

**DOLLARS, DALYs AND DECISIONS:**

**ECONOMIC ASPECTS OF THE  
MENTAL HEALTH SYSTEM**



**World Health  
Organization**

**DOLLARS, DALYs AND DECISIONS:**

**ECONOMIC ASPECTS OF THE**

**MENTAL HEALTH SYSTEM**



**Mental Health: Evidence and Research**  
**Department of Mental Health and Substance Abuse**

WHO Library Cataloguing-in-Publication Data

Chisholm, Daniel.

Dollars, DALYs and decisions : economic aspects of the mental health system.

"This document has been written by Dan Chisholm in collaboration with Shekhar Saxena and Mark van Ommeren"--  
Acknowledgements.

1.Mental health services - economics. 2.Cost of illness. 3.Cost-benefit analysis. 4.Health planning. I.Saxena, Shekhar.  
II.Ommeren, Mark van. III.World Health Organization. IV.Title.

ISBN 92 4 156333 8

(NLM classification: WM 30)

ISBN 978 92 4 156333 8

© World Health Organization 2006

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: [bookorders@who.int](mailto:bookorders@who.int)). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: [permissions@who.int](mailto:permissions@who.int)).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

The named authors alone are responsible for the views expressed in this publication.

Printed in Switzerland.

## TABLE OF CONTENTS

### Executive Summary

<b>1. Introduction</b>	<b>11</b>
1.1 Rationale for an economic perspective in mental health policy and practice	11
1.2 Economics for mental health planning and evaluation: a systems approach	14
<b>2. Measuring the burden of mental disorders: from DALYs to dollars</b>	<b>19</b>
2.1 Epidemiological burden: disability-adjusted life years (DALYs)	19
2.2 Economic burden: cost-of-illness studies	21
<b>3. Reducing the burden of mental disorders: from global to national evaluation</b>	<b>23</b>
3.1 WHO framework for cost-effectiveness analysis	23
3.2 Global evaluation of the cost-effectiveness of interventions	25
3.3 National evaluation of the cost-effectiveness of interventions	30
<b>4. Priority-setting and resource allocation for mental health system development</b>	<b>37</b>
4.1 Decision-making criteria for resource planning and allocation in health	37
4.2 Development of a priority-setting framework for mental health policy	39
4.3 Scaling up priority interventions: financial planning and budgetary allocation	43
<b>5. Conclusion</b>	<b>47</b>
References	49
Appendices	53



## Acknowledgements

This document has been written by Dan Chisholm in collaboration with Shekhar Saxena and Mark van Ommeren. The work reported here was carried out by the team, Mental Health: Evidence and Research (Coordinator: Shekhar Saxena), Department of Mental Health and Substance Abuse, WHO, Geneva. Overall guidance and support has been provided by Benedetto Saraceno, Director, Department of Mental Health and Substance Abuse.

The document has benefited from comments, advice and support from José Bertolote, Michelle Funk and Vladimir Poznyak. Collaborators from WHO regional offices include: Thérèse Agossou, Regional Office for Africa; José Miguel Caldas de Almeida and Itzhak Levav; Regional Office for the Americas; Vijay Chandra, Regional Office for South-East Asia; Matthijs Muijen, Regional Office for Europe; Mohammad Taghi Yasamy, Regional Office for the Eastern Mediterranean; and Xiangdong Wang, Regional Office for the Western Pacific.

Feedback and comments on the draft version were received from the following experts: Jose-Luis Ayuso-Mateos (Spain); Tei Weh Hu (USA); Rachel Jenkins (UK); Crick Lund (South Africa); Afarin Rahimi Movaghar (Islamic Republic of Iran); R. Thara (India); Harvey Whitford (Australia).

Field work, that has directly or indirectly enriched this document was carried out in Chile (investigators: Sandra Saldivia Borques and Marcelo Villalon), Estonia (investigator: Marge Reinpa and Taavi Lai), Mexico (investigator: Maria Elena Medina-Mora and Ricardo Orozco), Nigeria (investigator: Oye Gureje), Spain (investigator: Jose-Luis Ayuso-Mateos) and Sri Lanka (investigator: Nalaka Mendis).

Administrative support was provided by Rosemary Westermeyer.

The graphic design was done by Mr Jean-Claude Fattier.



## Executive Summary

### *Economic evidence for mental health action*

A health systems perspective provides an integrated approach to the identification of information and evidence needs for the planning, provision and evaluation of mental health programmes. Some relevant messages from the economic dimension of this approach are:

- Information on the **burden of mental disorders**, whether expressed in economic or epidemiological terms (i.e. in Dollars or DALYs [disability-adjusted life years]), is a potentially influential measure of the relative magnitude of mental, neurological and substance abuse disorders at the population level, but is an insufficient basis for allocating resources and setting priorities for action / service development. To date, studies of the economic burden of these disorders using cost-of-illness methodology can be characterized by their variable quality and inconsistent approach to the identification, measurement and valuation of costs. For such studies to produce appropriate and comparable estimates of the true economic consequences of mental, neurological and substance abuse disorders in the future, a major rethink appears to be needed.
- Economic evaluation or **cost-effectiveness analysis** of existing service arrangements and current / new intervention strategies (including consideration of the amount of burden that can be avoided), is an integral part of mental health financing and mental health system evaluation, providing a check on unfair or inefficient practice and a basis for renewed action or investment. It is a necessary mechanism for identifying an efficient allocation of mental health resources (greatest gain for available resources), but an insufficient tool for setting overall priorities in the mental health system.
- For the broader process of **priority-setting** in mental health, the efficiency of particular interventions or their combination into service packages needs to be systematically weighed up against other objectives or goals of the mental health system - in particular fairness (with respect to geographical or financial access to services), poverty reduction and human rights protection - plus the feasibility, acceptability and sustainability of their implementation.

### *Intervention impact and cost-effectiveness*

Mental health interventions encompass a wide range of possible actions, including legislative and regulatory frameworks, prevention and promotion, treatment and rehabilitation. There is currently best economic evidence for the treatment end of this spectrum. On the basis of an analysis of the comparative effectiveness and costs of key pharmacological and psychosocial interventions for leading contributors to the burden of mental disorders, both at the global level of 14 WHO sub-regions / six World Bank regions and at the national level in six WHO Member States, a number of overall findings can be stated:

- **Pharmacological interventions:** Currently, the high acquisition price of newer (atypical) antipsychotic drugs makes their use in most lower-income regions of the world inadvisable on efficiency or affordability grounds (although this situation should change as these drugs come off patent); conventional neuroleptic drugs have similar efficacy and are currently much cheaper. For anti-depressants, older and newer drugs also have similar efficacy but the price difference between older tricyclics (TCAs) and newer (generic) SSRIs is much smaller - and in certain countries such as India or Sri Lanka, negligible - meaning that the treatment of choice is more context-specific and can be driven by patient or clinical preferences. Long-term maintenance treatment of depression with anti-depressant drugs has a much larger impact on reducing the burden of depression than episodic treatment, and also represents a cost-effective strategy. First-line anti-epileptic drugs such as phenobarbital and phenytoin have similar efficacy to other commonly used anti-convulsants (e.g. carbamazepine or valproic acid), but are cheaper to buy and therefore more cost-effective.
- **Psychosocial interventions:** the relatively modest additional cost of adjuvant psychosocial treatment is expected to reap significant health gains, thereby making such a combined strategy for schizophrenia and bipolar disorder treatment more cost-effective than pharmacotherapy alone. For people with depression or anxiety, psychotherapy is expected to be as cost-effective as newer (generic) antidepressants. Clearly, however, there remains a major human resource constraint in making psychosocial interventions more widely available.
- **Affordability:** The most efficient interventions for common mental disorders such as depression and panic disorder can be considered very cost-effective (each DALY averted costs less than one year of average per capita income), while community-based interventions for more severe mental disorders using older anti-psychotic and mood-stabilizing drugs still meet the criterion for being cost-effective (each DALY averted costs less than three times average annual income). In other words, there is just as much of an economic rationale for investing in mental health as there is in other chronic, non-communicable diseases such as diabetes or hypertension. Some other interventions, however, for example hospital-based treatment of schizophrenia with newer anti-psychotic drugs, are simply not a cost-effective use of resources in the context of low- or middle-income countries.

- **Essential packages of mental health care:** Across six low- and middle-income World Bank regions, it is estimated that a selective package of cost-effective mental health interventions could be implemented at a cost of US\$ 3-4 per capita in low-income settings such as Sub-Saharan Africa and South Asia, and up to US\$ 7-9 in more middle-income regions (Latin America and the Caribbean; Europe and Central Asia). This means that for every US\$ 1 million invested in such a mental health care package, 350 to 700 healthy years of life would be gained over and above what would occur without intervention. At the national level, a selected package of care for schizophrenia, depression, epilepsy and alcohol misuse in Nigeria was estimated to cost 80 Naira per capita (less than one US dollar).

### *Policy and service implications*

- **Service organization:** Mental health services configured around a community-based model achieve similar mental health outcomes to hospital-based services, but are less costly to maintain. However, shifting away from currently inefficient structures and practices (including reliance on hospital-based services) to a more effective and efficient allocation of resources (towards community-based services) implies a potentially radical reorganization of the mental health system, not only in terms of strategic policy but also in terms of other dimensions including human resource development, capital infrastructure (primary care and district hospitals), and drug procurement / distribution. To facilitate this shift, bridge funding is likely to be needed.
- **Financial and human resource needs:** Based on the use of efficient interventions, the financial implications of scaling-up the effective coverage of key mental health care strategies need not be overwhelming (less than US\$ 10 in middle-income countries, and well below US\$ 5 per capita in low-income countries; in countries such as Nigeria or Sri Lanka, for example, it is expected to be in the range of just US\$ 1 per capita). However, current budgetary allocations to mental health in many low- and middle-income countries are often very low, relative to the need for care and support. Accordingly, there is an evident need to increase the mental health budget if the current clinical and economic burden attributed to mental disorders is to be significantly reduced. To match the resource base available to the most comprehensive mental health systems in the world, countries should expect to allocate up to 10%, and a minimum of 5%, of the total health budget to mental health.
- **Non-health benefits:** In addition to the reduced psychiatric morbidity associated with the introduction of cost-effective treatments, there are a number of other benefits that flow from their use, most notably reductions in family burden / informal care-giving at the household level, and higher rates of participation in the labour force / reduced levels of crime and antisocial behaviour at the community level. The evidence underpinning these arguments, however, needs to be strengthened through well-designed research.



# 1. Introduction

## Objectives of report

- To highlight the need for and relevance of an economic perspective in the assessment of mental health systems in WHO Member States and in planning and implementing action for their strengthening.
- To provide a summary of results from mental health economic analyses undertaken both at the level of WHO regions and Member States, including key messages for strengthening of mental health systems.

## Target audience

- Health planners, policy-makers and analysts in WHO Member States have a responsibility for strengthening mental health systems and their monitoring and evaluation.
- Health service researchers with an interest in mental health system, evaluation and financing.

## 1.1 Rationale for an economic perspective in the development and strengthening of mental health systems

As an integral component of health, mental or psychological well-being makes up a valuable part of an individual's capacity to lead a fulfilling life, including the ability to study, work or pursue leisure interests, and to make day-to-day personal or household decisions about educational, employment, housing or other social choices. Disturbances to an individual's mental well-being adversely compromises these personal and household capacities and possibilities, often only in a small, transient way, but sometimes also in a more fundamental and enduring manner.

Whether over the short- or long-term, the potential consequences of mental ill-health at the household level are numerous, including disturbed mood, thought or functioning among affected individuals (or their caregivers), and foregone earnings or savings as a result of impaired work ability or health care expenditures. Mental ill-health among individuals or households exerts a pressure on communities and societies to provide a range of health and welfare services on their behalf (most often funded from the taxes that households pay), a consequence of which is that resources so directed are then not available for other potential channels of public investment.

Economics is concerned with the use and distribution of resources among the individuals making up a society, and how different ways of allocating resources impacts on their well-being. Economics enters into the health sphere because resources available to meet all possible

societal needs or demands for health care and prevention are finite, meaning that choices or decisions somehow have to be made regarding how best to allocate these resources (typically in order to generate or maintain the greatest possible level of health in the population). Economics provides an explicit framework for thinking through different possible ways of allocating resources in health.

Resource allocation decisions in mental health are complicated by the fact that mental ill-health is common, debilitating and often long-lasting. Recent epidemiological research has clearly demonstrated the considerable (and previously underestimated) epidemiological burden that mental disorders impose on the world as a whole (more than 10% of lost years of healthy life and over 30% of all years lived with disability; WHO, 2001). The enormity of this disease burden is driven by the relatively high prevalence of these disorders, the often chronic nature of their course and the severity of disability associated with mental ill-health. Low rates of case recognition and effective treatment serve to compound the problem, particularly in poor countries.

It is important to note that disease burden is not in itself sufficient as a mechanism for resource allocation and priority-setting in health care. A disease can place a considerable burden on a population but if appropriate strategies or interventions to reduce this burden are absent or extremely expensive in relation to the health gains achieved, large-scale investment would be considered misplaced (since scarce resources could be more efficiently channelled to other burdensome conditions for which cost-effective responses were available). In other words, the size of the burden alone is not sufficient to guide action. For priority-setting and resource allocation, a more pertinent question is to ask what is the amount of burden from a particular disease that can be avoided through the use of evidence-based interventions and what is the relative cost of their implementation in the target population.

The last two decades have seen an ever-increasing interest in, and demand for, economic analysis of mental health care and policy, fuelled by government concerns about rises in health care expenditures (Singh et al, 2001). Considerations of cost and cost-effectiveness enter into health care reform processes, priority-setting exercises within and across health programmes, and regulatory decisions concerning drug approval or pricing. Despite the need for cost-effectiveness evidence, however, there remains a relative paucity of completed mental health economic evaluations from both developed and developing countries (Shah and Jenkins, 1999). Recently, for example, resource flows into providing mental health and psychosocial assistance to populations affected by emergencies have shown a marked increase. However, the evidence base for (cost-) effectiveness of interventions in this area is rather weak (Mollica et al, 2004).

Most completed economic evaluations in mental health care have been concerned with specific treatment modalities for psychoses and affective disorders, in particular the cost-effectiveness of different psychotropic medications and, more recently, various psychotherapeutic approaches to the management of these psychiatric disorders (Knapp et al, 1999; Rosenbaum et al, 1999). Many mental health economic studies undertaken to date suffer from a number of technical shortcomings, including small sample sizes and uncontrolled study designs. There is a consequent need to generate better estimates of both the costs and rela-

tive cost-effectiveness of interventions in order to usefully inform mental health policy and planning, both at the national and international level.

Development of such an economic evidence base in mental health can be achieved in two ways. Preferably, it would be generated via additional empirical studies in a range of socio-economic settings (particularly developing countries, where current evidence is most scarce). Well-designed economic evaluations of mental health care and prevention strategies are certainly needed and valuable, but they are also difficult, time-consuming and expensive to carry out (as well as having limited application beyond the immediate confines of the study location). This means that it is highly unlikely that a sufficient evidence base will be generated in this way, even within the next ten years or so. Alternatively, and more immediately, current information gaps could be filled via appropriate modelling of best available data concerning the expected costs and effects of interventions in these different settings. The danger of this latter approach lies in the inevitable assumptions that are required to be made when basing cost-effectiveness estimates on a variety of data sources from different research settings, while the attraction is that policy-relevant results can be generated relatively quickly and inexpensively.

