NATIONAL MENTAL HEALTH RESEARCH STRATEGY

BACKGROUND PAPER: The contribution of health economics to mental health research

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Introduction and context: What is the discipline of health economics about?

Economics is the science of scarcity. Within the health care context, health care is an economic good in the sense that delivering more of one type of care (from a fixed budget) displaces care elsewhere in the system. This reflects the concept of opportunity cost, which is the value of the consequences forgone by choosing to deploy resources in one way rather than in their best alternative use.[1] Health economics reflects a universal desire to obtain maximum value for money by ensuring not just clinical effectiveness, but also cost-effectiveness of healthcare provision. Importantly, the objective of cost-effectiveness analysis is not to save money per se, but to improve efficiency, which is achieved when healthcare resources are being used in a manner that provides the best value for money.[2]

What constitutes value in healthcare varies by country and various value frameworks have been developed.[3] The value assessments of health care technologies in Australia are largely based on the quality-adjusted life year (QALY) framework,[4] which is used as a measure of benefit for reimbursement decisions of pharmaceuticals and other medical services (via the Pharmaceutical Benefits and Medical Services Advisory Committees – PBAC/MSAC). However, given Australia's complicated health care system, funding decisions in other contexts (such as state-based funded and delivered services) do not have such formal requirements of evidence of cost-effectiveness.

Health economics and mental health research

The role of health economics in mental health research also plays an important role beyond the economic evaluation of health care interventions, services and programs (see below for greater description of this tool). The tools of health economics can be used for descriptive purposes, such as describing current activities in health care delivery, including the burden of a particular disease and the associated costs. For example, *Burden of Disease* studies and *Cost of Illness* studies provide important indices of the scale of health problems. When using consistent methodology in such studies, comparisons can be made between diseases to inform research prioritisation. In many respects the well-known burden of disease studies (pioneered by the World Health Organisation), which measure burden as disability-adjusted life years (DALYs),[5] have been instrumental in drawing attention to the scale of disease burden that can be attributable to mental disorders.[6] Knowledge generated from describing the status quo can also be used to predict future burden of disease and costs. Much of the literature regarding the impact on health expenditure of an aging population sits within this category of economics research.[7]

Finally, health economics can be used to explain health status trends by studying the economic influences on health status and resource use. However, these prediction and explanation tasks can also extend to broader economic issues such as provider behaviour under different financial payment mechanisms (e.g. salaried health care providers versus fee-for-service remunerated health care providers where there may be different financial incentives operating), or broader health care system design issues. Within mental health care, this may extend to how different policy levers – such as changes in insurance coverage or incentive payments – may increase the likelihood of providers or even consumers changing their behaviour (e.g. increasing likelihood of accessing care). However, at the heart of almost all health economics research is a focus on efficiency and opportunity cost.

Tools and methodologies

Health economists use a broad range of "tools" to answer a wide range of research questions as highlighted in the previous section. Many of the tools that are used in descriptive, predictive or explanatory studies are more akin to statistical techniques that are used in health research more broadly (largely regression type of statistical procedures using large datasets – such as cohorts or data collected via experimental designs – called "econometric" analyses). However, the main "tool" that health economics is particularly known for is economic evaluation. An economic evaluation compares two or more interventions on both costs and consequences. There are four different types of economic evaluations. Each values cost – including the costs of the interventions and other costs that might be impacted by interventions – in monetary units (e.g. Australian dollars) but differs in the valuation of consequences or outcomes. Cost-effectiveness analyses value consequences in clinical units (e.g. symptom free days, cases avoided) while cost utility analyses value outcomes using a metric that combines both the length and quality of life, such as QALYs or DALYs.

The recommended economic evaluation framework used by formal health technology agencies, such as the PBAC, MSAC and the National Institute for Health and Care Excellence (NICE) in the UK, is cost-utility analysis (CUA) where outcomes are assessed as QALYs. While there are well-known limitations of such outcome measures, they are nevertheless a well-accepted and understood outcome measure within the health sector and used extensively within most international health technology agencies. Importantly, the decision criterion of such methods is not that interventions need to demonstrate that they are cost-saving, as is the case in many business case appraisals, but rather that they represent some notional value for money. In the UK, for example, this is between £20,000 and £30,000 per QALY gained.[8] In Australia there is no explicit threshold of value for money, although recent evidence has suggested that it may be around $28,000 per QALY.[9] In addition, $50,000 per QALY is sometimes used as a rough rule of thumb threshold.[10] Importantly, the empirical derivation of the recently published $28,000 per QALY work did not include mental health care and thus may not reflect the threshold for mental health improvements. Furthermore, Australia's PBAC requires that the primary economic perspective is the health sector rather than societal. This means that productivity impacts are excluded from the base case cost-effectiveness results. The reasons for this are detailed in the PBAC submission guidelines,[11] but include well-known difficulties associated with the measurement and valuation of productivity impacts, along with equity considerations.[12] The advantage of such frameworks is that they offer a transparent method of evaluation that is well-described and accepted.

