

Introduction to key concepts in economics and economic evaluation

Stephen Jan

Outline/objectives

- Understand basic economic concepts including demand, supply, the role of markets in an economy
- Understand why market failure occurs in health sector
- Understand the role of economic evaluation in informing resource allocation decisions in lieu of markets
 - Case studies of live applications of economic evaluation
 - Social impact bonds
 - Health technology assessment



A Definition of Economics

The study of how men and society end up choosing, with and without the use of money, to employ **scarce productive resources** that could have alternative uses, to produce various commodities and distribute them for consumption, now or in the future, among various people and groups in society.

It analyses the **costs** and **benefits** of improving patterns of resource allocation.

Paul Samuelson



The economic problem

How much of what sorts of resources to allocate to which forms of health care, how, and for whom?

How are these questions addressed in the economy at large?



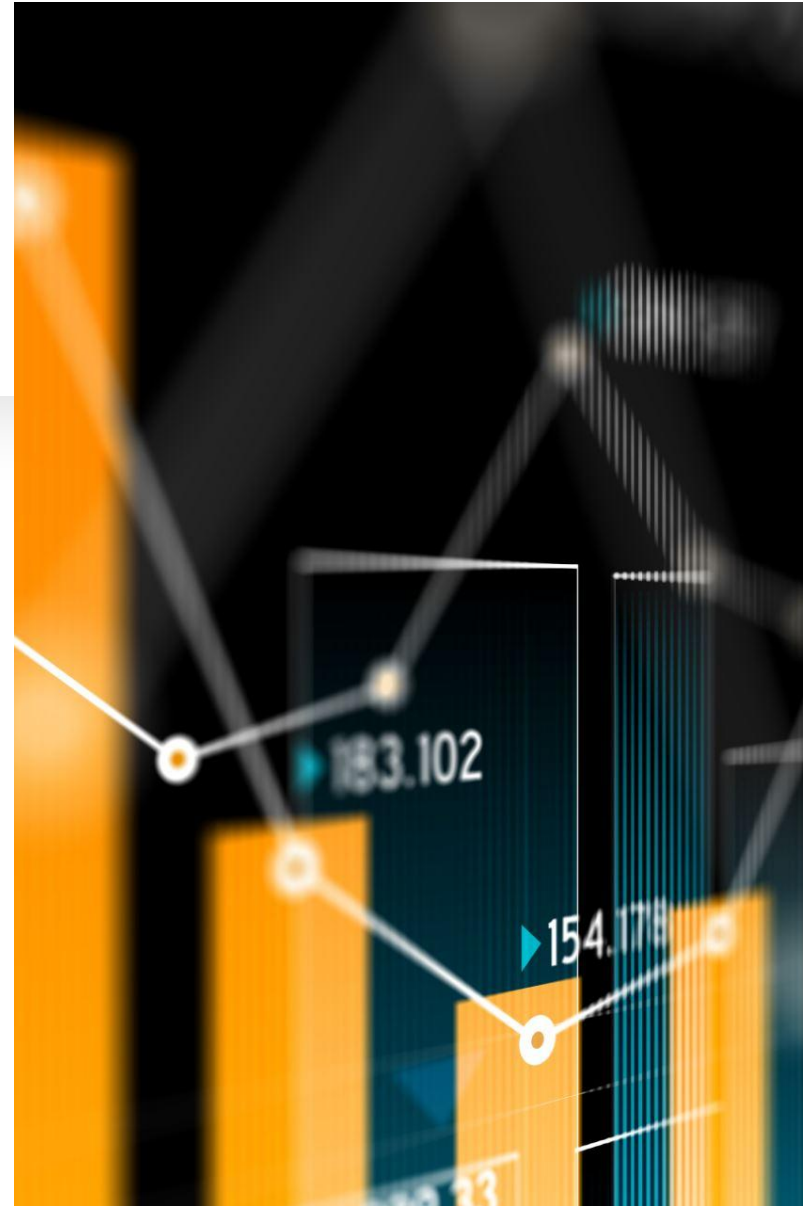
Why not allow the market to decide?