In short, the widening recognition of mental health as a significant international public health issue has led to an increasing need to demonstrate that investment of resources into service development is both required and also worthwhile. Specifically, there is a need to generate evidence on mental health care strategies that are not only effective and appropriate but are also cost-effective and sustainable. Economic analysis provides a set of principles and analytical techniques which can be usefully employed to assess the relative costs and consequences of different intervention strategies. It seeks to address a number of key policy questions about the magnitude of mental health problems, the relative effect and cost of different intervention strategies and the most appropriate use of scarce resources (see Table 1 below).

**Table 1 Mental health policy questions for intervention (cost-)effectiveness**

Policy question	Research task	Evidence generated
1. How significant is the burden of mental disorders?	Estimate burden of disease Identify other social & economic consequences of disorders	% of total burden caused by mental disorders % of mental disorder burden caused by different conditions (e.g. depression)
2. How effective are interventions for burden-some conditions?	Estimate current effective coverage Assess impact of new interventions	Comparative efficacy of interventions % of burden averted with current interventions or avertable with better strategies
3. What will it cost to provide effective care?	Calculate full cost of interventions Estimate cost of scaling-up coverage	Comparative cost of interventions at different levels of coverage in the population
4. What are the most efficient strategies?	Integration of costs and effectiveness Specification of essential packages	Evidence-based priorities for the efficient allocation of mental health care resources

In addition, economic considerations enter into the debate around a number of other mental health system components, in particular the fair and efficient financing of mental health services. An overview of the way in which economic considerations relate to different components of the mental health system is provided in the next section.

## **1.2 Economics for mental health planning and evaluation: a systems approach**

Notions of what is meant by the ‘mental health system’ are by no means universally agreed upon, and in fact differ according to the particular analytical viewpoint of the interested party. For example, someone responsible for developing an information system for mental health may view system dimensions and requirements differently to a district mental health manager. This document is not the place to elaborate at any great length on this issue, but it is nevertheless important to provide a simple framework in order to think through the various ways in which an economic approach may impact on distinct activities or functions of a mental health system.

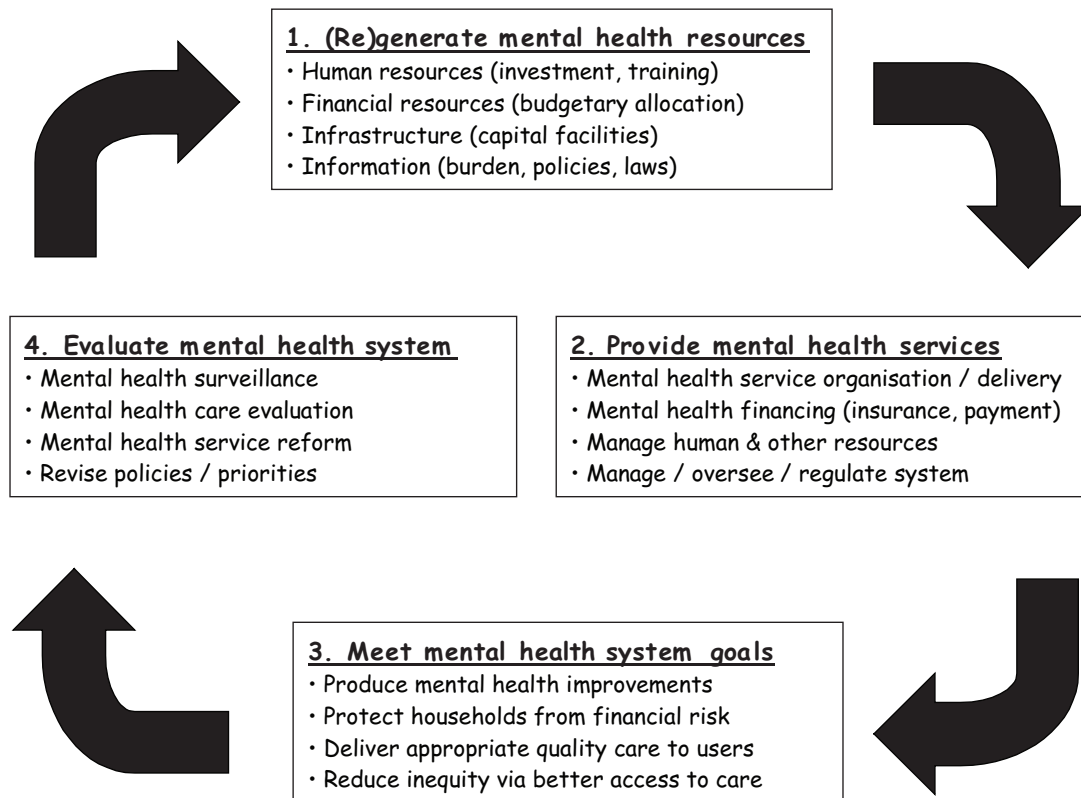
The need for a systems approach to mental health policy and planning is made apparent from a simple illustration: cheap, effective drugs exist for key neuropsychiatric disorders, including tricyclic anti-depressants, conventional neuroleptics and anti-epileptic drugs, which are affordable even to resource-poor countries; the availability and prescription of these drugs to those in need, however, is determined both by the extent to which such drugs have been distributed and by the ability of health care providers to detect and appropriately treat the underlying condition; access to and use of such medication may further be hampered by the private cost of seeking and receiving health care, particularly if it is out-of-pocket; user fees, provider incentives and clinical practice are in turn influenced by the availability of national legislation, regulation and treatment guidelines.

One potentially valuable framework for thinking through the components of a (mental) health system is that recently proposed by the WHO, which outlines a number of goals and functions considered core to any health system (WHO, 2000). While health improvement is unquestionably the primary goal of a health system, two other (social) goals are also proposed: the first is fair financing in health, which seeks to ensure that the financial risks each household faces with respect to health are distributed fairly, that is, according to their ability to pay; and the second has to do with how well the health system responds to the reasonable expectations of the people it seeks to serve, such as ensuring the quality of health facilities and preserving respect for the dignity of the system user. Similar goals have been applied within the context of mental health policy and planning in a number of developed and developing countries, including the pursuit of improved psychological well-being in the population, quality improvements in mental health service provision, and financial (as well as human rights) protection for the mentally ill (WHO, 2004; p.28-29).

Meeting these goals is achieved via a number of key health system functions, including the generation of resources, allocation of those resources via appropriate modes of financing,

the actual provision of services, and overall stewardship (oversight) and evaluation of these various functions (WHO, 2000). Figure 1 below provides an overview of how different strategic activities and functions contribute to the attainment of the mental health system's overall objectives.

**Figure 1 Functions and goals of a mental health system**



Many of these generic health system functions are represented in existing instruments for monitoring mental health service development in countries. However, these indicator schemes are neither comprehensive enough nor sufficiently applicable to resource-poor settings (Saxena et al, 2006). In response to these limitations, WHO has recently developed the WHO Assessment Instrument for Mental Health Systems (WHO-AIMS) (WHO, 2005). Within WHO-AIMS, the mental health system is defined as all the activities whose primary purpose is to promote, restore or maintain mental health. The mental health system includes all organizations and resources focused on improving mental health, and is comprised of six domains, each of which can be mapped onto the generic health system framework above as follows: 1) Policy and legislative framework (RESOURCE GENERATION); 2) Mental health services (PROVISION); 3) Mental health in primary care (PROVISION); 4) Human resources (RESOURCE GENERATION, PROVISION); 5) Public education and links with other sectors (PROVISION); 6) Monitoring and research (EVALUATION). It should nevertheless be acknowledged that WHO-AIMS is primarily focused on process outcomes related to system organization and delivery rather than assessment of improved mental health status in the population. The economic issues underlying the four distinct functions of the (mental) health system are summarized below.

### *Resource generation*

It remains a paradox that although substantial information is now available on the prevalence, course, disability and burden of mental disorders, information on the resources that exist or are needed to respond to this burden is lacking in most countries (WHO, 2001b; p. 6). The alarming scarcity of resources available in developing countries to people with mental health problems, relative to the population-level need for such resources, has been recently highlighted by WHO's ATLAS project (WHO, 2001b, 2005). This project has revealed the chronic shortage of trained mental health personnel and the weakness of mental health policy frameworks in most of the 185 countries surveyed. Commonly cited reasons for this gap between the need for mental health care and its appropriate resourcing are the under-recognition of psychological morbidity, the stigma attached to psychiatric diagnosis or help-seeking behaviours, plus competition for available resources from other public health priorities (WHO, 2003a; p. 27).

A number of responses are required to meet this resource challenge, among them effective awareness campaigns to combat stigma and the under-recognition of psychiatric morbidity. In addition, there is an important economic case to be made in terms of demonstrating that investment of resources into service development is required, worthwhile and sustainable (WHO, 2003b). From the economic viewpoint, therefore, key information needs underlying the resource generation function include:

- descriptive data on existing human resources, capital infrastructure such as numbers of mental health facilities and consumable inputs such as psychoactive drugs;
- specification of the appropriate balance between investment costs (such as training and capital) versus recurrent costs (such as human resources, drugs and infrastructural maintenance); and
- evaluative evidence on the cost-effectiveness of different mental health care strategies.

There is now increasing economic evidence to support the argument for increased investment into mental health service development and consequently improved equality with other conditions. Much remains to be done, however, in terms of identifying best strategies for addressing the human resources gap in mental health care, and the equally problematic issue of releasing for community-based services the resources tied up in outdated psychiatric hospital-based institutions.

### *Financing*

“Financing is the mechanism by which mental health plans and policies are translated into action through the allocation of resources” (WHO, 2003a; p. 8). In this sense, it is a critical driver of the mental health system as a whole, having implications not just for the actual provision of services but also for other key components identified above, including epidemiological need assessment, information systems, training and service evaluation or research.

In general terms, funding for mental health services is low relative to identified needs for services at the population level. 30% of 184 countries recently surveyed as part of the ATLAS project (WHO, 2005) did not have a specified mental health budget (although many of these countries do make financial allocations for mental health care as part of devolved budgets down to state level or as part of primary health care). Of those that do have a specified budget, 20% spend less than 1% of the total health budget on mental health (mostly in Africa and South-East Asia). Only a handful of countries worldwide devote more than 10% of the total health budget to mental health.

All health financing systems, however organized, share three key functions (WHO, 2000):

- revenue collection (i.e. how financial contributions to the mental health system are collected from different sources, and via what mechanism (tax, insurance etc.);
- risk pooling (i.e. how financial contributions are pooled together so that the risk of having to pay for mental health care is not borne by each contributor individually);
- purchasing (i.e. how contributions are used to purchase efficient mental health services).

Concerning revenue collection, there are now good data on the relative contribution of different financing mechanisms towards the cost of mental health care provision, both at the country and regional level (WHO, 2005). While tax-based financing is the most common mechanism, it is of particular note that out-of-pocket expenditure by households is also a commonly used mechanism for purchasing mental health services in certain, mainly low-income, regions of the world. WHO's Mental Health Atlas (WHO, 2005) figures demonstrate that 17.8% of 121 countries reporting on this aspect had out-of-pocket payment as the most common method of financing mental health care. It is widely acknowledged that out-of-pocket payments are a regressive form of health financing (they penalise those least able to afford care) and represent an obvious channel through which impoverishment may occur.

Economics as a discipline has provided a number of important insights into the theory and practice of revenue collection and risk pooling. Examples include the following:

- the potentially 'catastrophic' impact of private, out-of-pocket payments on the income and savings of households with a mentally ill member (e.g. a recent study in Goa, India found that 15% of women with a common mental disorder spent more than 10% of household income on health-related expenditures; Patel et al, 2006); payments are often made to local or indigenous practitioners for consultations or medicaments that have no proven effect.
- the detrimental consequences of competitive (non-compulsory) insurance markets for people with chronic mental health problems, such as restricting benefits or excluding coverage for higher-risk individuals (Frank and McGuire, 1998);
- the advantages of pre-payment mechanisms such as tax-based financing as a mechanism for effective access to (relatively high cost) mental health care (Knapp et al, 2006); and

- the potential financial shortfalls that mental health services undergoing a process of deinstitutionalisation may face, and the consequent need to provide bridge funding and new capital investment while community-based services are being successfully established.

### *Service provision*

Over and above the clinical or public health interventions that are actually provided, key aspects of a mental health service delivery system include how its various programmes, providers and facilities are organized, coordinated and also, in the face of underlying incentives, how they are regulated. There are economic dimensions to all of these aspects of service provision, for example:

- attempts to reconfigure mental health services away from hospital-based to community-based settings - for example, via assertive community treatment - carry important economic implications, as has been demonstrated in a number of countries such as the UK, the US and Italy (Cutler et al, 2003; Knapp et al, 1997; Thornicroft and Tansella, 2004);
- reforms to the (general or mental) health system typically lead to changes in the incentives facing service providers (Chisholm and Stewart, 1998; Knapp et al, 2006); many of these incentives have a direct economic rationale (for instance, separation of the purchasing of services from their actual provision is intended to promote quality as well as efficiency improvements), but need to be carefully monitored in order to prevent more perverse incentives creeping in (such as excluding from health plans mentally ill individuals liable to generate heavy use of resources);
- specification of the respective roles of public, private and non-governmental providers can benefit greatly from a 'mapping' of the mixed economy of mental health care, providing as it does an insight into the inter-connection between each sector's contribution to financing as well as provision (WHO, 2003a, p. 19-26).
- analysis of the economic or resource implications of mental ill-health on other (non-health) agencies, including the costs of providing social care or welfare support, or the costs to education, housing and criminal justice services.

### *Stewardship / oversight*

The last (but not least) of the four core functions identified within the WHO health system framework relates to the overall management or 'stewardship' of the system, namely ensuring that planning, provision and evaluation activities together contribute to the realization of the overall aims or goals of the system. In the present context, it closely relates to the formulation, execution and monitoring of Mental Health Plans, Policies and Programmes (WHO, 2004), which offers a number of steps for thinking through the information needs, priorities and responsibilities of different stakeholders in the mental health system.

Economics is but one of many disciplinary perspectives that contributes to this policy and planning framework, and enters into the process via its contribution to the understanding of other system functions, which include the following:

- the relative merits of national or social insurance over private insurance and out-of-pocket expenditures as equitable mechanisms for safeguarding at-risk populations from the adverse financial consequences of psychiatric disorders;
- the respective roles of public, private, voluntary and informal providers and their interaction;
- the impact of clinical practice guidelines, strategic frameworks and national mental health policies on creating a needs-based, responsive mental health system;
- the costs and cost-effectiveness of different mental health care and prevention strategies, together with an assessment of their feasibility and financial consequences; use of such data is being increasingly used by regulatory bodies charged with reimbursement or other allocation decisions (e.g. Rawlins and Culyer, 2004).

## **2. Measuring the burden of mental disorders: from DALYs to dollars**

### **2.1 Epidemiological burden: disability-adjusted life years (DALYs)**

Psychiatric epidemiology represents a common starting point for many economic analyses of mental health care and policy, whether on the basis of identified socio-economic risk factors for psychiatric morbidity (such as income level / poverty, or employment status), underlying incidence, prevalence and other data for modelling economic burden or intervention cost-effectiveness, or collaborative study design for clinical and economic evaluations. While the ultimate objectives of the two disciplines (health economics and epidemiology) may differ – efficiency concerns on the one hand, aetiology and risk factors on the other – both are essentially pitched at understanding the consequences of disease and its treatment at the level of the population. As such, the two disciplines can be viewed as offering complementary perspectives on mental health planning and evaluation.