Cost-benefit analysis (CBA) values consequences in monetary units (dollars) – necessitating the use of a monetary valuation on health outcomes – something not routinely done in most health economic evaluations. The benefit is that interventions across multiple sectors can be compared. The decision criterion is simple: if monetary benefits outweigh the costs of interventions then they are worth doing. While this is theoretically attractive and means that intersectoral interventions can be compared (e.g. education versus

health interventions), there are well-known difficulties in placing monetary valuations on health and mental health benefits. For example, many of the consequences associated with improved mental health, such as social participation and improved self-esteem, do not have readily available, empirically determined monetary valuations. The consequence of this is that many studies that attempt to adopt a CBA framework – particularly within the context of providing business case arguments for decision-makers outside the Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) – adopt limited economic perspectives. Many of these studies are termed "return on investment" (ROI) analyses and primarily consider the costs associated with implementing interventions compared with cost savings such as productivity improvements or potential cost savings of the downstream use of health services. While this is not incorrect, this does not support efficiency across the whole system. This is because different criteria of what is deemed to be cost-effective are used to fund different interventions that all aim to improve mental health.

Economic evaluation uses

Economic evaluations can be incorporated into randomised controlled trials to evaluate the value for money credentials of mental health prevention and treatment interventions. Trial-based economic evaluations have high internal validity due to the rigorous and often restrictive study designs. While trial-based economic evaluations provide useful information, their results have limited generalisability.

Model-based economic evaluations are an alternative to trial-based economic evaluations. These involve the development of mathematical models which simulate the health and economic consequences accruing to a cohort of individuals under a scenario where they receive a particular intervention versus a scenario where they receive some comparator (typically treatment-as-usual or no intervention). Model-based economic evaluations have several advantages over trial-based economic evaluations despite their lower internal validity. These include: the ability to extrapolate outcomes beyond the short timeframe of clinical trials; the linking of intermediate clinical endpoints to final outcomes; the ability to generalise findings to other settings; and the potential to inform decision-making in the absence of hard data. Examples of model-based economic evaluations that adopt best practice – applying a systematic approach to collecting and using all relevant data when calculating the costs and consequences arising from the intervention scenarios under analysis – include (but are not limited to): the Assessing Cost-effectiveness (ACE) studies conducted in Australia (e.g. ACE Mental Health[13] and ACE Prevention[14]); as well as many published modelled economic evaluations both nationally and internationally. Sophisticated modelling approaches can be used to account for the diverse experience of mental illness between individuals. However, the development of these models typically requires comprehensive longitudinal data on the experience of patient outcomes over time – which are not often available in practice.

Both trial-based and modelled economic evaluations can be applied to different aspects of mental health research by tailoring the study design to the mental health diagnosis, type of intervention and relevant time frame.

Practical examples

Table 1 below contains a few practical examples from our own research (although there are many others that could also be used) demonstrating how the tools of health economics can be used across the range of fields represented at the workshop

Table 1: Practical examples of health economic studies and their relevance to other domains considered in the workshop

Health economic methods	Research design	Examples	Relevance to other domains considered in the workshop
Cost of illness studies To estimate the costs related to mental health problems including treatment costs, carer costs, costs of productivity loss, etc	Population-based studies	High prevalence mental disorders including depressive disorders, anxiety related disorders and substance use disorders were associated with AUD$974 million cost to health sector and AUD$11.8 billion of annual productivity loss in Australia[15] Psychosis in Australia cost society an estimated $4.91 billion annually with $3.25 billion cost to the government[16]	Epidemiological and population health research Anxiety disorders, substance use disorders, mood disorders, psychosis/psychotic disorders
Cost effectiveness analysis To compare costs in monetary term and benefits (or outcomes) in natural units such as remission, depression scores that are meaningful to clinicians and providers	Trial-based studies	A matched controlled study indicated the cost-effectiveness of an early intervention in psychosis over 8 years[17]	Implementation and health services research Psychosis/psychotic disorders
	Modelled-based studies	The Triple P Parenting program was found to be dominant (cost less and more effective in preventing cases of conduct disorder) when Triple P reduces prevalence of conduct disorder by at least 7%[18]	Prevention research Implementation and health services research Children and young people
Cost utility analysis To compare costs in monetary term and benefits (or outcomes) in generic measures of health gain such as quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs)	Trial-based studies	Stepped care versus standard face-to-face cognitive behavioural therapy for treatment of anxiety in young people provided comparable QALYs at similar costs[19] Dietician supported modified Mediterranean diet versus befriending as add-on to treatment of depression (SMILES trial) resulted in significantly lower total health sector and societal costs with similar QALYs[20]	Treatment research Anxiety disorders, mood disorders
	Model-based studies	Family-based therapy is less costly than adolescent-focused individual therapy and more cost-effective than no intervention in treatment for adolescent with anorexia nervosa within the Australian context[21]	Treatment research Eating disorders Children and young people