- For most goods and services, *under ideal conditions*, markets allocate resources efficiently.
- Interaction of consumers and producers through the price mechanism that ensures the right quantity of the right types goods and services are produced (supply)
- And the market ensures that only those who really value the particular good or service receive them (demand)



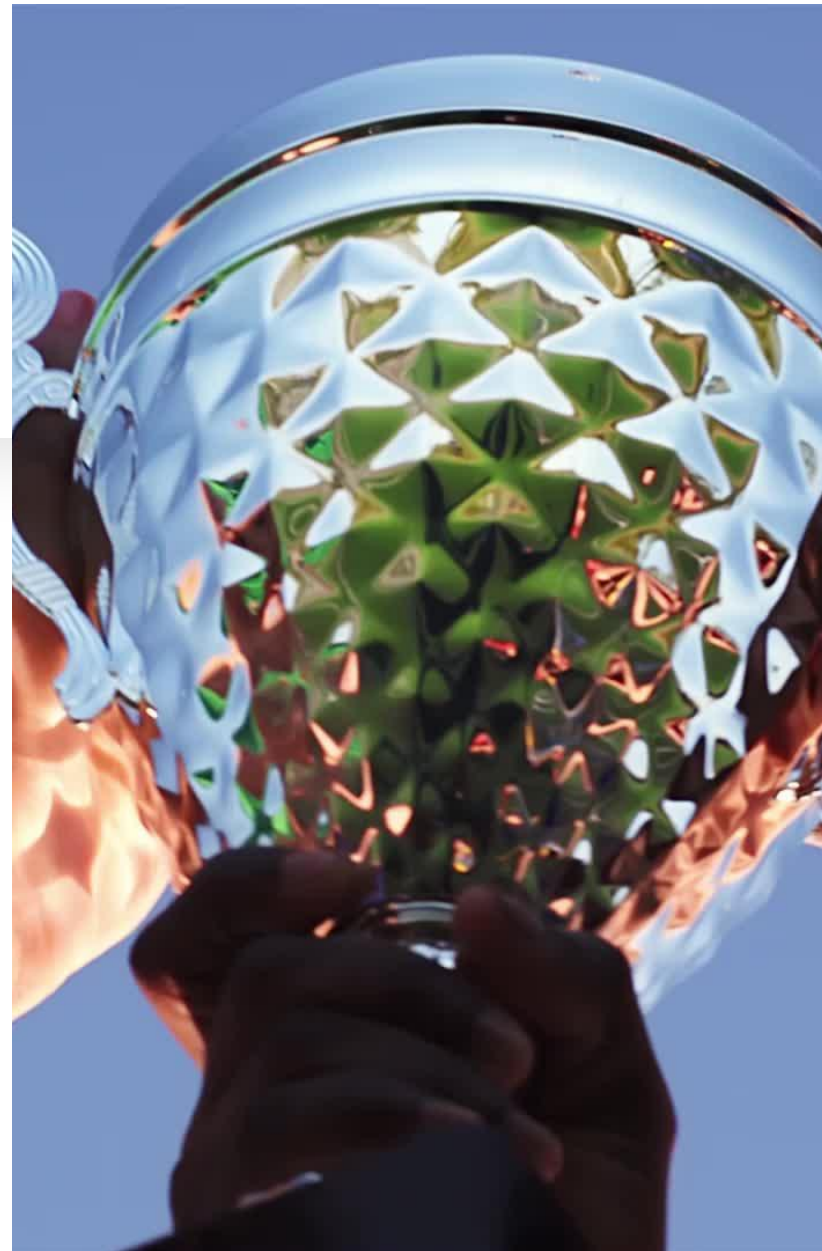
What do markets do?

- Bring buyers and sellers together
- Engage in voluntary exchange
 - Each better off as a result of transaction
 - ‘Pareto efficiency’
- Transmits information
- Allocates resources
 - Does so *efficiently* by creating equilibrium between demand and supply



Competitive markets

- Competition
 - Keeps prices low
 - Enables choice
 - Encourages innovation



Competitive markets

- Some conditions for competitive markets
 - Perfect information
 - Many buyers and sellers
 - Free from externalities
 - No barriers to entry
- Do these apply in health care?



Markets in health

- Perfect information or information asymmetry?
 - Agency relationship doctor and patient
- Many buyers and sellers?
 - Possibly in some areas
- Externalities?
 - Equity
 - Infectious disease, vaccination
- No barriers to entry?
 - Professional barriers



Implications of market failure

- Importance of agents (someone to make decisions on behalf of consumers)?
 - Professional ethics
- Government provision
- Government finance
- Government regulation
 - Price
 - Quantity
 - Quality
 - Increase information
- Equity issues



Role of economic evaluation

- In lieu of competitive markets, government intervention required.
- However, without markets how does govt determine how much is spent in different areas?
 - On prevention vs treatment;
 - Cancer vs cardiovascular disease vs injury;
 - Program A vs Program B;
 - Drug A vs Drug B