A good example of the link between health economics and epidemiology relates to the estimation of national and global disease burden. In particular, the Global Burden of Disease (GBD) study set out to provide a set of internally consistent estimates of incidence, prevalence, duration and case-fatality for 107 conditions and their 483 disabling consequences, which could be used to generate summary measure of population health capable of being linked to resource allocation decisions (Murray and Lopez, 1996).

The main summary measure used in the GBD study was the Disability Adjusted Life Year (DALY). One DALY can be thought of as one lost year of 'healthy' life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability. The disability component of this summary health measure was scored according to the severity of the disease sequela (for example, disability caused by major depression was found to be equivalent to blindness or paraplegia).

Following the incorporation of disability into disease burden estimates, mental disorders ranked as high as cardiovascular and respiratory diseases, and exceeded all cancers combined or HIV (Murray and Lopez, 1996). The GBD study thus revealed the magnitude of the long underestimated impact of mental health problems, thereby posing new opportunities to policy for mental disorders with unmet and growing needs in both developed and developing countries.

In highlighting the proportionate burden of disease attributable to different health conditions and causes of mortality at global and regional population levels, the Global Burden of Disease study represents a fundamental move forward in bridging the gap between mortality and the impact of disability. The results of the GBD study have been extremely influential and have been widely used as a justification for greater investment, not least in psychiatry and related fields as a result of the high burden attributed to these disorders.

DALYs share many of the characteristics (and limitations) of Quality Adjusted Life Years (QALYs). The key distinction between the two measures is that QALYs are an output to be gained (quality of life being a positive outcome domain) while DALYs are an output to be averted through health care interventions. The outstanding feature of both forms of measurement is that they offer a set of parameters and dimensions with which to compare interventions for different conditions, as well as for different interventions for a specific condition under investigation. They also provide an explicit framework within which to assess the relative burden of disease or the relative effectiveness of alternative interventions, in the sense that methodological assumptions are laid bare to see.

However, it is important to be aware of the limitations of the DALY approach and its data sources. For example, some of the basic inputs for epidemiological estimates (such as information on incidence, duration or treatment effect) do not exist for many developing countries, such that estimates for whole sub-regions of the world may be extrapolated from neighbouring regions. Just as importantly, and in common with other disease categories, good-quality descriptive data upon which to assess the degree of disability due to different mental disorders were (and still are) largely lacking. In addition, the inclusion of co-morbidity in the GBD study has been limited; given the high rates of co-morbidity of mental disorders and physical disorders, factoring this phenomena into future calculations of disease burden would constitute a potentially significant improvement. Finally, DALY estimates of the burden of neuropsychiatric disorders take into account neither the potential health consequences on people other than the diagnosed case (such as the burden on family members or caregivers), nor the non-health consequences of disease (such as lost ability to work).

## 2.2 Economic burden: cost-of-illness studies

Disease burden has also been estimated from an economic perspective for many years in the form of so-called ‘cost of illness’ studies, which have attempted to attach monetary values to a variety of societal costs associated with a particular disorder, often expressed as an annual estimate aggregated across all involved agencies.

Such studies have direct parallels with epidemiological estimates of disease burden, in the sense that the principal aim is to influence policy-making and resource allocation by demonstrating the relative magnitude or burden associated with a particular disorder (by multiplying case prevalence by cost per case, put very crudely). The potential advantage of cost of illness studies over DALY-based burden estimates of burden is that they are able to measure in a single metric [money] not only the direct health-related impact of disease (in terms of health care costs etc.) but also other economic consequences such as lost work or leisure time, and family or caregiver burden.

### **Box 1 Cost of illness and psychiatric disorders**

Psychiatric disorders impose a range of costs on individuals, households, employers and society as a whole. A proportion of these costs are financially self-evident, including the varied contributions made by service users, employers and taxpayers/insurers towards the costs of treatment and care, and the productivity losses resulting from work disability and impaired work performance. There are a series of further costs, which although not so readily quantifiable in monetary terms also represent potentially significant economic costs, including informal care inputs by family members and friends, treatment side-effects and mortality.

Where a comprehensive estimate of overall economic burden for depression has been attempted, for example, total estimated costs (1990 price levels) amount to £3.4 billion in the UK, and between \$30-40 billion in the US (Kind and Sorensen, 1993; Rice and Miller, 1995). A common feature of these studies is that the lost productivity costs exceed the direct costs of care and treatment, sometimes by as much as six or seven times.

Cost of illness studies in the area of mental health, neurology and addiction have been focused on a selective range of disorders (in particular schizophrenia, depression, epilepsy and alcohol abuse) in only a handful of countries (see Box 1); as such, they have limited relevance to a more international perspective of the economic burden associated with a broader range of neuropsychiatric conditions in the global population.

Furthermore, there remains an outstanding concern that the reliance on the human capital approach to costing lost productivity leads to an over-estimation of the total cost burden. The human capital approach assumes that when an individual is absent from work there is a corresponding reduction in national productivity. However, lost work time can sometimes be

‘made-up’ when the individual returns and replacement workers can be taken from the pool of unemployed labour to replace those who are absent. In such circumstances the human capital approach will substantially overestimate the cost of lost employment. An alternative approach, the so-called friction-cost method, takes these counterbalancing influences into account by counting only the production lost for the (friction) period over which a replacement worker is found. In an application of this method to Canada, Goeree et al (1999) estimated that the cost of lost productivity resulting from schizophrenia-related mortality was \$1.53 million, as opposed to \$105 million if the human-capital approach had been used (a 70-fold difference!).

Concerning the ‘indirect’ costs of illness, the conventional approach has been to estimate lost labour product (of both waged and non-waged workers) arising from illness or death as a result of being diseased. These lost productivity costs are then usually combined with ‘direct’ health-related costs to create an overall cost of illness to society (again often expressed in relation to gross national product). However, since the lost productive time of homemakers / informal caregivers (which has an economic value if not a paid value) does not in fact contribute to estimates of national product, it is inappropriate to combine this with other cost components which are related to national product. Contrary to prevailing practice, therefore, under no circumstances is it appropriate to combine all direct and indirect economic consequences of disease into an overall estimate and express this value in terms of gross national product.

One further important limitation of the prevailing approach to cost of illness studies, which has particular relevance in developing countries where there is a high proportion of private out-of-pocket spending on health care, is the lack of attention paid to the impact of disease and ill-health on households. At the household level, costs incurred in the acquisition of mental health or welfare services should represent the resources that could have been used for other types of consumption or investment had the disease or illness not occurred. Similarly for lost time and productivity costs, the appropriate method would be to compare the days worked by the sick person and their family compared to what would have happened in the absence of the illness. In the mental health context, however, very few studies have measured the consequences of illness on household productivity, for example in terms of the impact on long term productivity due to reductions in savings or reduced investment in children’s education.

It is important to re-emphasise that cost of illness and burden of disease estimates are not in themselves sufficient as a mechanism for allocating resources or setting priorities for mental health care and prevention; for those decisions, there is a need to ascertain how much of the burden can be avoided, and at what cost (see Section 3). For example, dementia represents a large and growing cause of disability and premature mortality, but as yet the proportion of burden that can be avoided through implementation of health care intervention remains low but costly. Needless to say, such efficiency concerns represent only one set of criteria for health care decision-making, which will also be informed by ethical and other social considerations (see Section 4).

### **3. Reducing the burden of mental disorders: from global to national evaluation**

#### **3.1 WHO framework for cost-effectiveness analysis**

Until recently there has been only a limited connection between DALYs as a measure of the burden of disease and their use as an outcome measure in cost-effectiveness analysis, even though such a link is needed to inform priority-setting. The key advantage to employing a summary measure of population health such as the DALY in cost-effectiveness analysis is that it not only enables comparisons to be drawn between interventions for different diseases or their attendant risk factors, but also directly addresses the highly policy-relevant question of avoidable burden. A critical reason for the absence of such a link has been that the lack of a sufficient framework for undertaking population-wide consideration of costs and effects across the health sector.

Through its CHOICE work programme (**CHO**osing **I**nterventions that are **C**ost-**E**ffective), WHO has recently developed a form of cost-effectiveness analysis that provides policy-makers with a set of results that aim to be generalisable across settings (Tan Torres et al, 2003). It does this by evaluating the costs and effectiveness of new and existing interventions compared to the starting point of doing none of the current interventions, which effectively eliminates differences in starting points (e.g. 'usual care' in North America versus South Asia may not be the same at all); this had made the results of earlier studies difficult to transfer across settings. Cost-effectiveness results can be used to define three broad sets of interventions – those which improve population health a great deal for a given set of resources; those which are not efficient ways to improve health; and those which are in between. This information enters the policy debate to be weighed against the impact of different intervention mixes on other objectives such as reducing health inequalities and responding to the legitimate expectations of populations (see Section 4).

The application of WHO-CHOICE in a systematic and standardized manner involves a number of key analytical steps that touch upon a diverse yet inter-related set of disciplinary areas, including demography, epidemiology, clinical effectiveness, cost analysis and health economics. Methods for undertaking this form of economic analysis are described in detail elsewhere (Tan Torres et al, 2003), so only the key principles and procedures are highlighted here (see Box 2).

**Box 2 Analytical steps of generalized cost-effectiveness analysis (WHO-CHOICE)**

**Step 1: Construct a profile of observed epidemiology.** WHO-CHOICE pursues a population-based, epidemiological approach to CEA. Accordingly, for the disorder and population in question, the first analytical step is to generate a profile or model of the prevailing epidemiological situation. The standard reference point for such a profile is the latest version of the Global Burden of Disease study (GBD 2000), which provides empirically-based but internally consistent estimates of the incidence, prevalence, remission and case-fatality for all leading causes of disease burden globally.

**Step 2: Construct natural history models.** A particular feature of WHO-CHOICE is its use of no treatment as a starting point for comparing the relative costs and consequences of different health interventions. For psychiatric conditions, natural history models can often be used. For some mental disorders and in certain regions of the world, it should be noted that at a population-wide level the current situation is in fact a very good approximation of the no treatment scenario (because so little intervention is taking place).

**Step 3: Calculate population-level intervention effectiveness.** Intervention effectiveness is determined via a so-called 'state transition model', in which members of a population move or transit through different possible states (such as being ill, healthy or deceased). Key transition rates are the incidence of the disorder in the population, case-fatality and remission. In addition, a disability weight is specified for time spent in different states of (ill-)health. Two situations are modeled, one representing the natural history of disease (no interventions in operation), the other reflecting the population-level impact of an intervention (such as reduced illness duration resulting from use of an antidepressant drug). The difference between these two simulations represents the health gain due to the implementation of the intervention.

**Step 4: Construct resource utilization and cost profile(s) for each intervention.** An 'ingredients' approach to the costing of health interventions is used, which requires separate estimation of the quantity of resource inputs needed (such as numbers of health personnel) and the price or unit cost of those resource inputs (such as the salary of a health professional). Patient-level resource quantities include hospital inpatient days, outpatient visits, medications and laboratory tests. In addition, programme costs are computed, including central planning, policy and administration functions, as well as resources devoted to training health providers. Costs are expressed in international dollars (I\$), which adjust for differences in the relative price of health-related resources across countries and thereby facilitate comparison across regions.

**Step 5: Cost-effectiveness analysis (including uncertainty).** Summary results for population-level costs, effectiveness and cost-effectiveness include the comparative efficiency of specified interventions, expressed as average and incremental cost-effectiveness ratios (CERs) of I\$ per DALY saved.

### 3.2 Global evaluation of the cost-effectiveness of interventions

Although the methods of WHO-CHOICE and other forms of sector-wide cost-effectiveness analysis are well suited to the comparative assessment of a wide range of potential strategies for improving mental health, its actual application is constrained by the availability of evidence and information supporting these different interventions. Thus, while there is increasing interest in and agreement on the vital importance of mental health prevention and promotion in the public health agendas of many countries, evidence of effectiveness for key interventions remains relatively sparse and weak. Likewise, many people with mental health problems in developing regions of the world consult with indigenous practitioners, but there is very limited evidence to indicate what is the expected size of effect that such consultations have on health outcome. To date, therefore, economic analysis of strategies for improving the mental health of populations has largely focused on reducing the burden of psychiatric disorders via evidence-based pharmacological or psychosocial treatment.

Economic evaluation has yet to be extensively applied to health promotion, although a number of texts have appeared which discuss key challenges around its potential deployment, such as the limitations of experimental study design, the complex and long-term nature of anticipated programme benefits and the shortage of sensitive or suitable outcome measures (Godfrey, 2001; Hale, 2000). As the evidence base in mental health prevention and promotion expands (WHO, 2001; Petticrew et al, 2006), so the opportunities to conduct economic evaluation of these modes of intervention will increase. Table 2 identifies some of the key domains of cost and outcome that would typically need to be considered when undertaking economic analysis of mental health promotion.

**Table 2 Cost outcome domains for the economic analysis of mental health promotion**

	<b>Level 1: Individuals</b> (e.g. school children or workers)	<b>Level 2: Groups</b> (e.g. households or communities)	<b>Level 3: Population</b> (e.g. regions or countries)
<b>Resource inputs</b>	Health-seeking time Health and social care Lifestyle changes (e.g. exercise)	Programme implementation Household support	Policy development and implementation
<b>Process indicators</b>	Change in attitudes or behaviour	Change in attitudes or behaviour	Change in attitudes or behaviour
<b>Health outcomes</b>	Functioning and quality of life Mortality (e.g. suicide)	Family burden Violence	Summary measures (e.g. DALYs)
<b>Social and economic benefits</b>	Self-esteem Workforce participation	Social capital / cohesion Reduced unemployment	Social inclusion Productivity gains Reduced health care costs

In addition to the availability of data on intervention costs and effects, public health burden and importance constituted a further criteria that has guided the choice of psychiatric disorders to which WHO-CHOICE has been applied to date. In this respect, schizophrenia, bipolar affective disorder, depression and obsessive-compulsive disorder all appear in the ten leading causes of disability world-wide (WHO, 2001a). For each of these burdensome conditions, a set of personal interventions covering key pharmacological and psychosocial treatments was identified and reviewed (Table 3; see also Hyman et al, 2006); international evidence for the effectiveness of specific health care interventions was sufficiently robust for all of the above conditions except obsessive-compulsive disorder (as a result of which, panic disorder was selected as the index condition covering anxiety disorders). In addition, WHO-CHOICE analysis has been carried out for epilepsy, a leading contributor to neurological burden of disease, and alcohol use.

