Million Dollar Therapies for Rare Conditions: Rethinking Value

May 22, 2018

ISPOR International Conference

Baltimore, Maryland, USA

Lou Garrison, PhD, Professor Emeritus

The CHOICE Institute

University of Washington

Agenda

- Basic Economics of Drug Development
- Value and Value Frameworks
- Augmented Cost-Effectiveness Analysis for Rare/Health-Catastrophic Conditions
- Challenges for Industry Sustainability

2017 FDA drug approvals

The FDA approved 46 new drugs last year, the highest total in more than two decades.
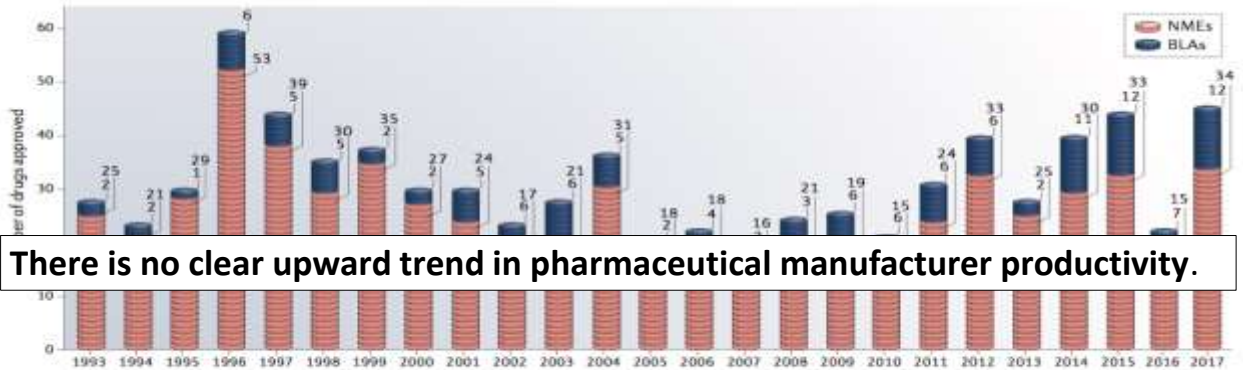
There is no clear upward trend in pharmaceutical manufacturer productivity.

Figure 1 | **Novel FDA approvals since 1993.** New molecular entities (NMEs) and Biologics License Applications (BLAs) approved by the Center for Drug Evaluati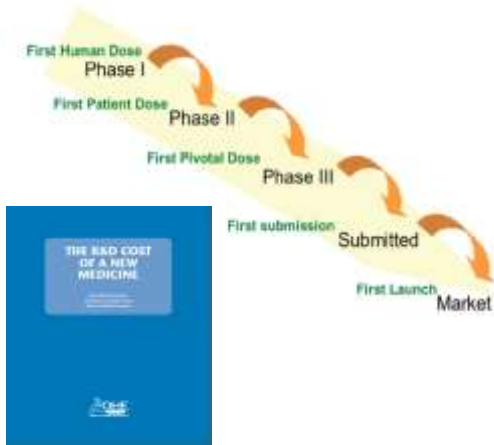on and Research since 1993 (see also TABLE 1). Approvals by the Center for Biologics Evaluation and Research are not included in this drug count (see TABLE 2). Data are from Drugs@FDA.

Mullard, A; 2018

What is a "medicine" from an economic perspective?

- One input in a "health production function":
    - H = H(physician visits, hospital care, medicines, own time, **OTHER**)
    - "OTHER"—the social determinants of population health

- What about an "innovative" drug?
    - Represents new information or knowledge.

- What is unique about new information or knowledge from an economic perspective?
    - It's a NOT a private good: it's a "public good."
    - It's NOT ONLY a public good, it's a **GLOBAL public good**.

- Free markets will tend to **undersupply public goods** (below what is socially optimal).
    - Therefore, intervene, but how?
    - Patents (intellectual property) and subsidies.