Economic evaluation in the health sector

Definition of economic evaluation:

“the comparative analysis of alternative courses of action in terms of both their [resource] costs and their [health] consequences” Drummond et al, 1997

Economic Evaluation

- Cost \rightarrow Program A \rightarrow Consequences
- Cost \rightarrow Program B \rightarrow Consequences
- Values *difference* in cost and consequence between A and B
- A = new program or treatment
- B = standard practice /status quo

Different types of economic evaluation

- Cost-minimisation analysis
- Cost-effectiveness analysis
- Cost-utility analysis
- Cost-consequence analysis
- Cost-benefit analysis

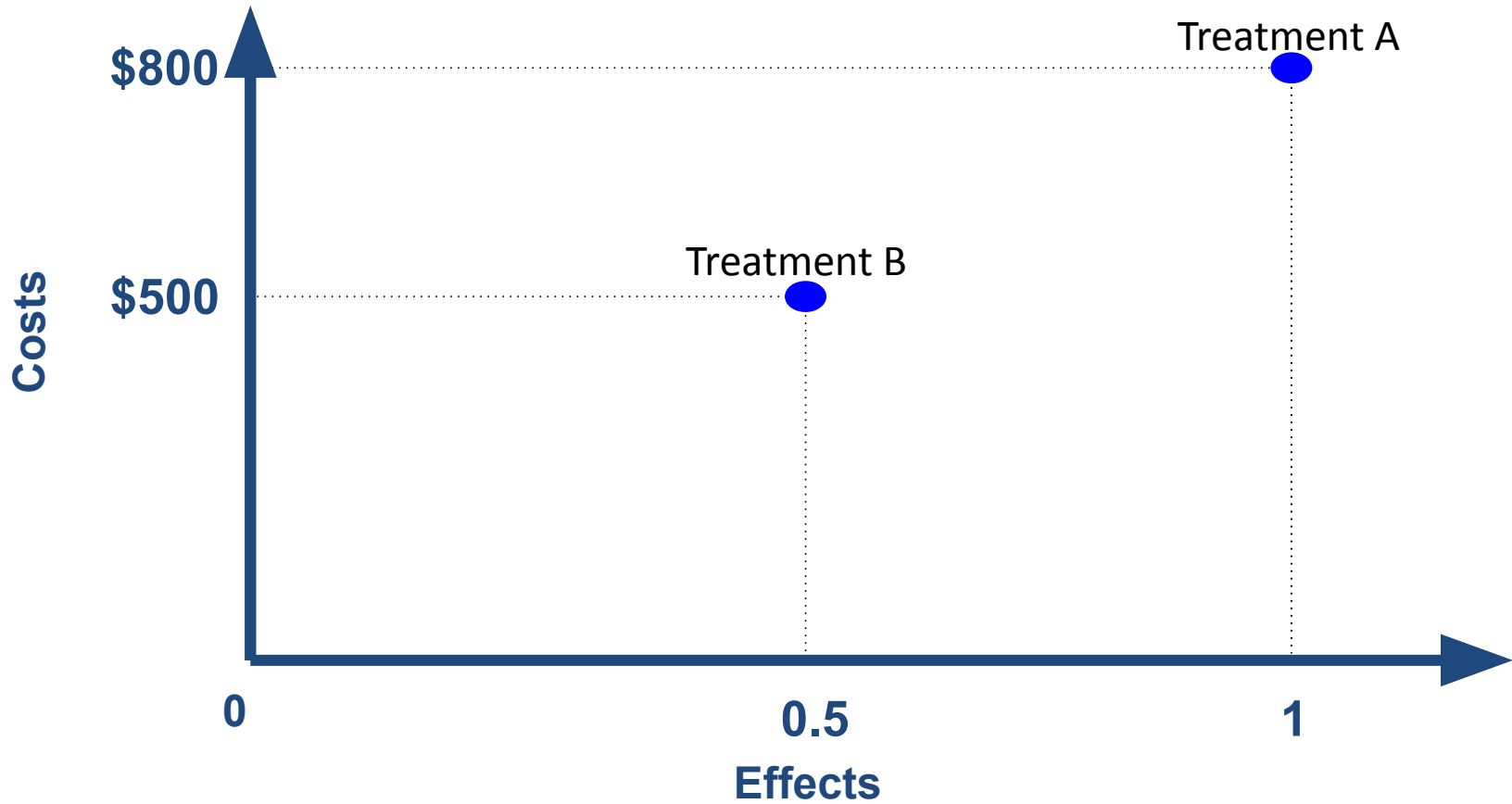


Cost effectiveness analysis

- Treatment A
- Costs \$800
- Increases life expectancy by 1 year
- Treatment B
- Costs \$500
- Increases life expectancy by 0.5 years