**Table 3 Interventions for reducing psychiatric disorders in developing countries**

Disorder	Intervention
<p><b>Schizophrenia</b>  <u>Treatment setting</u>: hospital outpatient  <u>Treatment coverage</u> (target): 80%</p>	<ul style="list-style-type: none"> <li>• Older (neuroleptic) antipsychotic drug</li> <li>• Newer ('atypical') antipsychotic drug</li> <li>• Older antipsychotic drug + psychosocial treatment</li> <li>• Newer antipsychotic drug + psychosocial treatment</li> </ul>
<p><b>Bipolar affective disorder</b>  <u>Treatment setting</u>: hospital outpatient  <u>Treatment coverage</u> (target): 50%</p>	<ul style="list-style-type: none"> <li>• Older mood stabiliser drug</li> <li>• Newer mood stabiliser drug</li> <li>• Older mood stabiliser drug + psychosocial treatment</li> <li>• Newer mood stabiliser drug + psychosocial treatment</li> </ul>
<p><b>Depression</b>  <u>Treatment setting</u>: primary health care  <u>Treatment coverage</u> (target): 50%</p>	<p><u>Episodic treatment</u></p> <ul style="list-style-type: none"> <li>• Older (tricyclic) antidepressant drug (TCA)</li> <li>• Newer antidepressant drug (SSRI; generic)</li> <li>• Psychosocial treatment</li> <li>• Older antidepressant drug + psychosocial treatment</li> <li>• Newer antidepressant drug + psychosocial treatment</li> </ul> <p><u>Maintenance treatment</u></p> <ul style="list-style-type: none"> <li>• Older antidepressant drug + psychosocial treatment</li> <li>• Newer antidepressant drug + psychosocial treatment</li> </ul>
<p><b>Panic disorder</b>  <u>Treatment setting</u>: primary health care  <u>Treatment coverage</u> (target): 50%</p>	<ul style="list-style-type: none"> <li>• Benzodiazepines</li> <li>• Older (tricyclic) antidepressant drug (TCA)</li> <li>• Newer antidepressant drug (SSRI; generic)</li> <li>• Psychosocial treatment</li> <li>• Older antidepressant drug + psychosocial treatment</li> <li>• Newer antidepressant drug + psychosocial treatment</li> </ul>

Estimation methods, baseline results and uncertainty analysis for individual diseases or their risk factors are reported in detail elsewhere, either by WHO epidemiological sub-region (Chisholm, 2005a; Chisholm et al, 2004a, 2004b, 2005) or by World Bank region (Chisholm, 2005b; Hyman et al, 2006; Rehm et al, 2006). Below, key findings for four psychiatric disorders (by World Bank region) are briefly discussed in order to illustrate the salient messages from such a global analysis.

### *Population-level effectiveness of interventions*

Even at a treatment coverage rate of 80% (i.e. four out of every five cases), the effect of pharmacological treatments for schizophrenia - whether with older neuroleptics or newer antipsychotic drugs - is modest (150-250 healthy years gained annually per one million population), reflecting the fact that interventions do not reduce the incidence or duration of the disease so much as making a difference to the day-to-day functioning of treated patients (approximately a 25% improvement over no treatment when treated with antipsychotic drugs alone, or closer to 45% when given adjuvant psychosocial treatment in addition; Mojtabai et al, 1998; Leucht et al, 1999). However, it needs to be emphasized that the full consequences of this often-catastrophic disease (on family life, social status and the ability to be productive) are not adequately captured by DALYs.

The addition of monthly sessions of individual-based psychosocial treatment to pharmacotherapy is projected to have a more pronounced benefit than switching from older to newer antipsychotic drugs (Appendix 1). Such a trend is also apparent for bipolar affective disorder, but with the added projection that due to its established impact on reducing suicide, lithium is expected to generate more population-level health gain than newer mood stabilisers such as valproate (Chisholm et al, 2005).

At a target coverage rate of 50%, healthy years of life gained annually from the treatment of bipolar disorder and panic disorder are both in the range 150-400 per one million population, whereas episodic treatment of depression with antidepressants and/or psychotherapy generate much larger gains (600-1,200), in large part due to the higher prevalence of this disorder in the population. Proactive, maintenance depression treatment has higher returns still (1,200-1,900 healthy years of life gained per year per one million population) because in this scenario a significant proportion of recurrent depressive episodes would be prevented (Chisholm et al, 2004a).

### *Intervention costs*

Results are presented both in US dollars and International dollars (I\$) for the year 2000. An international dollar has the same purchasing power as the U.S. dollar has in the United States; as such, it is a hypothetical currency that is used as a means of translating and comparing costs from one country to the other using a common reference point, the US dollar.

The annual cost per capita of community-based outpatient treatment of schizophrenia and bipolar disorder with older antipsychotic or mood stabilizing drugs ranged from international dollars (I\$) 0.80-1.10 (US\$ 0.40-0.50) in Sub-Saharan Africa and South Asia to I\$ 3 (US\$ 1.80) in the Latin America and Caribbean and Europe and Central Asia regions. The cost per capita for newer (atypical) antipsychotic drugs still under patent is much higher (I\$ 3-7, or US\$ 2.60-5.10). By contrast, some of the newer antidepressant drugs (SSRIs) are now off patent and accordingly their use was valued at their generic, non-branded price. The patient-level cost of treating a six-month episode of depression ranged from as little as I\$ 50 (older antidepressants in Sub-Saharan Africa or South Asia) to I\$ 150-200 (newer antidepressants

in combination with brief psychotherapy in Latin America and Caribbean and Europe and Central Asia).

### ***Cost-effectiveness of interventions***

Compared to the situation of no treatment (natural history), the most cost-effective strategy for averting the burden of psychosis and severe affective disorders is expected to be a combined intervention of first generation antipsychotic or mood stabilizing drugs with adjuvant psychosocial treatment delivered via a community-based outpatient service model, with a cost-effectiveness ratio in the region of I\$ 3,000 (US\$ 1,600-1,800) in Sub-Saharan Africa and South Asia, rising to I\$ 8,000-10,000 (US\$ 3,500-5,000) in middle-income regions (Appendix 2). Currently, the high acquisition price of second-generation antipsychotic drugs makes their use in most developing regions inadvisable on efficiency grounds alone, although this situation can be expected to change as these drugs come off patent and generic versions become widely available. By contrast, evidence indicates that the modest additional cost of adjuvant psychosocial treatment reaps significant health gains, thereby making such a combined strategy for schizophrenia and bipolar disorder treatment more cost-effective than pharmacotherapy alone.

For more common mental disorders treated in primary care settings (depressive and anxiety disorders), the single most cost-effective strategy is the scaled-up use of older antidepressants, due to their lower cost but similar efficacy to newer antidepressants. However, as the price margin between older and generic newer antidepressants continues to diminish, generic SSRIs can be expected to be at least as cost-effective and may therefore constitute the treatment of choice in the future. Since depression is so commonly a recurring condition, there are also good grounds for thinking that proactive care management, including long-term maintenance treatment with antidepressant drugs, represents a cost-effective (if more resource-intensive) way of significantly reducing the enormous burden of depression that exists in developing regions of the world.

### ***Affordability of interventions***

Having identified the expected cost of recovering a healthy year of life with a range of mental health care strategies, an important subsequent question relates to the affordability of these interventions in different contexts, both in absolute terms - society may well be unprepared to allocate large sums of money for one year of full health gained by an intervention - and also in relative terms (i.e. what is the cost-effectiveness of mental health care compared to interventions for other diseases?). In countries which have established thresholds for what constitutes an acceptable level of cost in order to obtain a healthy year of life (such as the US or UK), the amount is in the order of \$50,000. This value lies somewhere between one and three times average per capita income in these high-income countries, but in low-income countries this absolute value of \$50,000 might be ten or more times the average income per capita. Accordingly, WHO-CHOICE follows the criteria of the Commission for Macroeconomics and Health (2001), which suggested that a health intervention capable of generating

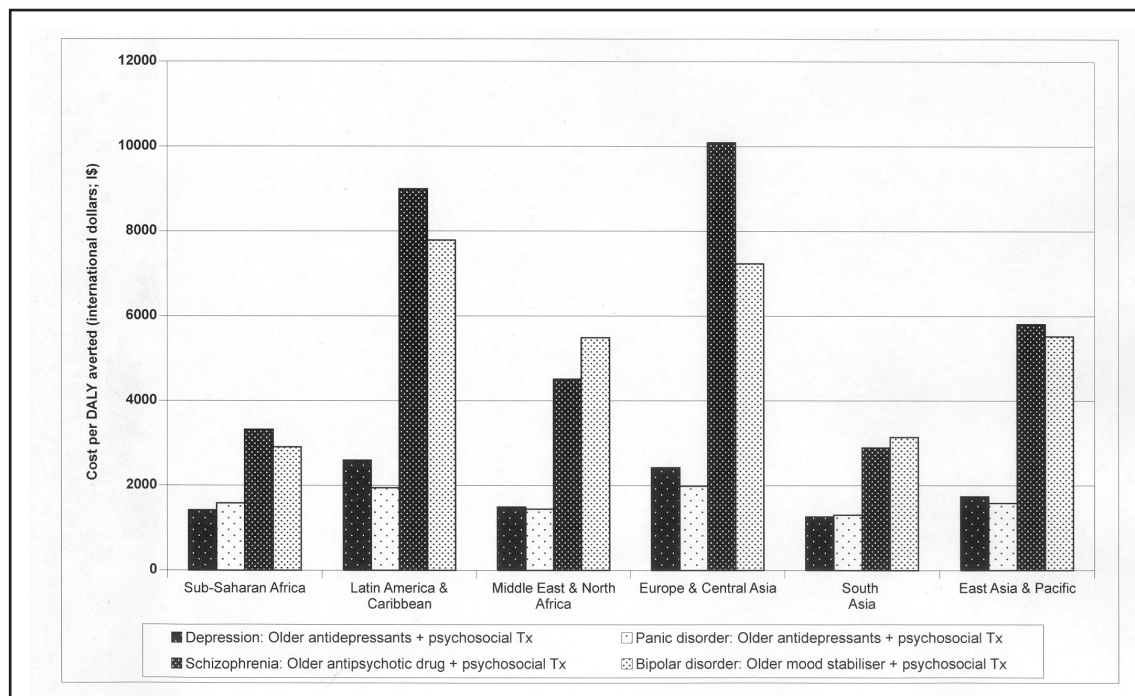
one year of healthy life at a cost that is below average per capita income should be considered a very cost-effective use of resources, while one that costs less than three times per capita income should still be considered moderately cost-effective (interventions above three times per capita income are deemed not cost-effective). Using these thresholds, the results of this analysis indicate that:

- The most efficient interventions for common mental disorders (depression and panic disorder) can be considered very cost-effective (each DALY averted costs less than one year of average per capita income);
- Community-based interventions for more severe mental disorders using older antipsychotic and mood stabilizer drugs meet the criterion for being cost-effective (each DALY averted costs less than three times average income per capita); and
- Use of atypical anti-psychotics at current international prices - particularly when delivered in hospital-based settings - are not a cost-effective use of scarce resources (each DALY averted costs [considerably] more than three times GDP per capita).

### *Packages of care*

The considerable difference in cost-effectiveness between common and more severe mental disorders, as well as between low- and middle-income regions of the world, is clearly shown in Figure 2, which illustrates the ratios of cost to effect for a selective package of mental health interventions (one efficient treatment per disorder).

**Figure 2 Cost-effectiveness ratios for a basic mental health package in low and middle-income regions of the world**



Results for this baseline package indicate that, across six low- and middle-income regions, the potential total health gain emanating from such a combination of intervention strategies is in the order of 2,000-3,000 DALYs averted per one million total population, which could be achieved at an estimated cost of I\$ 5-6 (US\$3-4) per capita in low-income settings such as Sub-Saharan Africa and South Asia, and up to I\$ 13 (US\$ 9) in more middle-income regions such as Latin America and the Caribbean. Two-thirds of the total costs of this package, but only about one third of the health gains are attributable to the more severe psychiatric conditions (schizophrenia and bipolar disorder). Approximately 225-450 healthy years of life can be gained for every investment of one million international dollars.

Numerous other specifications are of course possible, including estimation of the costs and effects of a package that makes use of newer psychotropic drugs, or does not include any psychosocial treatment. Such comparisons reveal, for example, that substituting older with newer psychotropic drugs for the baseline package described above is anticipated to increase costs by 100-200% (an extra cost of I\$ 4-7 per capita), while health gains would only increase by 23-32%.

These findings therefore provide new information to health policy-makers regarding the relative value of investing in the treatment of these disorders, and in so doing may help to remove one of many barriers to a more appropriate public health response to the burden of these conditions.

There are nevertheless a number of important limitations associated with such an analytical approach, including: the aggregated unit of analysis (which can be addressed by undertaking analysis at the national level, see below); the extrapolation of data on the efficacy of interventions (a particular concern for psychosocial treatments that may be influenced by sociocultural factors); and the inadequate handling of comorbidity (which is more the rule than the exception in some disorders, and which may have an adverse impact on the cost-effectiveness of interventions because of worse health outcomes and/or higher consumption of health care resources).

### **3.3 National evaluation of the cost-effectiveness of interventions**

#### *Country-level contextualisation process*

The existence of cost-effectiveness information at the highly aggregate level of WHO or World Bank regions is no guarantee that findings and recommendations will actually change mental health policy or practice at the national level (where policies are determined and resources actually allocated). Accordingly, there is a clear need to attempt a contextualisation of regional estimates down to this level, since many factors may alter the actual cost-effectiveness of a given intervention across settings, including the underlying epidemiology of disorders; the potential level of effective coverage in the population; the availability, mix and quality of inputs, especially personnel, drugs and consumables; and local prices, especially labour costs.

- Contextualization of intervention effectiveness: The population-level impact of different interventions at a regional level has been measured in terms of DALYs averted per year. Key input parameters underlying this summary measure of population health under natural history conditions include the population’s demographic size and structure, epidemiological rates (incidence, prevalence, remission and case fatality) and the value of time spent in different health states (such as being acutely psychotic, relative to full health). All of these parameters are subject to revision and remodelling at the national level (see case study below). The specific impact of an intervention is gauged by a change to one or more of these epidemiological rates, and is a function of the efficacy of an intervention, adjusted by its coverage in the population and, where applicable, rates of adherence by its recipients. Data on these effectiveness parameters can be obtained at the local level, based on reviews of evidence and population surveys (if available) or expert opinion.
- Contextualization of intervention costs: Intervention costs at the regional level of analysis have been expressed in international dollars (I\$). This captures differences in purchasing power between different countries and allows for a degree of comparison across regions that would be inappropriate using official exchange rates. For country-level analysis, costs would be more appropriately expressed in local currency units, which can be loosely approximated by dividing existing cost estimates by the appropriate purchasing power parity exchange rate, or estimated more accurately by substituting new unit prices for all specified resource inputs (e.g. the price of a drug or the unit cost of an outpatient attendance). In addition, the quantities of resources consumed can easily be modified in line with country experiences (reflecting, for example, differences in average length of stay in hospital).

The output of such a contextualisation exercise is a revised, country-specific set of average and incremental cost-effectiveness ratios for interventions addressing leading contributors to national disease burden. As shown below in Table 4, such a process of contextualisation for neuropsychiatric conditions has now been carried out in a number of countries.

**Table 4 WHO-CHOICE contextualisation studies for neuropsychiatric conditions**

Country (WHO region)	Chile Americas	Estonia Europe	Mexico Americas	Nigeria Africa	Spain Europe	Sri Lanka South- East Asia	Thailand South- East Asia
Diseases							
Schizophrenia	✓	✓	✓	✓	✓	✓	
Bipolar disorder						✓	
Depression	✓	✓	✓	✓	✓	✓	
Epilepsy				✓			
Risk factors							
Alcohol use	✓	✓	✓	✓			✓

*Case study: Defining a mental health care package in Nigeria*

Despite the existence of a national mental health strategy in Nigeria and the well-documented prevalence of mental, neurological and substance abuse disorders in the country (e.g. Gureje et al, 1995; WHO World Mental Health Survey Consortium, 2004), resources currently allocated to meet the needs of persons with these disorders are extremely meagre (considerably less than 1% of the total health budget, itself no more than 3% of Gross Domestic Product). Recent estimates prepared for the WHO's ATLAS project (WHO, 2005), for example, reveal that there are only 4 psychiatric beds, 4 psychiatric nurses and 0.1 psychiatrists per 100,000 population.