2

Drug Development: Complex, Risky, and Costly

First Human Dose
Phase I

First Patient Dose
Phase II

First Pivotal Dose
Phase III

First submission
Submitted

First Launch
Market

THE R&D COST
OF A NEW
MEDICINE

Only about 20-25 percent of drugs tested in humans make it to the market

New Tufts Estimate--$2.6 Billion Per New Medicine

Tufts Center for the
Study of Drug Development

ABOUT   RESEARCH   COURSES & FORUMS   LIBRARY & BIBLIOGRAPHY   REPORTS

Home   News   / Complete Story   / PR Tufts CSDD 2014 Cost Study

News

November 18, 2014

Cost to Develop and Win Marketing Approval for a New Drug Is $2.6 Billion

BOSTON – Nov. 18, 2014 – Developing a new prescription medicine that gains marketing approval, a process often lasting longer than a decade, is estimated to cost $2,558 million, according to a new study by the Tufts Center for the Study of Drug Development.

". . . the cost to develop and win marketing approval for a new drug has increased by 145% between the two study periods, or at a compound annual growth rate of 8.5%."
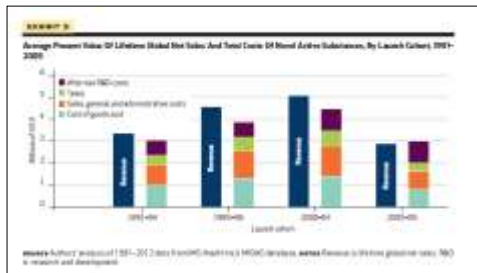
5

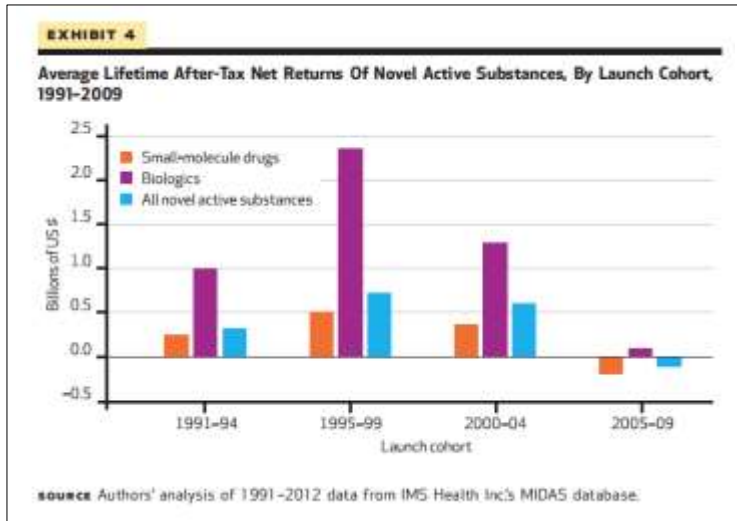## Rising Real Prices of Oncology Medicines in US

Figure 2
Drug Price per Life Year Gained versus Drug Approval Date
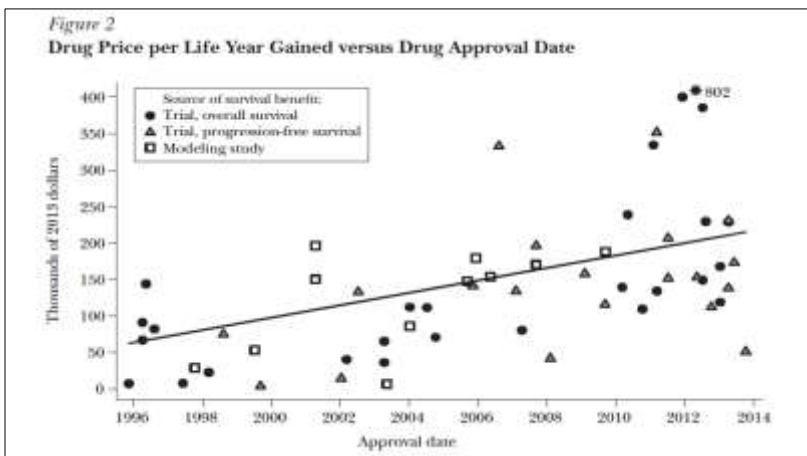
Pricing in the Market for Anticancer
Drugs