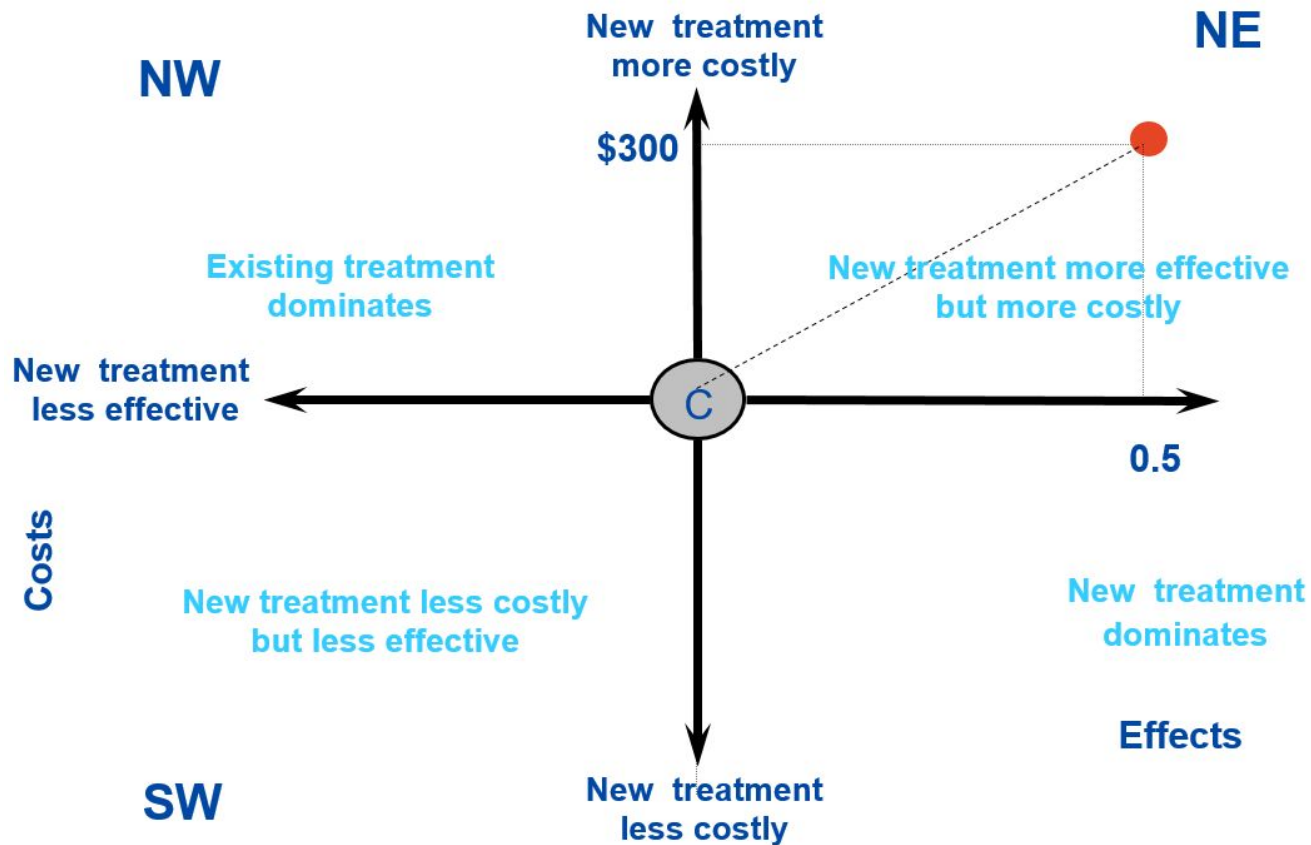


Graphing costs and effects





Incremental cost-effectiveness plane





Incremental cost-effectiveness ratio (ICER)

$$\begin{aligned} \text{ICER} &= \frac{\text{Cost Treatment A} - \text{Cost treatment B}}{\text{Effect Treatment A} - \text{Effect treatment B}} \\ &= \frac{\$800 - \$500}{1 \text{ year} - 0.5 \text{ year}} \\ &= \$600 \text{ per life year} \end{aligned}$$



Is this cost-effective?

- How much is society/government prepared to pay for a Life Year or Quality Adjusted Life Year?
- UK NICE £30K – explicit threshold
- Australian PBAC \$50-70K implicit
- WHO threshold 3x per capita Gross National Income
- Generally arbitrarily set

In short.....

