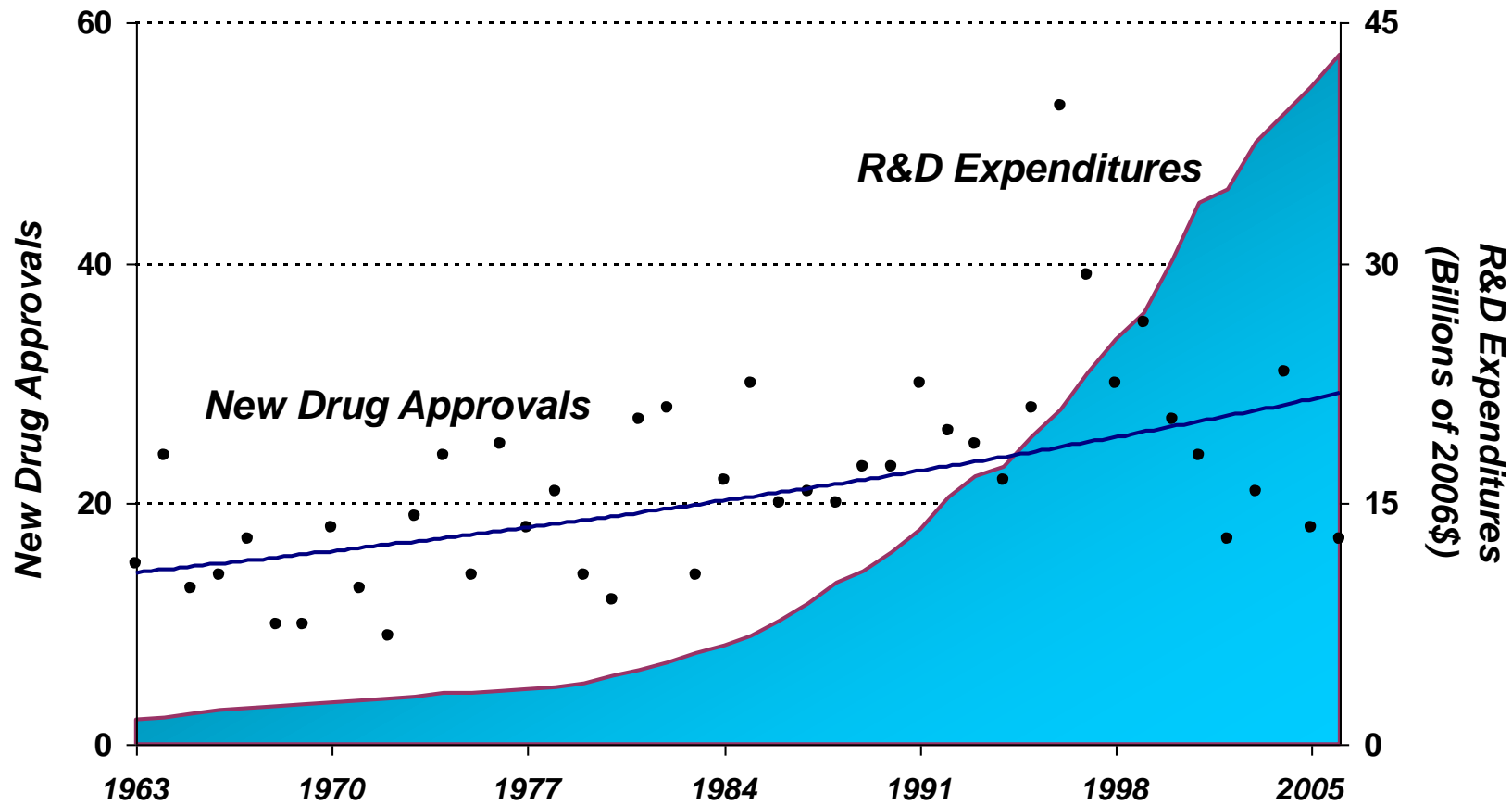
Individual patient preference/benefit or societal benefit?

About societal values

- There are most likely not many patients who would say to the doctor:

“I want the treatment, which is best for the Society”

New Drug Approvals Are Not Keeping Pace with Rising R&D Spending – Innovation ‘return’ slowing down



R&D expenditures adjusted for inflation

Source: Tufts CSDD Approved NCE Database, PHRMA, 2007

Pharmaceutical cost-can we keep up to the escalating costs?

- Costs of pharmaceuticals is leveling out
- Patents expiring on many innovative drugs
- Canada needs to ask why generic drugs cost more in Canada than in the US-same drugs and often same manufactures
- Early introduction of new innovative therapies often save costs and improve outcomes”

1st message: *be careful about early assessments predicting the future.*

- ***"Radio has no future"***
- ***"Heavier than air flying machines are impossible"***
- ***"X rays will prove to be a hoax"***

Lord Kelvin, president of the Royal Society, 1890-95

2nd message: Innovation is incremental – with occasional unplanned leaps

- Innovation rarely involves a single giant leap – you can't "order up" breakthroughs
- Innovation process is fragile, slow, unpredictable.
- Many false starts and dead ends.
- First product that reaches market often flawed and inadequate, gradually replaced by superior alternatives
- The process for assessment must recognize this.

3rd Message: Interdisciplinary science and collaboration across public/private sectors is the future

- Convergence of mathematics, chemistry, biology, physics, computing sciences, medicine, engineering – never has there been such opportunities to solve medical challenges
- Systems biology and systems engineering
- mimicry of sensor/effector pathways
- image analysis
- predictive modeling of biological systems
- Interdisciplinary cooperation essential
- Clinical and regulatory support.

4th Message: Not just a simple yes/no decision on new technologies – **get things into practice**

- Certain new technologies are beneficial for some populations but not all.
- New field - pharmacogenomics
- Use of technologies needs to be examined along the entire care pathway.
- Need to develop ways to ensure early
 - Coverage with Evidence Development** and
 - Comparative Effectiveness analyses.**



Getting started - some recommendations

- Support opportunities for dialogue between funders, innovators and practitioners.
- Fund and support discovery (basic) research. Over 70% of new patents quote university research as the basis of the patent.
- Provide resources for knowledge and evidence transfer
- Develop capacity to review evidence for new as well as established technologies
- Focus attention on the conditions that account for most health care burden (*cancer, heart disease, infectious diseases, neurodegenerative diseases and mental health*)
- Focus attention on quality research-across the full spectrum of research and recognize and encourage excellent talent

Global number of people:

- **Living with HIV** **33 million**
- **Living with chronic Hepatitis B** **350 million**
- **Living with chronic Hepatitis C** **170 million**
(3-4 million newly infected per year)

Dreamers and Innovators and Entrepreneurs are needed

- *“The future belongs to the unreasonable ones, the ones who look forward not backward, who are certain only of uncertainty, and who have the ability and the confidence to think completely differently.”*

Bernard Shaw

IHE Health Innovation Forum

- First Forum today on Comparative Effectiveness
- A second Forum is planned for March 2009
-a follow up of today's discussions
- The third Forum will take place in November 2009 tentative topic; Health and Economic Growth