David H. Howard, Peter B. Bach, Ernst R. Berndt, and Rena M. Conti

Falling Returns in Pharma

Source:
Berndt et al., 2015

EXHIBIT 4

Average Lifetime After-Tax Net Returns Of Novel Active Substances, By Launch Cohort, 1991–2009

source Authors' analysis of 1991–2012 data from IMS Health Inc's MIDAS database.

ISPOR Initiative on US Value Assessment Frameworks
STF Final Report. Feb. 2018

A Health Economics Approach to US Value Assessment Frameworks—Introduction: An ISPOR Special Task Force Report [1]
Peter J. Neumann, Richard J. Willke, Louis P. Garrison Jr

An Overview of Value, Perspective, and Decision Context—A Health Economics Approach: An ISPOR Special Task Force Report [2]
Louis P. Garrison Jr, Mark V. Pauly, Richard J. Willke, Peter J. Neumann

Defining Elements of Value in Health Care—A Health Economics Approach: An ISPOR Special Task Force Report [3]
Darius N. Lakdawalla, Jalpa A. Doshi, Louis P. Garrison Jr, Charles E. Phelps, Anirban Basu, Patricia M. Danzon

Objectives, Budgets, Thresholds, and Opportunity Costs—A Health Economics Approach: An ISPOR Special Task Force Report [4]
Patricia M. Danzon, Michael F. Drummond, Adrian Towse, Mark V. Pauly

Approaches to Aggregation and Decision Making—A Health Economics Approach: An ISPOR Special Task Force Report [5]
Charles E. Phelps, Darius N. Lakdawalla, Anirban Basu, Michael F. Drummond, Adrian Towse, Patricia M. Danzon

Review of Recent US Value Frameworks—A Health Economics Approach: An ISPOR Special Task Force Report [6]
Richard J. Willke, Peter J. Neumann, Louis P. Garrison Jr, Scott D. Ramsey

A Health Economics Approach to US Value Assessment Frameworks—Summary and Recommendations of the ISPOR Special Task Force Report [7]
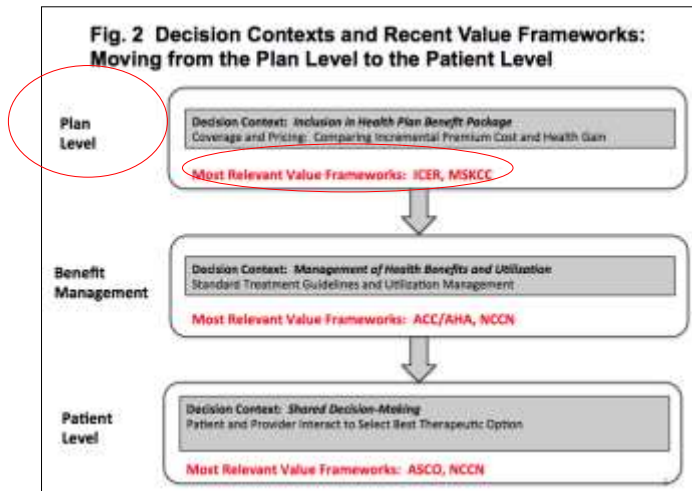*Louis P. Garrison Jr, Peter J. Neumann, Richard J. Willke, Anirban Basu, Patricia M. Danzon, Jalpa A. Doshi, Michael F. Drummond, Darius N. Lakdawalla, Mark V. Pauly, Charles E. Phelps, Scott D. Ramsey, Adrian Towse, Milton C. Weinstein*

4

Decision Contexts and Value Frameworks

Source: STF Final Report, Section 2 (Garrison, Pauly, et al, Value Health, Feb. 2018)

Working Premise

". . .it is critical to investigate these value frameworks **because of the signals they send to innovators**. Value-based approaches can encourage firms to produce more of what is being optimized in the frameworks, and discourage them from bringing to market products that do not produce good value. Ideally, that means society will benefit from medical products and healthcare technologies that **efficiently improve the health and welfare of the population** according to consistent and well-founded measures of value. Conversely, ill-conceived frameworks could produce long-lasting harms by encouraging innovators to develop treatments that fail to produce real value." *[emphasis added]*

Source: STF Final Report [1], ViH, Feb. 2018

What is "Value"?