- In economic theory, markets seen as an (Pareto) efficient means of allocating resources in society
- Markets often seen to 'fail' in health care
- Government intervention can be required to address these market failures
- Economic evaluation is a tool to guide resource allocation in lieu of competitive markets

**Live
application
of economic
evaluation:
Social
Impact
Bonds (SIBs)**

- SIBs: method of financing health and social programs
 - first launched in 2010 in UK
 - Global market approx. \$200 mill in investment
 - Finance social programs including social justice, homelessness and health
 - delivered by non-govt organisations
 - cost savings to govt via improved health and social outcomes and reduced service use (eg, hospitalisations).

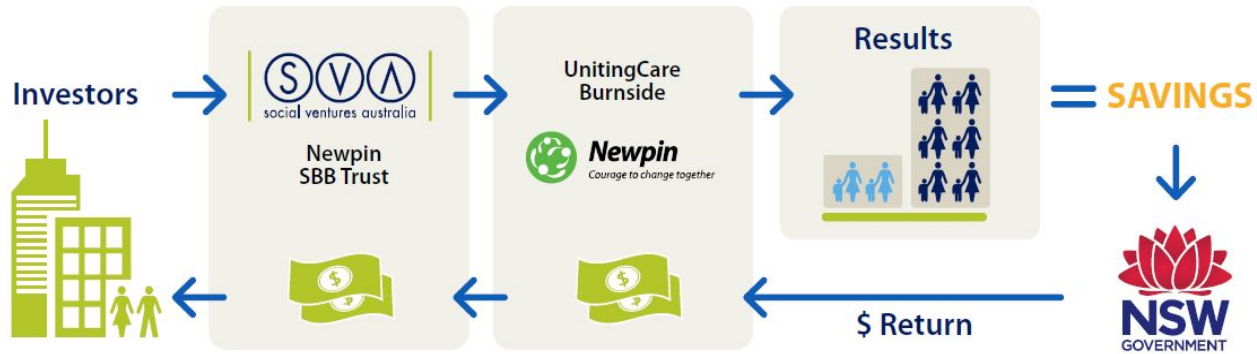
Social Impact Bonds (SIBs) as a form of value capture

- Bonds purchased by private investors
- Returns paid by govt subject to future cost savings
 - determined by a 3rd party evaluation.
- SIBs enable govts to:
 - access private capital ('new money') and offset the risk of public investments
 - Incentivise providers through 'payment for success'
- Strong support amongst investors to expand in SIBs into health and medical research (Impact Investing Australia)

NSW Social Benefit Bonds

- The NSW govt, the earliest adopter in Australia
 - *Newpin* pilot— a UnitingCare parenting program to support families to avoid children being put into out-of-home care.
 - restored 130 children to their families;
 - prevented 47 children entering out-of-home care
 - restoration rate: 61% over 3 years vs a baseline of 21%
 - *Newpin* achieved a return of 12.2%, paid by NSW Treasury to bondholders.