In the context of prevailing resource scarcity, but with the intention of stimulating mental health policy dialogue, investment and service development in Nigeria, a small research project conducted by the Department of Psychiatry at the University of Ibadan set out to estimate the expected costs and effects of an intervention package capable of reducing the current burden associated with priority neuropsychiatric problems (Gureje et al, 2006). Based on local clinical experience and health facility admissions / service utilization data, as well as epidemiological data on the prevalence and associated disability of different neuropsychiatric disorders in Nigeria (Gureje, 2002; WHO World Mental Health Survey Consortium, 2004), four priority conditions were identified (schizophrenia, depression, epilepsy and alcohol abuse). For each of these conditions, a process of contextualisation was carried out as described above:

- **Demography:** Regional population data (including births and deaths) were substituted with national data for Nigeria (total population, 115 million);
- **Epidemiology:** Current disease burden figures for schizophrenia, depressive episode, epilepsy and heavy alcohol use - based on WHO's Global Burden of Disease 2000 study for African sub-region AFR-D - were reviewed and, where supported by good-quality local data, revised. Since no recent population-wide survey data was available for schizophrenia, and given the relatively stable estimates found for this particular condition from other African studies, no revision was made to default regional values. For depression and heavy alcohol use, however, up-to-date data available from representative sample surveys in the Nigerian population (WHO World Mental Health Survey Consortium, 2004) were used to revise prevalence estimates.
- **Effectiveness:** International data sources used to estimate intervention effects in regions were reviewed and altered to better reflect local evidence or expectations. For example, parameters underlying the anticipated impact of increased taxes on alcoholic beverages - including the distribution of different beverage types, the current rate of taxation on these beverages and the prevailing level of untaxed production - were tailored to the Nigerian context. In addition, planned rates of psychiatric treatment coverage in the population were reduced to more realistic, attainable levels.
- **Resource use and costs:** For each disorder included in the analysis, country-specific values concerning the frequency and intensity of health care uptake were used (e.g. 50%

of acutely psychotic patients are expected to be admitted to a psychiatric hospital ward, with an average length of stay of 21 days). Estimates were based on local expert opinion, including a Delphi consensus panel survey of 24 mental health professionals working in different parts of the country. Predicted unit costs in local currency units for primary and secondary care services (Adam et al, 2003) were validated against local hospital data, while other default resource inputs such as salaries of health professionals, psychotropic drugs and laboratory tests were substituted with their corresponding local values.

Table 5 provides summary results for an intervention package consisting of: community-based outpatient care for schizophrenia patients with older anti-psychotic drugs and psychosocial care (6-8 sessions of individual-based treatment 30-50% of cases, depending on severity); primary care treatment of depression and epilepsy with older (tricyclic) anti-depressants and anti-epileptic drugs, respectively; and roadside alcohol breath-testing of drivers. Each of these interventions was the most efficient strategy out of all those considered for the particular condition.

Schizophrenia has the highest cost per treated case (9,200 Naira per year, or US \$ 88 at the official exchange rate for 2000) but depression absorbs the highest proportion of total costs (more than half) owing to its considerably greater prevalence in the population (Naira 4,200 million per year, equivalent to US \$ 41.2 million). Highest returns in terms of health outcome and cost per unit of outcome are for epilepsy treatment and roadside breath-testing (over 100,000 DALYs averted per year, each at a cost of 9,000-11,000 Naira [US \$ 100 or less]). The annual cost of the package amounts to more than 9 billion Naira (US \$ 88 million), equivalent to 81 Naira (US\$ 0.77) per capita.

**Table 5 Costs and effects of an intervention package in Nigeria**

Condition	Intervention	Coverage	Effectiveness (DALYs averted)	Total cost per year (millions)	Cost per treated case per year	Cost per DALY averted
Schizophrenia	Older anti-psychotic drug + psychosocial treatment (community-based model)	70%	26,980	Naira 1,811	9,215	67,113
				USD 17.2	88	639
Depression	Older (tricyclic) anti-depressant drug in primary care	40%	69,608	Naira 5,367	4,680	77,109
				USD 51.1	45	734
Epilepsy	Older anti-epileptic drug in primary care	50%	105,946	Naira 1,113	2,868	10,507
				USD 10.6	27	100
Hazardous alcohol use	Roadside breath-testing of motor vehicle drivers	80%	109,490	Naira 972	-	8,873
				USD 9.3	-	85
<b>Total package</b>			<b>312,024</b>	Naira 9,263	<b>Cost per capita</b> 81	<b>29,686</b>
				USD 88	0.77	283

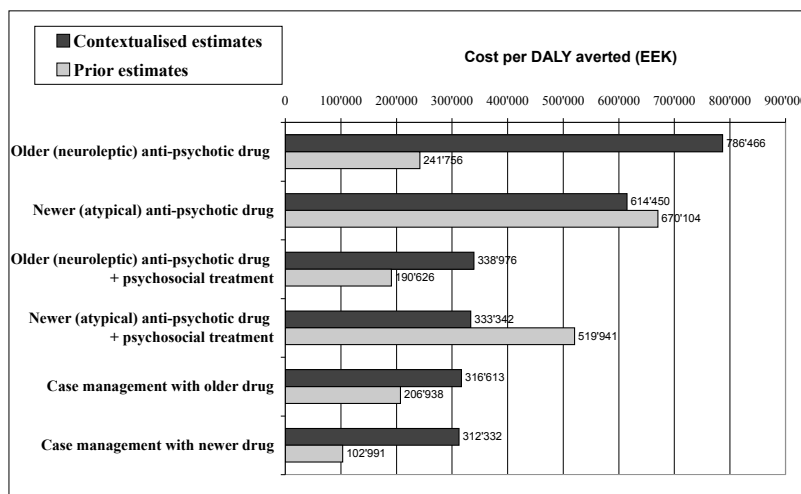
#### *Implications of national-level cost-effectiveness analysis for research and policy*

A key assumption underlying the contextualisation of regional WHO-CHOICE results down to the level of individual countries is that changes in the values of key input parameters - such as the price of psychotropic drugs, the cost of an outpatient visit or the expected efficacy of

treatment - may result in differences in the absolute and also relative cost-effectiveness of interventions. In other words, re-running the analysis with a revised set of (locally-derived) values may not only increase / decrease the absolute cost of gaining one extra year of healthy life, but also alter the actual ordering of interventions (for example, an intervention expected to represent best value for money at the regional level may not be considered to be so following a national-level analysis). Using the national-level results currently available for the three most commonly included health conditions - schizophrenia, depression and hazardous alcohol use - it is possible to directly address this question (see Appendix 3 for a comparison of cost-effectiveness results before and after contextualisation), and in turn comment on the usefulness and implications of contextualised CEA for health policy.

- Schizophrenia:** Regional analysis indicated that the most cost-effective strategy would be first generation antipsychotic or mood-stabilising drugs with adjuvant psychosocial treatment delivered via a community-based outpatient service model. Use of atypical anti-psychotic drugs was expected to be very much more costly but only marginally more effective, making their use a cost-ineffective choice (more than three times average national income). Completed national-level studies in Nigeria, Sri Lanka and Estonia focussed on a similar set of community-based pharmacological interventions, and in all cases the rank order of cost-effectiveness differed to regional results. In the lower-income settings of Nigeria and Sri Lanka, newer anti-psychotic drugs ranked worse than older neuroleptic drugs - particularly in Nigeria, where the extra cost is astronomical - but in Estonia ranked better (due to only a small difference in drug price but a high differential in drug adherence). Combined pharmacological-psychosocial strategies, which had almost identical cost-effective ratios to case management strategies, were preferred choices to stand-alone drug treatment in Estonia and Nigeria, but not in Sri Lanka. In absolute terms, the cost of each averted DALY was higher than prior regional estimates in Nigeria, but lower in Sri Lanka. In Estonia, differences between contextualised versus prior estimates were determined by expected versus actual prices of anti-psychotic drugs. As shown in Figure 3, interventions using older drugs were higher than expected, whereas interventions using the newer (atypical) anti-psychotic drugs had a considerably lower cost-effectiveness than expected.

**Figure 3 Cost-effectiveness of schizophrenia interventions in Estonia: prior versus contextualised estimates (EEK = Estonian Kroon; 1 US Dollar = 13 EEK)**



- Depression:** The most cost-effective strategy found at the regional level was episodic treatment with older (tricyclic) antidepressants in primary care; a more proactive care approach was expected to generate greatest health gain but was less cost-effective. In the three countries for which results are already available, pharmacological treatment with TCAs remained most cost-effective in Nigeria, but not in Sri Lanka and Estonia, where the negligible price differences between generic SSRIs and TCAs means that the superior adherence profile modelled for newer anti-depressants makes them the drug of choice. Across the three countries, costs and cost-effectiveness were generally higher than prior estimates, due in large part to higher salaries and the higher acquisition prices of anti-depressant drugs found locally (the lowest international supplier price, adjusted for shipping and distribution, had been used in the regional analysis).
- Hazardous alcohol use:** Regional analysis of alcohol control strategies had concluded that the cost-effectiveness of interventions was closely related to the rate of heavy drinking, such that in regions with a prevalence in the total population of more than 5%, population-level interventions including taxation and comprehensive advertising bans were expected to be the most efficient response to the burden of hazardous alcohol use, while in regions with lower rates more targeted interventions such as breath-testing motor vehicle drivers and brief advice for heavy drinkers were expected to be most cost-effective. This was found to be the case in Estonia, where intervention cost-effectiveness closely reflected results for the (high-prevalence) WHO sub-region in which it sits. However, rates of hazardous alcohol use in Thailand - and to a lesser extent Nigeria - do not correspond well to their respective regions (for example, the WHO sub-region in which Thailand sits is dominated by the Muslim, low-drinking population of Indonesia), and this resulted in large discrepancies between prior and contextualised estimates. For example, taxation and other population-level intervention strategies were found to be absolutely and also relatively more cost-effective in the Thai context than the results from the regional analysis (in which brief interventions and roadside breath-testing were ranked most cost-effective).

In summary, country-level application of WHO-CHOICE has shown that while overall policy messages tend to match those derived from regional analysis, country-region differences with respect to disease prevalence, prices (particularly drugs) and treatment effectiveness can lead to substantial changes in the absolute cost and cost-effectiveness of mental health care strategies.



## **4. Priority-setting and resource allocation for mental health system development**

### **4.1 Decision-making criteria for resource planning and allocation in health**

Determination of the most cost-effective interventions for a set of diseases or risk factors, while highly informative in its own right, is not the end of the process. Rather, it represents a key input into the broader task of priority-setting. For this task, the purpose is to go beyond efficiency concerns only. Other criteria against which cost-effectiveness arguments need to be considered include the relative severity of different diseases, the potential for reducing impoverishment and protection of human rights. Thus, priority-setting necessarily implies a degree of trading-off between different objectives of the mental health system, such that the most equitable allocation of resources may not in fact be the most efficient allocation.

Within the mental health system, schizophrenia treatment is an obvious example where on pure efficiency grounds alone it would be overlooked in favour of cheaper and more cost-effective care and prevention strategies for more common mental disorders, but this disorder is typically included as a priority condition - as in the Nigerian package, for example - because of the severity of the condition (and consequent vulnerability of effected persons to poverty and human rights violations), its frequently disastrous effect on the welfare and/or income of families, the modest but still valuable impact of treatment on individual-level symptoms and functioning, and the potential impact on the human rights situation of the person with this disorder.

Ultimately, the end allocation of resources arising from a priority-setting exercise, using a combination of qualitative or quantitative methods, will reflect the particular socio-cultural setting in which it is carried out and the preferences of its populace and/or its representatives in government. Methods are now available for eliciting these preferences or values - including quantitative approaches such as discrete choice experiments (Baltussen et al, 2006) and more qualitative approaches such as Delphi consensus techniques or focus groups (Kapiriri et al, 2004) - which can be employed in order to lay firmer foundations for the decisions made at national or local level (see next section). To date, however, mental health resource allocation decisions at the national level have not been determined so much by a context-specific value base, as by current spending patterns, historical precedent, advocacy movements, and, at the international level, by ideological trends in the theory and practice of public health.

Cost-effectiveness or efficiency represents one such trend in public health that has grown substantially over the last couple of decades, initially in the context of industrialized countries facing ever tighter budget constraints in the face of creeping inflation within the health sector, and subsequently propagated by the World Bank and other international organizations working within the developing world as a means of maximizing the use of very limited resources for health.

A landmark publication in this respect was the World Development Report in 1993, which ranked a number of core health care interventions according to their cost-effectiveness and used the results to propose a minimum package of services for use in low- and middle-in-

come countries (World Bank, 1993). Selecting such a minimum package on this basis importantly presumes that in a sequential ordering of possible competing criteria, considerations of efficiency should come first (at the expense of criteria dealing with equity, for instance). Viewed from a perspective in which economic reforms and the burden of debt repayments on poor country health budgets heads the political agenda, this might indeed be an appropriate first step.

Critics of this approach, however, have pointed out some of the shortcomings of this approach, including the limitations of summary measures of population health such as the DALY to pick up the full spectrum of health benefits that may flow from interventions and its failure to take into account the fair distribution of these health benefits across different socioeconomic groups in society (i.e. interventions which best address those in greatest need may not be given precedence over those that generate most health gain).

When determining what will be financed from a given amount of resources, therefore, the overall objective should be to ensure that health interventions maximize the benefits to society, while also accounting for the distribution of these benefits plus other equity considerations, which revolve around the ideas that each person must be given their due and equals must be treated as equals.

Discussions about justice or equity at a policy level have typically concentrated on the distribution or redistribution of (scarce) resources, which in the context of mental health is typically determined by need and expressed in terms of equal access to or utilization of services (horizontal equity). However, the horizontal equity criterion gives little guidance on how to define priorities when different population groups exhibit different needs, and thus is less useful in comparing health interventions for different illnesses. Thus horizontal equity is complemented by vertical equity considerations (literally, unequal treatment for unequal need), which can aid decisions on how to deal with the needs of different population groups, such as those with more severe mental disorders or the most socio-economically disadvantaged sections of society (James et al, 2004).

The justification for giving greater preference to interventions that target severe health conditions like schizophrenia or bipolar affective disorder, even if they are not as cost-effective as other interventions, can be made by suggesting that an improvement in health from a severe health condition is valued more highly (by individuals or by society) than the same size improvement in health for a less severe condition. Indeed, empirical findings have shown that people seem to tolerate lower levels of cost-efficiency for those interventions for individuals with a higher burden of illness (Nord et al, 1999). Concerning the poor, horizontal equity implies that they should have no worse access to care than anyone else, but in many countries there is in fact a deliberate policy to not treat them as others, that is, to give preference to interventions that may particularly benefit this disadvantaged group (where 'disadvantaged' is couched in terms of wealth rather than health). From the standpoint of equity, in other words, resources should be allocated first towards tackling the health problems of poor people and only then between different programmes or interventions. It is also to be recognized that decisions about distribution of public resources affect poorer populations more because of their larger dependence on public health care than the rich, the latter having the option of buying private health care when needed.