- From an economic perspective:
  - Value is what someone is (actually) willing to pay or forgo to obtain something (opportunity cost)

- Implications:
  - Varies *across individuals*, *across indications* for the same medicine, and *dynamically over time* (as more evidence becomes available and competitors emerge).
  - Difficult to measure in health care because of insurance
  - In principle, we would ask a plan member about their willingness to pay the <u>incremental insurance premium (or taxes).</u> In practice, the amount is too small to be estimated reliably.

11

Societal Revealed Preference Example: Cost per Quality-Adjusted Life Year--Hemodialysis (versus No Treatment)

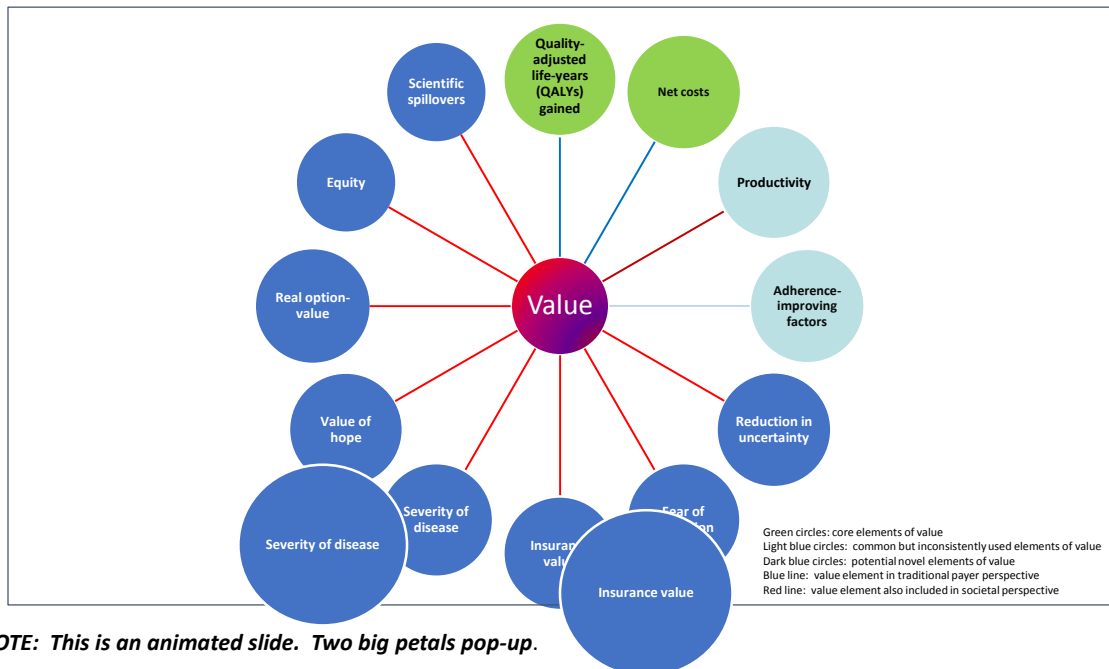|		1980	TODAY
Cost per Year for Dialysis (*in current $*)		$50,000	**$88,000**
Quality Adjustment Factor for Dialysis [.6 x 1 year]		0.56	
Quality Adjustment Factor for Death		0.0	
C-E Ratio	=	<u>Incremental Cost</u> Incremental Benefit	
	=	<u>$50,000 - 0</u> 0.56 - 0	
	=	**$89,000/QALY**	**$157,000/QALY**

6

Two approaches to setting threshold

- **Extra-welfarism**
  - UK-NHS: maximizing QALYs from fixed budget: implies constant marginal threshold
  - In practice, this is over-ridden with other considerations., e.g.,rarity.