Newpin Social Benefit Bond



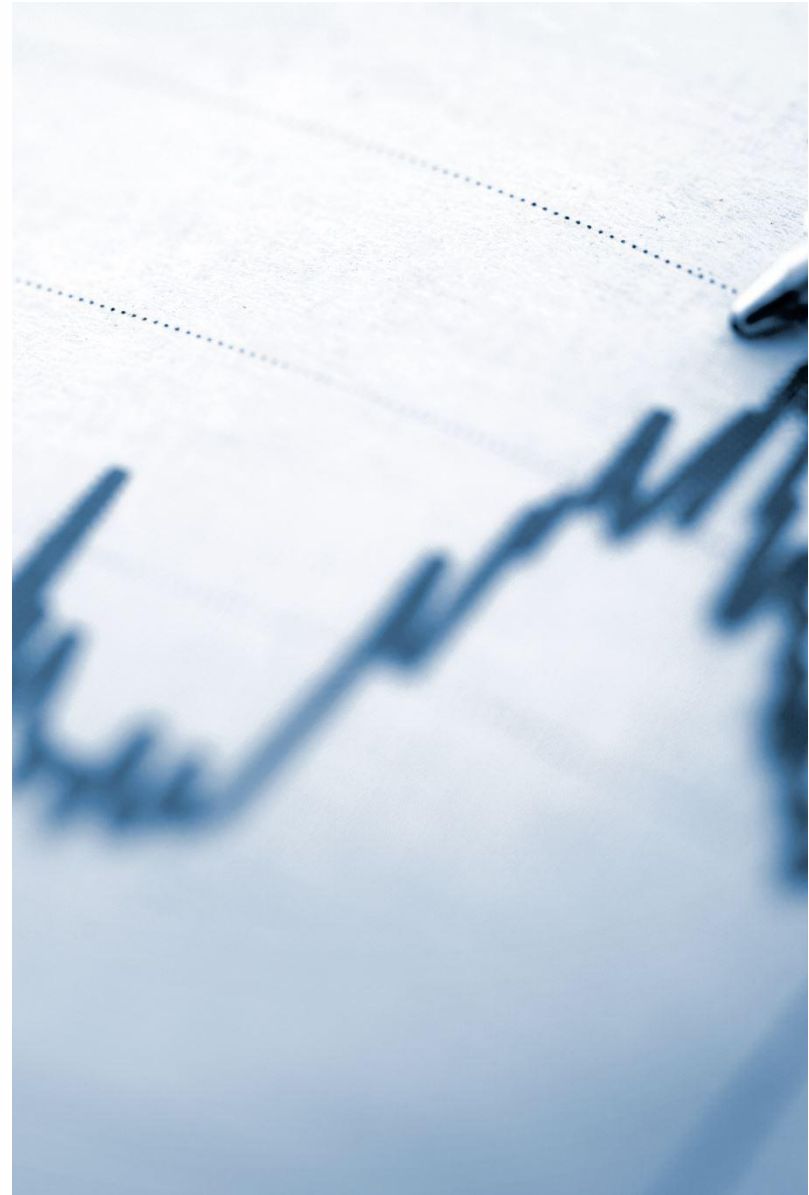
NSW Social Benefit Bonds


- Subsequently, the NSW SIB program was extended to health with two new bonds:
 - *Mental health (RESOLVE)*
 - 8 years, \$21 million
 - *Managing palliative care (Silver Chain Group)*
 - 8 years, \$80 million
- Expectation of cost savings through reduced hospitalisations.

Live application of economic evaluation: Health Technology Assessment

Health technology assessment (HTA) .. is a multidisciplinary process that aims to determine the value of a health technology and to inform guidance on how these technologies can be used in health systems around the world.

https://www.who.int/health-topics/health-technology-assessment#tab=tab_1





**Health
Technology
Assessment and
the
Pharmaceutical
Benefits Scheme
(PBS)**

- In 1993 Australia one of the first countries internationally to introduce cost-effectiveness into the listing process for new drugs on the PBS
- This process via the Pharmaceutical Benefit Advisory Committee (PBAC) precedes NICE by a number of years

How does it work?

- Sponsor driven process
- Industry makes a submission
- Submission reviewed by evaluation team and a technical committee
- Feedback then goes to the Pharmaceutical Benefits Advisory Group (experts and stakeholders)
- PBAC makes recommendation to minister
- Main area of contention is usually price
- Similar processes for medical services (MSAC)

PBAC Guidelines



Main sections of submission

- A. Details of the proposed drug and its intended use on the PBS
- B. Clinical evaluation for the main indication
- C. Translating the clinical evaluation to the listing requested for inclusion in the economic evaluation
- D. Economic evaluation for the main indication
- E. Estimated extent of use and financial implications
- F. Additional relevant information