Efficiency and equity constitute two important criteria for decision-making, directly addressing key goals of the mental health system (maximizing health outcomes, reducing inequalities). Resource allocation decisions affecting choices in health, however, stand to be influenced by a broader range of factors. One alternative starting point for priority-setting that has been recently proposed is to ascertain the extent to which there is a justification for public sector financing (Musgrove, 1999), in which a number of ‘market failures’ can be used as filters for the appropriate channelling of public resource flows. When applied to the mental health context (Beeharry et al, 2002), it becomes clear that while there are weak grounds for public health financing on some grounds (for example, mental disorders do not lead to pervasive negative spill-over effects in the way that some infectious diseases do), there are other criteria related to the inadequate demand for mental health (due to under-recognition and stigma) and potential household impoverishment resulting from mental illness which, together with the need for adequate insurance and regulatory mechanisms, make a strong case for public financing of mental health services.

## **4.2 Development of a priority-setting framework for mental health policy**

As discussed in the previous section, there are a number of possible criteria that can be used to make choices in mental health, including patient-level factors (e.g. severity of illness, age), treatment characteristics (e.g. size of effect, cost-effectiveness) and societal values (e.g. poverty reduction). These criteria are not necessarily compatible with each other, which implies that a degree of trading-off may be required, for example between targeting people with the most severe mental health problems and selecting the most cost-effective interventions. One approach recently adopted as part of a sectoral assessment of cost-effectiveness in the Australian mental health context was to consider a set of ‘second stage’ criteria – strength of evidence, equity, feasibility and acceptability – which were defined and used to qualify the preceding efficiency findings in a qualitative way, for example stating that while cognitive behavioural therapy for depression may represent a cost-effective use of resources, there are obvious challenges in making this intervention widely available in the population (Vos et al, 2005).

To date, little attempt has been made in the mental health sector to integrate these (often competing) criteria into a composite prioritization score, which means there is little sense of the relative importance or weight associated with these diverse considerations. One exception to this, again from Australia, concerned overall program benefits in a mental health priority-setting exercise carried out in the state of South Australia (Peacock et al, 1997). Benefits were couched quantitatively in terms of individual health gain (contributing an importance weight of 28%), community health gain (27%) and equity (45%). From a rational, explicit perspective on priority-setting, such a uniformly quantitative approach has some appeal, since it applies available information on local preferences to a range of possible intervention strategies. Building on this kind of empirical exercise, and in light of recent developments in the priority-setting literature (Robinson, 1999; Hauck et al, 2003; James et al, 2004; Baltussen et al, 2006), the generation of a priority-setting framework adapted for mental health planning was investigated in Nigeria.

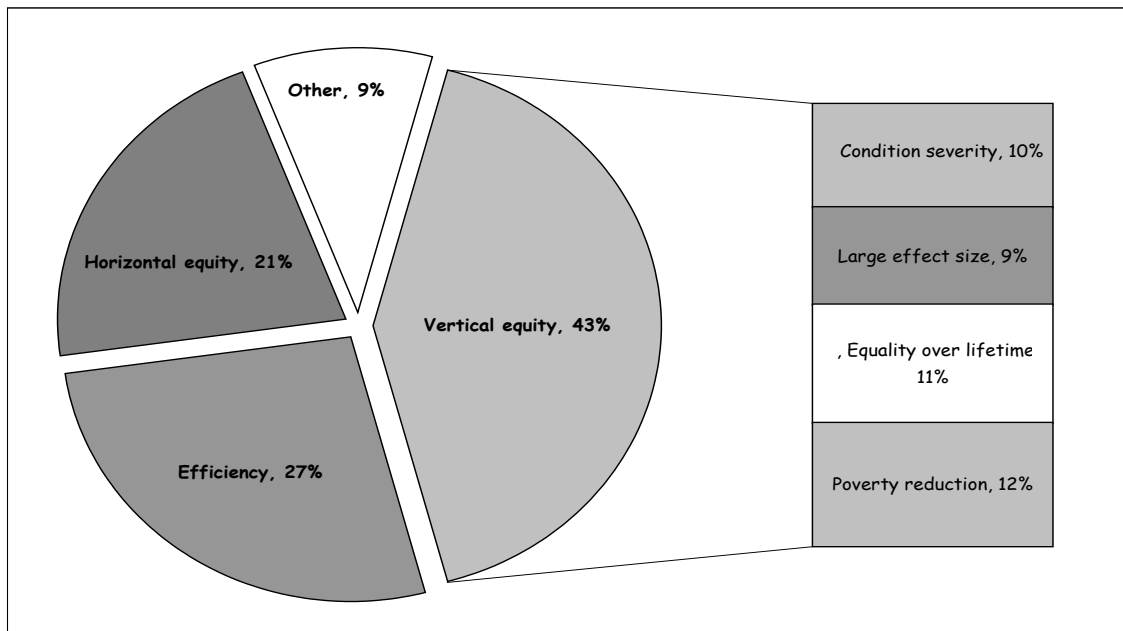
**Case study 1: Priority-setting for mental health in Nigeria**

In the context of this case study, priority-setting issues were addressed via the administration of a questionnaire to a group of mental health professional (mainly doctors), to capture the relative importance that respondents would give to a number of resource allocation criteria. Weights were to be given for the following criteria: efficiency (cost-effectiveness); vertical equity (higher priority to severe health conditions, interventions that have a big effect on an individual's health, equality over the life cycle [i.e. interventions that favour the young] and consideration for the poor); horizontal equity (promoting equal health care access for equal need); and other criteria (for example, collective versus individual responsibility for one's health). Respondents were then asked to score a number of mental health interventions against these different criteria.

In terms of ranking, the respondents allocated only 27% of the total score to efficiency (Figure 4). Equity was given a weight of 64%, out of which vertical equity, where consideration is given to the severity of the health conditions and to vulnerable groups, accounted for two-thirds. It is clear that, for this particular group of respondents, efficiency is only a minor part of the picture in a consideration of the factors that should determine the allocation of resources for health in Nigeria. Their decisions were no doubt influenced by their professional responsibilities, being mainly doctors in hospital settings where the majority of patients have more severe mental disorders, and also by the daily contact they make with poor patients who have difficulties paying for health care. Ideally, generation of priority-setting weights in health should reflect a broader set of societal preferences that includes the expectations of consumers and other stakeholders.

In a second step, a selective list of interventions were ranked in terms of their expected priority (inpatient detoxification versus outpatient detoxification plus case management for alcohol dependence; outpatient treatment versus community outreach with neuroleptics for schizophrenia; episodic versus maintenance treatment with tricyclic anti-depressants for depression; and outpatient versus primary care management of epilepsy with older anti-epileptic drugs such as phenytoin). The results indicated that, when efficiency was the only consideration, the intervention with the highest priority was proactive primary care with tricyclic anti-depressants for depression, while the lowest priority was outpatient detoxification and case management for alcohol dependence. However, when respondents considered a number of factors related to vertical and horizontal equity, the intervention ranked highest was primary care management with phenytoin for epilepsy while the last on the priority list was inpatient detoxification programme for alcohol dependence.

**Figure 4 Priority-setting weights for health care resource allocation in Nigeria (N=40)**



**Case study 2: Priority-setting project in Ghana**

In a subsequent development, Baltussen et al (2006) carried out a Discrete Choice Experiment (DCE) in order to determine the relative importance of different criteria in identifying priority interventions in Ghana. Thirty respondents - made up of health policy-makers - chose between twelve pairs of scenarios that described interventions in terms of a number of medical and non-medical criteria (see Table 6 for chosen criteria and their definitions). These criteria apply to health in general, that is, they were not derived with exclusion reference to mental health.

Subsequently, a composite ranking of interventions was made by mapping interventions on those criteria. An illustration of how such a ranking of interventions might look in the context of neuropsychiatric conditions, using the importance weights derived in Ghana, is provided in Appendix 4, which shows how incorporation of equity criteria can produce a more fine-tuned list of priorities for investment or service development. It should be emphasized, however, that this rank ordering of interventions is purely illustrative (in order to show a potential method), and is not indicative of actual mental health priorities in Ghana or elsewhere.

As currently constructed, this method is insufficiently sensitive to differences between the characteristics of interventions, owing to the use of only two levels for each criterion. To illustrate, no distinction is made between the cost-effectiveness of schizophrenia interventions using older versus newer anti-psychotic drugs (despite the enormous price difference, neither produce a healthy year of life for less than the value of gross national income per capita

in the Sub-Saharan African context, according to WHO-CHOICE results), and none of the selected interventions are considered to particularly benefit the young (despite the difference between alcohol misuse and schizophrenia, which really do occur mostly in adulthood, versus epilepsy and depression, which of course can occur in children and adolescents). Adding an additional level to each criterion would enhance the usefulness of this approach and enable, for example, the distinction between mild / moderate and severe conditions, or the distinction between interventions that are very cost-effective, cost-effective and cost-ineffective. Also, priority-setting exercises focussed on mental health services might consider the addition of other criteria, such as human rights protection or caregiver burden.

**Table 6 Decision-making criteria for setting priorities in health, Ghana**

Criteria	Justification for inclusion	Operational definitions / levels (score)
<b>Poverty reduction</b>	Treatment of diseases prevalent among poor reduces poverty; ethically, the poor may deserve treatment more	<u>positive</u> : target diseases that are mainly prevalent among the poor (1) <u>neutral</u> : targeting diseases not specifically prevalent among the poor (0)
<b>Severity of disease</b>	Ethically, severe patients may deserve treatment more	<u>severe</u> : Healthy life expectancy < 5 years (1) <u>not severe</u> : Healthy life expectancy > 5 yrs (0)
<b>Large individual health effect</b>	A single big health effects may be valued higher than many small effects because it affects societies' welfare more	<u>high gain for few patients</u> : 100 patients gain ten years of life in full health (1) <u>low gain for many patients</u> : 1000 patients gain one year of life in full health (0)
<b>Age of target group</b>	Priority to young ('future of society' / 'fair innings')	<u>young</u> : < 15 years (1) <u>adults</u> : 15 years and older (0)
<b>Cost-effectiveness</b>	Interventions with low cost and high effects lead to large health gains at the population level	<u>cost-effective</u> : 1 healthy life year < GDP per capita (1) <u>not cost-effective</u> : 1 healthy life year > GDP per capita (0)
<b>Budget impact</b>	Total costs of treatment of all patients may not be affordable	<u>small budget-impact</u> : < US\$15 million (1) <u>high budget-impact</u> : ≥ US\$15 million (0)

Source: Baltussen et al (2006)

In line with the above limitations, the main criticism leveled at this explicit approach to priority-setting is that it attempts to squeeze too much (uncertain) information into a single score, thereby missing some of the critical qualitative or conceptual arguments around the issues concerned. For example, there are counter-positions to the 'fair innings' argument (the preference to give extra weight to younger age groups), and differences over the operational definition of a 'poverty reduction' indicator.

Ultimately, however, there ought to be scope for both the conventional, dis-integrated approach (in which different criteria are assessed independently and only considered together

in an unstructured or qualitative way), as well as the more simplified, explicit and integrated approach described above. Whichever approach is adopted, the conclusion to be drawn is that there is a clear need to go beyond cost-effectiveness considerations only, and that the way to most appropriately accomplish this is by carefully considering the priority to be accorded to interventions from a number of (locally determined) perspectives, first in isolation and then in conjunction with each other.

### **4.3 Scaling up priority interventions: financial planning and budgetary allocation**

Over and above the consideration of equity alongside efficiency measures, other more pragmatic concerns enter into the final decision to invest in new technologies or scale up the availability of existing interventions, in particular the acceptability of proposed new strategies to relevant stakeholders, the feasibility of their implementation, and, vitally, the availability of funds. An intervention could be found to be both an efficient and equitable use of resources, but if its implementation were to be both organisationally very demanding and also absorb a large proportion of the overall mental health budget, it would quite likely not see the light of day.

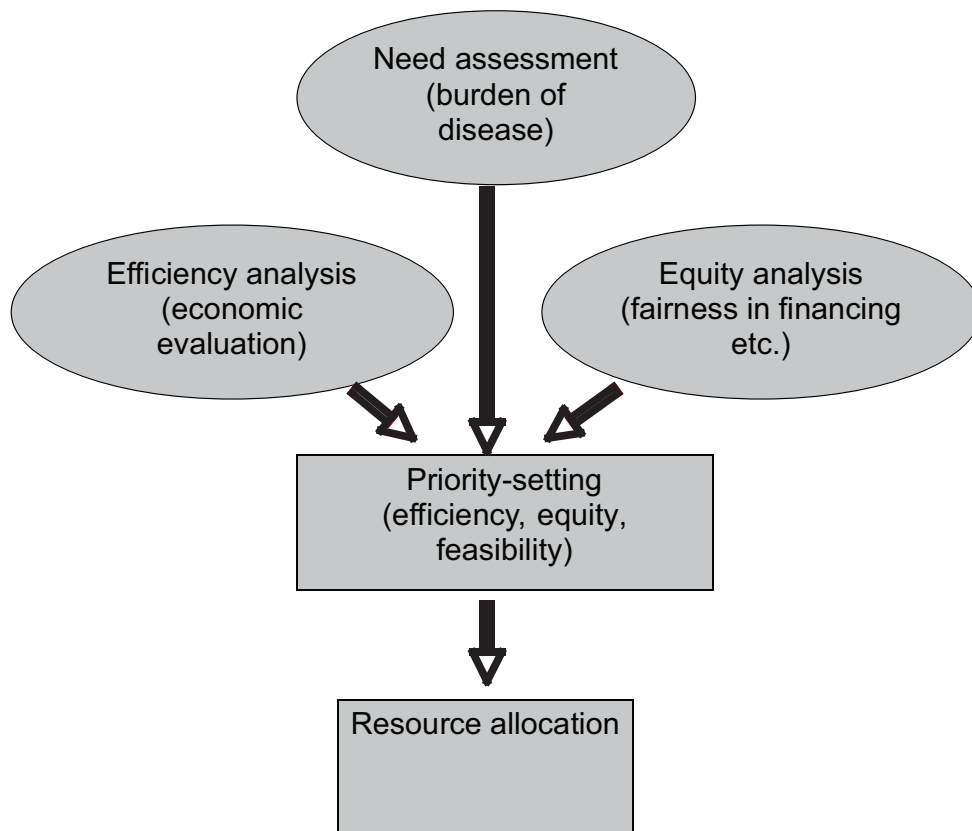
A good example in the context of mental health and addiction services is psychosocial treatment, for which there is increasing evidence of its cost-effectiveness across a range of diagnostic categories, either delivered on its own (e.g. cognitive behavioural therapy or problem-solving treatment for depression) or in conjunction with pharmacological treatment (e.g. family therapy for psychosis or bipolar affective disorder). However, the training and financial implications of greatly scaling up the availability of psychosocial treatment within primary and secondary mental health services together create a potentially imposing barrier to its implementation (Vos et al, 2005).

The likelihood, particularly in countries with a scarcity of mental health personnel, is that scaling-up of cost-effective or prioritized interventions takes place in an incremental and piecemeal fashion. Furthermore, the provision of evidence-based treatment for common mental disorders such as depression or anxiety is expected to largely take place in primary health care settings, meaning that financing of these interventions needs to be made out of integrated primary health care budgets (rather than dedicated mental health budgets). Over and above calls for greater investment in mental health, therefore, there is a need to develop improved methods or models for estimating the financial costs of scaling-up provision of these interventions over time; for example, this might be a budgetary impact tool for predicting additional mental health resource needs in primary health care over a five-year expenditure period.