		National bans of highly hazardous pesticides in low- and middle-income countries are cost-effective in preventing suicides attributable to pesticide self-poisoning[22]	Prevention research Suicide prevention
Return on Investment/Cost-Benefit Analysis To value the financial return, or benefits, of an intervention in relation to the total costs of its delivery	Model-based studies	A recent report from National Mental Health Commission on interventions targeting children, young people and older adults showed that for every dollar invested for the prevention of depression and/or anxiety, bullying, and loneliness, there is around a 1.1 to 3.1 AUD dollars return from that investment in terms of health care service savings and increased productivity[23]	Prevention research Anxiety disorders, mood disorders Children and young people
Econometric analysis For example: to apply statistical methods to economic data to estimate relationships	Analysis of large databases	Analysis of Medicare and Pharmaceutical Benefits data for women at risk of perinatal mental illness found that the National Perinatal Depression Initiative (NPDI) increased access to Medicare funded mental health services for women under 25 and over 34 in major cities.[24] Analysis of NSW and WA hospitalisation records before and after the implementation of the NPDI found that it reduced inpatient psychiatric hospital admission by up to 50% in the first postnatal year[25]	Prevention research
Outcome measurement	Health state utility values	A recent study has provided a set of consistently derived health state utility values across eating disorder diagnostic categories, a range of key socioeconomic backgrounds and disease-specific symptoms. Importantly, this research highlighted that eating disorders have similar quality of life impacts to other common mental health disorders like anxiety, depression and schizophrenia[26]	Epidemiological and population health research Eating disorders Children and young people
	Measurement and scale validity	Different outcome measures (referred to as multi-attribute utility instruments, MAUIs) have been developed to compute QALYs in a CUA. This study compared five MAUIs in individuals living with depression and identified that the AQoL-8D had the highest correlation with depression-specific measures and the best goodness-of-fit transformation properties	Mood disorders

Policy and funding in Australia

Unlike the UK, where there is a single health technology agency (NICE) that assesses both health and social care within a comprehensive evaluation/economic evaluation framework, Australia does not have a comprehensive health technology agency or framework. In Australia, formal health technology agencies and processes exist for the funding of pharmaceuticals via the PBAC and medical and other services via the MSAC. Both the PBAC and MSAC recommend products for listing on both the PBS and the MBS. For services or programs that are not funded through these two mechanisms, there are no formal health technology appraisal frameworks.

Clinicians and other health and social care providers who seek funding for their interventions/services and programs often commission or undertake business case studies themselves to present a compelling case for funding, which is then presented to various treasury departments. Furthermore, many effective interventions may require financial support from sectors outside of health (e.g. school-based interventions for mental health promotion/prevention). Given that both state and local governments tend to directly fund such interventions (for example, specialised mental health care is a state responsibility), there is no legislated formal requirement that services and interventions must demonstrate cost-effectiveness – although many public policy and background documents do highlight the need for value for money or efficiency considerations. In fact, departments of treasury tend to recommend CBA methods. This fragmented and uncoordinated process does not support the overall efficiency of the system.

Formal health technology agencies also underpin healthcare decision making in other international contexts outside the UK (NICE), including the Netherlands, Canada, Sweden, and New Zealand.

While economics clearly has a central role in formal health technology agencies and more broadly in the research areas described above, the extent to which economic research has impacted mental health care funding decisions in other contexts is variable. Within the developing country context, a priority-setting approach pioneered by the World Health Organisation called Choosing Interventions that are Cost-Effective (WHO-CHOICE) provides information to help countries choose funding priorities through provision of information on intervention cost-effectiveness and potential impact.[27] Countries also utilise health economics in their policy decisions.

In terms of mental health specific application, ROI studies on mental health promotion and prevention in the UK have directly informed national policy documentation.[28] Sweden has national guidelines on depression and anxiety, abuse and addiction, and schizophrenia for resource allocation.[29] New Zealand's He Ara Oranga Report of the Government Inquiry into Mental Health and Addiction in 2018 recommended the establishment of a Mental Health and Wellbeing Commission to advise the Ministry of Health in the consideration of both effective and cost-effective interventions.[30] Furthermore, there are alternative approaches to funding specifically in mental health care which are achieving academic attention but not widespread adoption to date (for example, value-based funding which is a type of funding mechanism whereby providers are paid for results rather than "processes").[31]

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[4] QALYs are a commonly used outcome measure in health economics that combine the quality and quantity of life into a single value. A QALY is calculated by multiplying the period of time spent in a particular health state by the "utility" or preference value assigned to that health state measured on a scale from 0 (denoting death) to 1 (denoting full health).

[5] DALYs are similar to QALYs because they combine years of life lost due to premature mortality and years of life lived with a disability. DALYs are calculated similarly to QALYs by multiplying the time spent in a health state by a "disability weight" associated with that particular health state. However, the disability weights are defined on a reverse scale with 0 indicating no disability and 1 denoting death.

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