- **Welfarism**
  - US/market-oriented based on individual utility maximization
  - Each citizen has a unique threshold.
  - Or, more generally, each citizen has a number of variable thresholds that depend on the severity of disease, and rarity and catastrophic health impact of a disease.

Green circles: core elements of value
Light blue circles: common but inconsistently used elements of value
Dark blue circles: potential novel elements of value
Blue line: value element in traditional payer perspective
Red line: value element also included in societal perspective

NOTE: This is an animated slide. Two big petals pop-up.

Evidence and Uncertainty in Rare Diseases

- Evidentiary challenges in rare diseases:
    - They are often are fatal or have severe health consequences.
    - Natural history of disease is often not well understood.
    - Trials are difficult to design, with RCTs facing ethical barriers, resulting in low levels of evidence.

> ***Implications:***
> 1) Greater uncertainty about the ultimate value (i.e., cost-effectiveness)
> 2) Greater need for post-launch RWE and re-assessment of value.

HealthAffairs   TOPICS   JOURNAL   BLOG

HEALTH AFFAIRS BLOG   DRUGS AND MEDICAL INNOVATION

- **"Insurance value"**—accrues to "*all* premium-paying beneficiaries who are *at risk* albeit low of developing a given rare disease." Depends on "its severity and its rarity."
- **"Value of health equity"**—"individuals may feel significantly greater altruism. . . " Related to "fair innings"
- **"Large spillover effects to loved ones."** e.g., caregiver burden and well-being

My Contention

- In a US context (of extra-welfarism), one can argue for a higher WTP threshold based on insurance value for a rare and health-catastrophic disease.

- The questions are:
  1. How much high much higher would this threshold be?
  2. How much is justified by insurance value vs. other factors (e.g., ethical/rule of rescue, family spillovers)?
  3. How do we handle the large number of "million dollar" therapies? Reinsurance could be key.

How to aggregate elements of value?

1. Monetization of elements in addition to cost per QALY
- Extended CEA—Risk protection and equity impact (used in global health)
- Augmented CEA—ECEA+other factors
- Net Monetary Benefit (NMB)—change in QALY x WTP threshold + Net cost

2. Multi-criteria Decision Analysis (MCDA)
- Analytical Hierarchy Process (AHP)
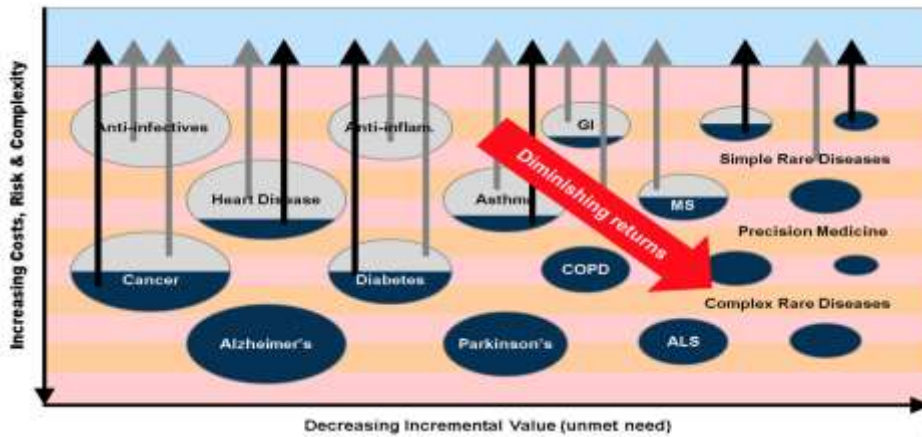- Multi-attribute utility theory (MAUT)
- Deliberative processes

Pharma's broken business model: An industry on the brink of terminal decline

Thanks!

Lgarrisn@uw.edu