Whatever the time frame of this process of scaling-up, in other words, there is an evident requirement for tools that are capable of moving the decision-making agenda on from economic analysis and priority-setting to financial planning and budgeting, thereby completing the evaluative cycle that started with epidemiological need or disease burden assessment (see

Figure 5). A number of such tools have been generated with this objective in mind, including one developed for mental health service development as part of the WHO's Mental Health Policy project (Planning and Budgeting to Deliver Services for Mental Health; WHO, 2003b). This planning module provides a step-by-step guide to assessing current epidemiology and resource availability in the population, ascertaining the resource cost requirements to meet targeted epidemiological needs, and monitoring implemented plans via budget management and economic evaluation.

**Figure 5 Components of the planning and evaluation cycle**



For the specific purpose of establishing the costs associated with the implementation of cost-effective interventions, one relevant development subsequent to the publication of the above recommended module is the CostIt tool ([http://www.who.int/choice/toolkit/cost\\_it/en/index.html](http://www.who.int/choice/toolkit/cost_it/en/index.html)), which provides a detailed template for pulling together the various resource inputs and associated costs of health interventions. Annual implementation costs are broken down into a number of components, including programme-level or infrastructural inputs (at national, province and district level), training inputs, health care facility inputs (broken down by type of service provider: government, NGO, private), and household-level costs associated with health care seeking and provision. In addition, the actual quantity of resources are captured (e.g. total inpatient days, outpatient visits, etc.), which offers an important data source for relating resource needs to current or planned service capacity.

For estimation of the financial costs of scaling-up mental health care delivery at the national level, there are new opportunities to build upon existing efforts to construct such models for other disease areas, in particular those included in the Millenium Development Goals (see Gutierrez et al, 2004, for example, in relation to the estimated price tag for scaling-up antiretroviral therapy under the so-called '3 by 5' initiative, or go to [http://www.who.int/immunization\\_financing/tools/](http://www.who.int/immunization_financing/tools/) to view an Excel-based tool and user guide for projecting future resource needs for immunization programs in countries). Each of these developments recognize that strategic planning for health service delivery requires credible information about how much is being spent, on what and from what source, and how much funding will be needed in the future to achieve programme objectives. Mental health is no different to other areas of health in this respect, and the development of such a tool would represent a valuable addition to evidence-based mental health planning and evaluation.



## 5. Conclusion

This document set out to provide an introduction to the concepts and principles of economic analysis as they relate to mental health, illustrate how economic evaluation methods have been applied to different policy questions, and capture a number of key messages relevant to service development in WHO Member States. A number of these key messages are:

- The economic perspective is (or should be) an integral part of health system thinking. Too much is at stake, or stands to be lost, to ignore the economic perspective, whether measured in terms of foregone health gains, misallocated monies or unfair financing mechanisms.
- Insights from economic analysis that can be drawn upon in developing mental health services and systems include:
  - o better understanding of the economic consequences of mental ill-health;
  - o identification of efficient and affordable strategies to best combat the increasing burden of mental, neurological and substance abuse disorders; and
  - o improved ways of financially rewarding service providers or protecting payers.
- National or social insurance is very likely to represent a more equitable mechanism for safeguarding at-risk populations from the adverse financial consequences of mental disorders than private insurance or out-of-pocket expenditures.
- Cost-effectiveness analysis has the potential to place the future planning and resource allocation of scarce health care resources on a more evidence-based footing, as well as identify current areas of inefficiency or under-investment. Although economic analysis can be technical and complex, clear recommendations or messages that are relevant to policy-makers and service planners can be elicited:
  - o the high acquisition price of second generation antipsychotic drugs makes their use in most lower-income regions of the world inadvisable on efficiency or affordability grounds (although this situation should change as these drugs come off patent); conventional neuroleptic drugs have similar efficacy and are currently much cheaper.
  - o older and newer antidepressant drugs have similar efficacy but the price difference between older tricyclics (TCAs) and newer (generic) SSRIs is much smaller, meaning that the treatment of choice can be driven more by patient or clinical preferences (rather than by economic circumstances).
  - o the relatively modest additional cost of adjuvant psychosocial treatment reaps significant health gains, thereby making such a combined strategy for schizophrenia

and bipolar disorder treatment more cost-effective than pharmacotherapy alone. For people with depression or anxiety, psychotherapy appears to be as cost-effective as newer (generic) antidepressants. Clearly, however, there remains a major human resource constraint in making psychosocial interventions more widely available.

- o since depression is so often a recurring condition, proactive care management, including long-term maintenance treatment with antidepressant drugs, has a much larger impact on reducing the burden of depression than episodic treatment, and also represents a cost-effective strategy.
- There are multiple components and functions of a mental health system, all of which will influence the feasibility and attractiveness of different intervention strategies. For example, the capacity to implement efficient mental health strategies will depend on the supply and availability of mental health care personnel, psychotropic medications and basic infrastructures.
- Efficiency is and can only ever be one of many inputs into the decision-making process. Other criteria, notably equity considerations relating to disease severity or poverty reduction, may be deemed more important in determining priorities. For these wider priority-setting and planning tasks, the underlying purpose should be to go beyond efficiency concerns only and establish combinations of cost-effective interventions that best address stated goals of the mental health system, including poverty reduction, equity, and human rights protection.

Needless to say, many gaps in the economic knowledge base remain unfilled, not least because of the diversity of information needs within and between health systems across the world. That of course points to the need for more mental health services research into these economic aspects of the mental health system across a range of socioeconomic settings, although much more could also be made of information or data that already exists within these health systems (but is not readily accessible or appreciated). For example, a modest but targeted data synthesis effort could yield much better information on current resources and expenditures on mental health, an important indicator for measuring existing investment that also provides a baseline against which additional resource need estimates can be monitored. The availability of country-level descriptive information of this kind has in fact greatly improved in recent years as a result of the WHO Atlas project (WHO, 2005a), and is being further enhanced in many countries via the WHO-AIMS instrument (WHO, 2005b), which seeks to provide Member States with a detailed profile of mental health system domains against which progress towards stated goals can be monitored over time.

## References

1. Adam T, Evans D, Murray CJ (2003). Econometric estimation of country-specific hospital costs. *Cost-effectiveness and Resource Allocation*; 1: 3.
2. Baltussen R, Stolk E, Chisholm D, Aikins M (2006). Towards a multi-criteria approach to priority-setting: an application to Ghana. *Health Economics*, 15: 689-696.
3. Beeharry G, Whiteford H, Chambers S, Baingana F (2002). Outlining the scope for public sector involvement in mental health. HNP Discussion Paper; World Bank, Washington DC.
4. Chisholm D (2005a). Cost-effectiveness of first-line anti-epileptic drug treatments in the developing world: a population-level analysis. *Epilepsia*, 46: 751-759.
5. Chisholm D (2005b). Choosing cost-effective interventions in psychiatry. *World Psychiatry*, 4: 37-44.
6. Chisholm D, Healey A, Knapp MRJ (1997). QALYs and mental health care. *Social Psychiatry and Psychiatric Epidemiology*, 32: 68-75.
7. Chisholm D, Stewart A (1998). Economics and ethics in mental health care: traditions and trade-offs. *Journal of Mental Health Policy and Economics*, 1: 55-62.
8. Chisholm D, Sanderson K, Ayuso-Mateos JL, Saxena S (2004a). Reducing the burden of depression: a population-level analysis of intervention cost-effectiveness in 14 epidemiologically-defined sub-regions (WHO-CHOICE). *British Journal of Psychiatry* 184: 393-403.
9. Chisholm D, Rehm J, van Ommeren M, Monteiro M, on behalf of WHO-CHOICE (2004b). Reducing the global burden of hazardous alcohol use: a comparative cost-effectiveness analysis. *Journal of Studies on Alcohol*, 65: 782-793.
10. Chisholm D, Van Ommeren M, Ayuso-Mateos JL, Saxena S (2005). Cost-effectiveness of clinical interventions for reducing the global burden of bipolar disorder: a global analysis (WHO-CHOICE). *British Journal of Psychiatry*, 187: 559-567.
11. Commission on Macroeconomics and Health (2001). *Macroeconomics and health: Investing in health for economic development*. Geneva: World Health Organization.
12. Cutler D, Bevilacqua J, McFarland B (2003). Four Decades of Community Mental Health: A Symphony in Four Movements. *Community Mental Health Journal*, 39: 381-398.
13. Ferri C, Chisholm D, Van Ommeren M, Prince M (2004). Resource utilisation for neuropsychiatric disorders in developing countries: a multinational Delphi consensus study. *Social Psychiatry and Psychiatric Epidemiology* 39: 218-227.
14. Frank R, McGuire T (1998). Parity for mental health and substance abuse care under managed care. *Journal of Mental Health Policy and Economics*, 1: 153-159.
15. Godfrey C (2001). Economic evaluation of health promotion. In: Rootman I et al., eds. *Evaluation in health promotion: principles and perspectives*. World Health Organization (European Series, No. 92).
16. Goeree R, O'Brien B, Blackhouse G et al (1999). The valuation of productivity costs due to premature mortality: a comparison of the human-capital and friction-cost method for schizophrenia. *Canadian Journal of Psychiatry*, 44: 464-472.

17. Gureje O, Odejide OA, Olatawura MO et al (1995). Psychological problems in general health care: results from the Ibadan centre. In: *Mental Illness in General Health Care: An International Study* (eds. Ustun, T.B. and Sartorius, N.) London: John Wiley and Sons, pp. 157 – 173.
18. Gureje, O. (2002) Psychological disorders and symptoms in primary care: association with disability and service use after 12 months. *Social Psychiatry and Psychiatric Epidemiology*, 37: 220-224.
19. Gureje O, Chisholm D, Kola L, Lasebikan V, Saxena S (2006). Cost-effectiveness of an essential mental health intervention package in Nigeria. *World Psychiatry*, in press.
20. Gutierrez J, Johns B, Adam T et al (2004). Achieving the WHO/UNAIDS antiretroviral treatment 3 by 5 goal: what will it cost? *Lancet*, 364: 63-64.
21. Hale J (2000). What contribution can health economics make to health promotion? *Health Promotion International*, 15:341–348.
22. Hauck K., Smith P. and Goddard M. (2003). *The Economics of Priority Setting for Health Care - A Literature Review*. HNP Discussion Paper; World Bank, Washington DC.
23. Hyman S, Chisholm D, Kessler R, Patel V, Whiteford H (2006). Mental disorders. In: Jamison D, Breman J, Measham A, Alleyne G, Evans D, Jha P, Mills A, Musgrove P (eds.) *Disease Control Priorities in Developing Countries* (2nd Edition). New York: Oxford University Press.
24. Hutubessy R, Chisholm D, Tan Torres T (2003). Generalized cost-effectiveness analysis for national-level priority-setting in the health sector. *Cost Effectiveness and Resource Allocation*; 1: 8.
25. James C, Carrin G, Savedoff W, Hanvoravongchai P (2005). Clarifying efficiency-equity tradeoffs through explicit criteria, with a focus on developing countries. *Health Care Analysis*, 13, 33-51.
26. Kapiriri L, Arnesen T, Norheim OF (2004). Is cost-effectiveness analysis preferred to severity of disease as the main guiding principle in priority setting in resource poor settings? The case of Uganda. *Cost Effectiveness and Resource Allocation*, 2:1
27. Kind P, Sorensen J (1993). The costs of depression. *International Clinical Psychopharmacology*, 7: 191-195.
28. Knapp MRJ, Chisholm D, Astin J, Lelliott P, Audini B (1997). The cost consequences of changing the hospital-community balance: the mental health residential care study. *Psychological Medicine*, 27: 681-692.
29. Knapp MRJ, Almond S, Percudani M (1999). Costs of schizophrenia. In M Maj, N Sartorius (eds.). *Evidence and Experience in Psychiatry* (Volume 1), John Wiley and Sons, London.
30. Knapp MRJ, Funk M, Curran C, Prince M, Grigg M, McDaid D (2006). Economic barriers to better mental health practice and policy. *Health Policy and Planning*, 21: 157-170.
31. Leucht S, Pitschel-Walz G, Abraham D, Kissling W (1999). Efficacy and extrapyramidal side-effects of the new antipsychotics olanzapine, quetiapine, risperidone, and sertindole compared to conventional antipsychotics and placebo. A meta-analysis of randomized controlled trials. *Schizophrenia Research*, 35: 51-68.
32. Mojtabai R, Nicolson RA, Carpenter BN (1998). Role of psychosocial treatments in management of schizophrenia: a meta-analytic review of controlled outcome studies. *Schizophrenia Bulletin*, 24: 569-587.

33. Mollica RF, Cardozo BL, Osofsky HJ, Raphael B, Ager A, Salama P (2004). Mental health in complex emergencies. *The Lancet*, 364: 2058-67.
34. Murray, CJL, Lopez AD (1996). *The Global Burden of Disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020*. Harvard University Press; Cambridge, MA.
35. Musgrove P (1999). Public spending on health care: how are different criteria related? *Health Policy*, 47: 207-223.
36. Nord E., Pinto J.L., Richardson J., Mensal P., Ube P. (1999). Incorporating societal concerns for fairness in numerical valuations of health programmes. *Health Economics*, 8: 25-39.
37. Patel V, Chisholm D, Rabe-Hesketh S, Dias-Saxena F, Andrews G, Mann A (2003). Efficacy and cost-effectiveness of drug and psychological treatments for common mental disorders in general health care in Goa, India: a randomised, controlled trial. *Lancet*, 361: 33-39.
38. Patel V, Chisholm D, Kirkwood B, Mabey D (2006). The economic consequences of common health problems in women: a comparison of reproductive tract infections, anaemia and depressive disorders in a community survey of 2,494 women in India. *Tropical Medicine and International Health*, in press. [published online 31 Oct 2006; DOI:10.1111/j.1365-3156.2006.01756.x]
39. Peacock S, Richardson J, Carter R (1997). Setting priorities in South Australian Community Health II: Marginal analysis of mental health services. Research Report 14, Centre for Health Program Evaluation, University of Melbourne and Monash University.
40. Petticrew M, Chisholm D, Thomson H, Jane-Llopis E, (2005). Evidence: The Way Forward. Chapter 15, Promoting Mental Health - Concepts, Emerging Evidence, Practice, World Health Organization, Geneva
41. Rawlins MD, Culyer AJ (2004). NICE and its social value judgements. *British Medical Journal*, 329: 224-227.
42. Rice DP, Miller LS (1995). The economic burden of affective disorders. *British Journal of Psychiatry*, 166: 34-42.
43. Rehm J, Chisholm D, Room R, Lopez A (2006). Alcohol. In: Jamison D, Breman J, Measham A, Alleyne G, Evans D, Jha P, Mills A, Musgrove P (eds.) *Disease Control Priorities in Developing Countries (Second Edition)*. New York: Oxford University Press.
44. Robinson R (1999). Limits to rationality: economics, economists and priority-setting. *Health Policy*, 49: 13-26.
45. Rosenbaum JF, Hylan T (1999). Costs of depressive disorders: a review. In M Maj, N Sartorius (eds.). *Evidence and Experience in Psychiatry (Volume 2)*, John Wiley and Sons, London.
46. Saxena S, van Ommeren M, Lora A, Saraceno B (2006). Monitoring of mental health systems and services. *Soc Psychiatry Psychiatr Epidemiol*, 41:488-497.
47. Shah A, Jenkins R (1999). Mental health economic studies from developing countries reviewed in the context of those from developed countries. *Acta Psychiatrica Scandinavica*, 100: 1-18.
48. Singh B, Hawthorne G, Vos T (2001). The role of economic evaluation in mental health care. *Australian and New Zealand Journal of Psychiatry*, 35: 104-117.
49. Tan Torres T, Baltussen RM, Adam T et al (2003). Making choices in health: WHO guide to cost-effectiveness analysis. World Health Organization, Geneva.

