

## Economic aspects of mental health in children and adolescents

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### Introduction

Mental illness<sup>1</sup> is increasingly being recognized as the most significant health concern for children and adolescents in developed countries, with an estimated prevalence of 8% to 23% of the child and adolescent population in European countries (4,5). Prevalence rates seem to be rising, particularly in psychosocial disorders among young people (6).<sup>2</sup> While prevalence and, partly, trend data are well documented and understood, there is also a need to document the associated economic burden of mental illness, as well as the economic return (or “cost–effectiveness”<sup>3</sup>) of interventions aiming to address the problem. The purpose of this background paper is to explore these two issues.

Highlighting the non-health effects of a given health challenge may provide an additional lever for attracting the attention of policy-makers, particularly those outside the health sector. Since the economic burden by itself serves as an incomplete input for priority setting in the allocation of public and private resources, this paper also examines the evidence on economic evaluations of interventions to reduce the child and adolescent mental health burden. Cost–effectiveness offers a straightforward and (in principle) transparent way of making the most of a limited amount of resources to achieve better health outcomes.

In mental health, as in all other areas of health, social and economic policy decisions have to be made under existing resource constraints. Consequently, there is a need for transparent decision criteria on choosing between alternative uses of public money (8). The pressure to prove “value for money” may even be increasing as rising health expenditures strain public coffers. An increase in the quantity and quality of available evidence on “cost–effectiveness” of interventions addressing child and adolescent mental health problems will increase the willingness of decision-makers to devote resources and/or efforts to this cause and to develop informed priorities.<sup>4</sup>

The paper consists of two sections: (i) the economic consequences of child and adolescent mental illness; and (ii) evidence on the economic evaluation of interventions. Both sections include the main findings from a systematic review of the European evidence over the last five years. In each section, the information extracted from the systematic reviews is complemented by additional relevant evidence. The last section concludes, discusses policy implications and lists other important issues that are not discussed in the paper.

### Economic consequences of child and adolescent mental illness

This section reviews the economic consequences of child and adolescent mental illness. Relevant conceptual and methodological considerations are discussed, followed by a presentation of the key findings of the systematic review. The section closes with additional findings on the transmission of child to adult mental illness, the implications for cost estimates and the need for early interventions.

<sup>1</sup> Mental illness “implies the existence of a clinically recognisable set of symptoms or behaviours associated in most cases with distress and with interference with personal functions” (1). To date, no single definition has been universally accepted as one which adequately specifies precise boundaries for the concept of “mental illness” (2) since the phrasing used depends on the social, cultural, economic and legal context in different societies or contexts (3).

<sup>2</sup> Child and adolescent mental health trend assessments should be evaluated with caution since they are subject to errors due to problems of limited data, differing case definitions and methodological approaches employed in the various studies, and also because generalizations across different mental disorders should be avoided (7).

<sup>3</sup> Unless otherwise stated, the term “cost–effectiveness” is used in the very general meaning of “value for money”. As discussed elsewhere in the paper, cost–effectiveness, in the narrow sense, is just one of several economic evaluation methods that measure “value for money” in different ways.

<sup>4</sup> This is not to imply that cost–effectiveness is the only relevant or actual criteria for priority setting. For a discussion of other criteria, see Musgrove (9) and Hauck, Smith & Goddard (10).

## Conceptual and methodological considerations

Mental illness accounts for a large and growing share of ill health among children and adolescents in Europe. It is not only a significant health issue, but also affects many other spheres of life, including the individual directly concerned, his or her family and friends and society at large (see Table 1 for an attempt to organize those different potential impacts from an economic perspective).

**Table 1**

Potential economic consequences of mental illness in children and adolescents  
Source: modified from Chisholm (11) and Byford & Knapp (12).