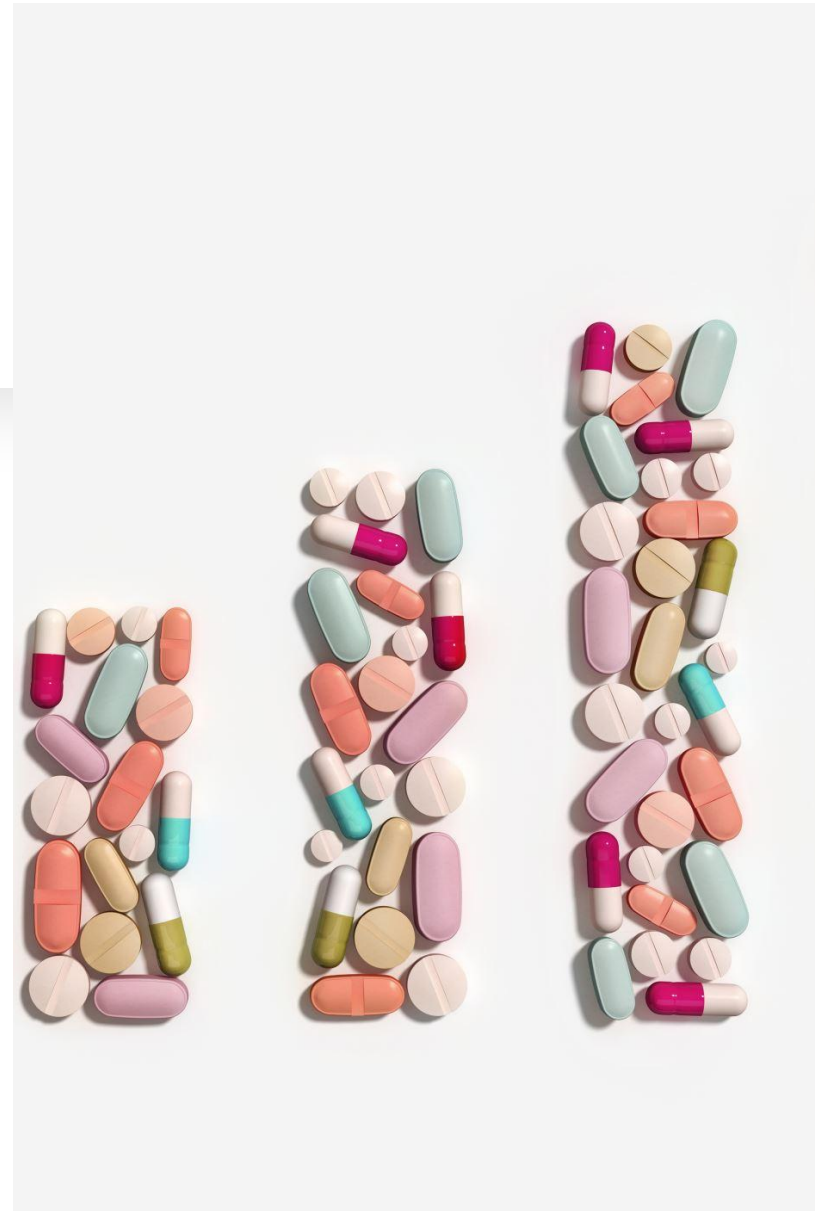
Economic Evaluation within the PBAC



- Health sector perspective (Costs and outcomes)
- Comparison vs usual care
- Needs to demonstrate cost-effectiveness and acceptable budget impact.
- Reasons for exceptions:
 - rule of rescue,
 - orphan drugs (rare diseases)
- If equivalent outcomes, cost minimisation to match the price of new drug to the old drug

What does the PBS achieve?

- Government monopsony keeps drug prices low
- Industry profits are higher with PBS than would be the case in a perfectly competitive and unsubsidised market
- Australians have timely access to affordable medicines



Summary



- Markets involve the interaction of buyers and sellers for good and services and are seen as an efficient way in which society allocates its resources
- Market failure sometimes occurs and often in the health sector
- Economic evaluation helps governments and health care funders achieve efficient resource allocation in lieu of markets
 - Case studies
 - Social impact bonds
 - Health Technology Assessments

Examples of economic evaluations

RESEARCH ARTICLE

Cost-effectiveness of the Da Qing diabetes prevention program: A modelling study

Wanxia Hu¹✉, Wenhua Xu²✉, Lei Si³, Cuilian Wang¹, Qicheng Jiang⁴, Lidan Wang^{1,5}✉, Henry Cutler³

1 School of Health Management, Anhui Medical University, Hefei, China, **2** Affiliated Stomatological Hospital, Anhui Medical University, Hefei, China, **3** The George Institute for Global Health, Sydney, New South Wales,

Household contact investigation for the detection of tuberculosis in Vietnam: economic evaluation of a cluster-randomised trial



Thomas Lung, Guy B Marks, Nguyen Viet Nhung, Nguyen Thu Anh, Nghiem Le Phuong Hoa, Le Thi Ngoc Anh, Nguyen Binh Hoa, Warwick John Britton, Jessica Bestrashniy, Stephen Jan, Gregory J Fox



Hydroxyethyl starch versus saline for resuscitation of patients in intensive care: long-term outcomes and cost-effectiveness analysis of a cohort from CHEST

Colman Taylor, Kelly Thompson, Simon Finfer, Alisa Higgins, Stephen Jan, Qiang Li, Bette Liu, John Myburgh, for the Crystalloid versus Hydroxyethyl Starch Trial (CHEST) investigators and the Australian and New Zealand Intensive Care Society Clinical Trials Group

Discrete choice experiments

Archives of Osteoporosis (2019) 14: 85
<https://doi.org/10.1007/s11657-019-0624-z>