50. Thornicroft G, Tansella M (2004). Components of a modern mental health service: a pragmatic balance of community and hospital care: overview of systematic evidence. *British Journal of Psychiatry*, 185: 293-300.
51. Vos T, Haby M, Magnus A, Mihalopoulos C, Andrews G, Carter R (2005). Assessing Cost-Effectiveness (ACE) – Mental Health: Helping policy-makers prioritise and plan health services. *Australian and New Zealand Journal of Psychiatry*, 39: 701-712.
52. WHO (2000). *The World Health Report 2000; Health Systems; Improving Performance*. World Health Organization, Geneva.
53. WHO (2001a). *The World Health Report 2001; Mental Health: New Understanding, New Hope*. World Health Organization, Geneva.
54. WHO (2001b). *Atlas: Mental health resources in the world 2001*. World Health Organization, Geneva.
55. WHO (2003a). *Mental Health Financing. Mental health Policy and Service Guidance Package*; World Health Organization, Geneva.
56. WHO (2003b). *Investing in Mental Health*. World Health Organization, Geneva.
57. WHO (2003c). *Planning and budgeting to deliver services for mental health. Mental health Policy and Service Guidance Package*; World Health Organization, Geneva.
58. WHO (2004). *Mental Health Policy, Plans and Programmes. Mental health Policy and Service Guidance Package*; World Health Organization, Geneva.
59. WHO (2005). *Atlas: Mental health resources in the world 2005*. World Health Organization, Geneva. Available at [http://www.who.int/mental\\_health](http://www.who.int/mental_health)
60. WHO (2005) *World Health Organization Assessment Instrument for Mental Health Systems (WHO-AIMS)*, World Health Organization, Geneva. Available on-line at: [http://www.who.int/mental\\_health/evidence/AIMS\\_WHO\\_2\\_2.pdf](http://www.who.int/mental_health/evidence/AIMS_WHO_2_2.pdf)
61. WHO (2001) *Evaluation in health promotion*, WHO Regional Publications European Series, No. 92
62. WHO World Mental Health Survey Consortium (2004). Prevalence, severity and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 291: 2581-2590.
63. World Bank (1993). *World Development Report 1993: Investing in Health*. Oxford University Press, Oxford.

**Appendix 1 Population-level intervention effects  
(DALYs averted per year per one million population)**

		World Bank region					
		<u>Sub-Saharan Africa</u>	<u>Latin America &amp; Caribbean</u>	<u>Middle East &amp; North Africa</u>	<u>Europe &amp; Central Asia</u>	<u>South Asia</u>	<u>East Asia &amp; Pacific</u>
<i>Total population (million)</i>		640	502	482	462	1,242	1,827
	<i>Coverage</i>						
<b>Schizophrenia<sup>1</sup></b>							
Older (neuroleptic) antipsychotic drug	80%	149	219	214	254	177	231
Newer (atypical) antipsychotic drug	80%	160	235	230	273	190	248
Older antipsychotic drug + psychosocial treatment	80%	254	373	364	353	300	392
Newer antipsychotic drug + psychosocial treatment	80%	261	383	373	364	308	403
<b>Bipolar affective disorder<sup>1</sup></b>							
Older mood stabiliser drug (lithium)	50%	292	336	296	381	319	389
Newer mood stabiliser drug (valproate)	50%	211	300	273	331	278	351
Older mood stabiliser drug + psychosocial treatment	50%	312	365	322	413	346	422
Newer mood stabiliser drug + psychosocial treatment	50%	232	330	300	365	306	386
<b>Depression</b>							
Episodic treatment: older antidepressant drug (TCAs)	50%	599	995	920	874	987	891
Episodic treatment: newer antidepressant drug (SSRIs)	50%	632	1,049	971	925	1,042	941
Episodic psychosocial treatment	50%	624	1,036	958	936	1,028	927
Episodic psychosocial treatment + older antidepressant	50%	745	1,237	1,144	1,100	1,228	1,107
Episodic psychosocial treatment + newer antidepressant	50%	745	1,237	1,144	1,100	1,228	1,107
Maintenance psychosocial treatment + older antidepressant	50%	1,174	1,953	1,806	1,789	1,937	1,747
Maintenance psychosocial treatment + newer antidepressant	50%	1,174	1,953	1,806	1,789	1,937	1,747
<b>Panic disorder</b>							
Anxiolytic drug (benzodiazepine)	50%	144	182	170	183	168	195
Older (tricyclic) antidepressant drug (TCA)	50%	232	290	272	290	269	312
Newer antidepressant drug (SSRI, generic)	50%	245	307	287	307	284	330
Psychosocial treatment (CBT)	50%	233	292	273	292	270	313
Older antidepressant plus psychosocial treatment	50%	262	329	308	329	304	353
Newer antidepressant plus psychosocial treatment	50%	276	346	324	346	320	372

<sup>1</sup> Results for community-based service model presented here only (hospital-based service model not shown)

**Appendix 2 Average cost-effectiveness of interventions at specified levels of coverage (I\$ per DALY averted)**

		World Bank region					
		<u>Sub-Saharan Africa</u>	<u>Latin America &amp; Caribbean</u>	<u>Middle East &amp; North Africa</u>	<u>Europe &amp; Central Asia</u>	<u>South Asia</u>	<u>East Asia &amp; Pacific</u>
<i>Total population (million)</i>		640	502	482	462	1,242	1,827
	<i>Coverage</i>						
<b>Schizophrenia<sup>1</sup></b>							
Older (neuroleptic) antipsychotic drug	80%	5,202	13,369	6,882	12,260	4,482	8,760
Newer (atypical) antipsychotic drug	80%	18,497	26,199	19,584	25,693	17,991	22,010
Older antipsychotic drug + psychosocial treatment	80%	3,314	8,993	4,511	10,089	2,887	5,814
Newer antipsychotic drug + psychosocial treatment	80%	11,669	17,352	12,562	20,627	11,354	14,281
<b>Bipolar affective disorder<sup>1</sup></b>							
Older mood stabiliser drug (lithium)	50%	3,025	8,706	6,122	8,051	3,302	6,103
Newer mood stabiliser drug (valproate)	50%	4,829	10,074	6,935	9,620	4,422	7,230
Older mood stabiliser drug + psychosocial treatment	50%	2,903	7,785	5,492	7,233	3,136	5,524
Newer mood stabiliser drug + psychosocial treatment	50%	4,520	8,988	6,222	8,607	4,147	6,530
<b>Depression</b>							
Episodic treatment: older antidepressant drug (TCAs)	50%	1,026	2,219	1,193	2,178	924	1,469
Episodic treatment: newer antidepressant drug (SSRIs)	50%	1,396	2,518	1,531	2,526	1,290	1,801
Episodic psychosocial treatment	50%	1,384	2,726	1,499	2,494	1,205	1,787
Episodic psychosocial treatment + older antidepressant	50%	1,416	2,595	1,487	2,421	1,256	1,738
Episodic psychosocial treatment + newer antidepressant	50%	1,819	2,982	1,866	2,860	1,641	2,125
Maintenance psychosocial treatment + older antidepressant	50%	1,706	2,935	1,721	2,589	1,547	1,968
Maintenance psychosocial treatment + newer antidepressant	50%	2,245	3,460	2,229	3,162	2,072	2,487
<b>Panic disorder</b>							
Anxiolytic drug (benzodiazepine)	50%	1,277	1,853	1,237	1,748	997	1,332
Older (tricyclic) antidepressant drug (TCA)	50%	1,013	1,378	984	1,328	842	1,057
Newer antidepressant drug (SSRI; generic)	50%	1,174	1,519	1,135	1,481	1,010	1,219
Psychosocial treatment (CBT)	50%	1,276	1,666	1,145	1,702	970	1,271
Older antidepressant plus psychosocial treatment	50%	1,583	1,942	1,440	1,983	1,303	1,584
Newer antidepressant plus psychosocial treatment	50%	1,722	2,061	1,570	2,121	1,441	1,720

<sup>1</sup> Results for community-based service model presented here only (hospital-based service model not shown)

### Appendix 3 Cost-effectiveness ratios before and contextualisation for three neuropsychiatric conditions in three WHO regions

	Nigeria (AFRO region)				Estonia (EURO region)				Sri Lanka (SEARO region)			
	CER (value)		CER (rank)		CER (value)		CER (rank)		CER (value)		CER (rank)	
	Region (IS)	Country (LCU)	Region	Country	Region (IS)	Country (LCU)	Region	Country	Region (IS)	Country (LCU)	Region	Country
<b>SCHIZOPHRENIA</b>												
Older (neuroleptic) anti-psychotic drug	3'705	128'321	3	3	10'961	786'466	3	6	6'583	108'156	3	1
Newer (atypical) anti-psychotic drug	13'295	2'899'585	6	6	22'180	614'450	6	5	16'689	214'463	6	4
Neuroleptic + psychosocial treatment	2'350	67'113	2	1	9'046	338'976	2	4	4'356	127'434	1	2
Atypical + psychosocial treatment	8'374	1'647'121	4	4	17'874	333'342	4	3	10'804	177'747	4	3
Case management with older drug	2'465	71'144	1	2	8'740	316'613	1	2	4'448	N/A	2	N/A
Case management with newer drug	8'613	1'789'290	5	5	17'914	312'332	5	1	11'077	N/A	5	N/A
<b>DEPRESSION</b>												
Older anti-depressant drug (TCAs)	733	62'095	1	1	1'960	71'026	1	2	1'165	23'678	1	2
SSRI)	1'105	142'159	3	6	2'376	48'781	5	1	1'551	19'097	4	1
Brief psychotherapy	998	104'272	4	3	2'186	100'314	3	5	1'428	59'634	3	7
Older anti-depressant + psychotherapy	1'026	107'865	2	4	2'131	120'021	2	7	1'392	55'632	2	6
Newer anti-depressant + psychotherapy	1'414	188'966	6	7	2'623	103'779	6	6	1'816	53'559	6	5
mgt	1'244	75'079	5	2	2'272	97'359	4	4	1'590	40'819	5	4
mgt	1'767	134'730	7	5	2'920	83'820	7	3	2'164	38'760	7	3
<b>ALCOHOL</b>												
Current taxation	1'719	20'134	3	4	185	1'153	3	3	1'855	1'604	7	3
Increased taxation (Current + 25%)	2'288	18'201	2	3	169	1'037	2	2	1'677	1'432	6	2
Increased taxation (Current + 50%)	2'662	17'125	1	2	156	913	1	1	1'531	1'260	4	1
Reduced access to retail outlets	1'188	N/A	6	N/A	200	2'096	6	4	1'413	12'732	3	6
Comprehensive advertising ban	1'135	N/A	4	N/A	224	2'142	4	5	1'590	12'032	5	5
Brief advice in primary care	601	64'400	5	5	590	13'743	5	7	812	31'376	2	7
Roadside breath-testing	2'022	8'873	7	1	1'108	6'213	7	6	421	6'572	1	4
<b>Thailand (SEARO region)</b>												

Notes: I\$ International dollar

LCU Local currency units [Nigerian Naira; Estonian Kroon; Sri Lankan Rupee; Thai Baht]

## Appendix 4 Ranking of selected interventions for neuropsychiatric conditions for priority-setting - an illustration

(based on importance weights derived for Ghana by Baltussen et al, 2006; scores for the four criteria are illustrative only)

Interventions	Intervention mapping (1 = Yes; 0 = No)				Priority setting			
	Cost-effective (< I\$ 1,250)	Poverty reduction	Severe condition	Young age group	Pure efficiency rating		Composite index	
	Coefficient (logistic regression)*				value	rank	value	rank
	+/- 1.42	+/- 1.25	+/- 0.38	+/- 0.84				
Epilepsy: Treatment with older anti-epileptic drugs (e.g. phenytoin)	1	1	0	0	1.42	1	1.45	1
Depression: Treatment with older antidepressant drug (TCAs)	1	0	0	0	1.42	1	-1.05	2
Depression: Psychosocial treatment	1	0	0	0	1.42	1	-1.05	2
Alcohol: Random breath-testing (RBT) of motor vehicle drivers	1	0	0	0	1.42	1	-1.05	2
Alcohol: Brief advice to heavy drinkers by a primary care physician	1	0	0	0	1.42	1	-1.05	2
Epilepsy: Treatment with newer anti-epileptic drugs (e.g. valproate)	0	1	0	0	-1.42	6	-1.39	6
Schizophrenia: Treatment with older (neuroleptic) antipsychotic drug	0	0	1	0	-1.42	6	-3.13	7
Schizophrenia: Treatment with newer (atypical) antipsychotic drug	0	0	1	0	-1.42	6	-3.13	7
Schizophrenia: Older antipsychotic drug + psychosocial treatment	0	0	1	0	-1.42	6	-3.13	7
Schizophrenia: Newer antipsychotic drug + psychosocial treatment	0	0	1	0	-1.42	6	-3.13	7
Depression: Treatment with newer antidepressant drug (SSRIs)	0	0	0	0	-1.42	6	-3.89	11
Alcohol: Excise tax on alcoholic beverages	0	0	0	0	-1.42	6	-3.89	11

\* Only (4 out of a possible 6) criteria that were statistically significant at  $P < 0.05$  were used to map interventions.  $\text{Log likelihood} = 843$ ;  $R^2 = 0.24$

The widening recognition of mental health as a significant international public health issue has led to an increasing need to demonstrate that investment of resources into service development is both required and also worthwhile. In particular, there is a need to generate evidence on mental health care strategies that are not only effective and appropriate but are also cost-effective and sustainable.

Aimed at health policy makers and service researchers with an interest in strengthening mental health systems, this publication sets out to highlight the need for and relevance of an economic dimension to decision-making and to summarise results from existing mental health economic analyses.

Throughout, a health systems perspective is promoted, since this provides an integrated approach to the identification of information and evidence needs for the planning, provision and evaluation of mental health programmes. Some relevant messages from the economic dimension of this approach are:

- Information on the **burden of mental disorders**, whether expressed in economic or epidemiological terms (i.e. in Dollars or DALYs [disability-adjusted life years]), is a potentially influential measure of the relative magnitude of disease, but is an insufficient basis for allocating resources and setting priorities for service development.
- Economic evaluation or **cost-effectiveness analysis** is an integral part of mental health financing and mental health system evaluation, but it is an insufficient tool for setting overall priorities in the mental health system.
- For the broader process of **priority-setting**, the efficiency of interventions needs to be systematically weighed up against other objectives or goals of the mental health system - including fairness, poverty reduction and human rights protection - plus the feasibility, acceptability and sustainability of their implementation.

ISBN 92 4 156333 8



9 789241 563338