ORIGINAL PAPER



Chinese patients' preference for pharmaceutical treatments of osteoporosis: a discrete choice experiment

Lei Si^{1,2} · Liudan Tu³ · Ya Xie³ · Andrew J. Palmer^{4,5} · Yuanyuan Gu^{6,7} · Xuqi Zheng³ · Jiamin Li³ · Qing Lv³ · Jun Qi³ · Zhiming Lin³ · Mingsheng Chen⁸ · Jieruo Gu³ · Mickaël Hiligsmann⁹

Research

BMJ Global Health

What do community health workers want? Findings of a discrete choice experiment among Accredited Social Health Activists (ASHAs) in India

Marwa Abdel-All,^{1,2} Blake Angell,² Stephen Jan,^{1,3,4} Martin Howell,⁵ Kirsten Howard,⁵ Seye Abimbola,^{1,2} Rohina Joshi^{1,2,6}

ORIGINAL CLINICAL SCIENCE

Community Preferences for the Allocation of Donor Organs for Transplantation A Discrete Choice Study

Howard, Kirsten¹; Jan, Stephen²; Rose, John M.³; Wong, Germaine^{1,4}; Irving, Michelle^{1,4}; Tong, Allison^{1,4}; Craig, Jonathan C.^{1,4}; Chadban, Steven^{4,5}; Allen, Richard D.⁶; Cass, Alan^{2,7} **Author Information**

Transplantation: March 2015 - Volume 99 - Issue 3 - p 560-567
doi: 10.1097/TP.0000000000000365

Household economic burden / out of pocket costs

- Studies of household economic burden of illness
 - Out of pocket costs , catastrophic health expenditure, illness induced poverty
 - Financial stress
 - Coping strategies
 - Treatment abandonment, non-adherence
- Over 20 studies different disease, LMICs and Australia
- Strong advocacy message particularly around universal health coverage and financial protection

Catastrophic health expenditure on acute coronary events in Asia: a prospective study

Stephen Jan,^a Stephen W-L Lee,^b Jitendra PS Sawhney,^c Tiong K Ong,^d Chee Tang Chin,^e Hyo-Soo Kim,^f Rungroj Krittayaphong,^g Vo T Nhan,^h Yohji Itohⁱ & Yong Huo^j



A Multicenter Prospective Cohort Study of Quality of Life and Economic Outcomes after Cataract Surgery in Vietnam

The VISIONARY Study

Beverly M. Essue, PhD,¹ Qiang Li, MBiostat, BPH, AStat,² Maree L. Hackett, PhD,² Lisa Keay, PhD,² Beatrice Izzo,² Khanh Duong Tran, BSc,² Huynh Tan Phuc, MD,³ Stephen Jan, PhD,² on behalf of the VISIONARY study team*

Original research

We can't afford my chronic illness! The out-of-pocket burden associated with managing chronic obstructive pulmonary disease in western Sydney, Australia

Beverly Essue, Patrick Kelly¹, Mary Roberts², Stephen Leeder³, Stephen Jan

Open Access

Research article

Economic hardship associated with managing chronic illness: a qualitative inquiry

Yun-Hee Jeon^{*1,2}, Beverley Essue^{3,4}, Stephen Jan⁴, Robert Wells^{1,5} and Judith A Whitworth⁶

PharmacoEconomics (2021) 39:63–80
<https://doi.org/10.1007/s40273-020-00963-x>

SYSTEMATIC REVIEW

Health Economic Evaluation Alongside Stepped Wedge Trials: A Methodological Systematic Review

Thomas Lung^{1,2} · Lei Si^{1,4} · Richard Hooper³ · Gian Luca Di Tanna¹

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CSIRO PUBLISHING

Australian Health Review, 2018, 42, 117–119
<http://dx.doi.org/10.1071/AH16194>

HEALTH SERVICE RESEARCH

Perspective

Funding therapies for rare diseases: an ethical dilemma with a potential solution

Colman Taylor^{1,2,3,4} PhD, Postdoctoral Research Fellow, Conjoint Senior Lecturer,
Director Market Access, Strategy and HEOR

Stephen Jan^{1,2} PhD, Professor, NHMRC Principal Research Fellow

Kelly Thompson^{1,2} RN BN MPH, Senior Clinical Research Associate, Honorary Associate

Commentary

BMJ Global Health

Using strategic price negotiations to contain costs and expand access to medicines in China

Lei Si^{1,2} · Lizheng Xu,³ Mingsheng Chen,^{4,5,6} Stephen Jan^{1,2}