Perspective	Care costs	Productivity costs	Other costs
Individual with mental disorders/problems	Treatment and service fees and payments	Reduced learning capacity (Future) work disability (Future) lost earnings	Suffering Treatment side-effects Suicide Stigma Social exclusion
Family and friends	Informal care-giving	Time off work Reduced productivity	Psychological hardship/carer burden
Society		Reduced productivity	Loss of lives
Health system	Provision of mental health care and general care (taxation and insurance)		
Social services	Local authority care and accommodation, social work		
Education services	Educational psychologists, special education costs, education welfare officers, indirect costs incurred from worse educational attainment		
Youth justice system	Youth offending team, youth custody		

In the following subsection, the existing evidence on the non-health effects of mental disorders is synthesized. The main focus is on the economic consequences, but with a broad interpretation of what “economic” means. Documenting the economic consequences of a health problem (or of any social problem) is often considered necessary to attract the attention of policy-makers outside the health sector, which is necessary if mental disorders are to be tackled more effectively in the future.<sup>5</sup>

When evaluating the impact of an economic evaluation on the burden of an illness or an intervention, it is important to clarify the meaning of “costs” from an economic perspective.

To non-economists (and to accountants), cost is typically what is paid for a good or service – a tangible transaction commonly confirmed by a receipt. This concept is sometimes, but not always, compatible with the cost concept used by economists, which is that of “opportunity costs”. To economists, “cost refers to the sacrifice of benefits by using resources for a particular use rather than for some other (best) use. By using a resource for a particular use one is foregoing the opportunity of using that resource elsewhere” (13).

<sup>5</sup> It should be noted that the alleged dichotomy between health effects on the one hand and economic effects on the other is misleading, in that it implies that economists ignore any health effects. In fact, as discussed in the economic evaluation section below, it is the improvement of health as the result of an intervention that is seen as what is providing the “value” for the money invested in such interventions.

There may be monetary transactions that do not represent true economic (opportunity) costs – transfer payments, such as sales tax payments to the government, for example. There are also many cases in which opportunity costs exist but no money changes hands, for instance when industries pollute nearby water resources free of charge. In the present context of children with mental disorders, the time spent by relatives, friends or volunteers in caring for the child represents an economic cost, even though it is not directly billed. In many health care interventions, the opportunity cost of time spent in caring for an unhealthy individual is an important, yet mostly unaccounted for, component.

Apart from defining costs (an issue that cannot be covered exhaustively here<sup>6</sup>), measuring economic costs is also a challenge. Identifying accurate ways to account for the time allocated to informal care is only one of the many measurement challenges faced. Difficulty also exists in measuring the costs of formal services used by the patient. The ability to measure those costs depends crucially on how the payment system is organized in any one country or region (8). In the United States, a type of “billing” system records the amounts transferred between a payer and a provider of services utilized by individual patients. This is far less feasible in most European health care systems, where no such billing data exist and where information systems are too underdeveloped to provide a basis for cost calculation.

In this case, other creative ways of collecting data have to be found, such as via interviews with family members or service professionals (15,16). Once the service-use patterns have been specified, unit-cost estimates must be attached to each of the services used. These unit costs may be available from public sources, other research, or may need to be estimated anew by the researcher (17,18).

Cost assessment becomes even more complicated as one moves beyond the simple service cost assessments, for example into the estimation of possible productivity consequences. While the foregone productivity can in principle be proxied by future (foregone) earnings, it is difficult to assess what earnings the child would have had if he or she had not developed mental illness. Referring to some sort of average earnings is the commonly applied solution, but is subject to a potentially large amount of bias. The studies reviewed below only focus on the contemporary productivity consequences for the parents of the child with mental illness, and fail to take into account the child’s future foregone productivity costs.

The difficulties increase when attempting to assign a monetary value to some of the broader consequences, such as social exclusion, stigma or lower quality of life. This is why this type of burden is often excluded from the analysis, leaving out a share of the costs that is particularly large in the case of mental illness.

Who bears the burden of the cost, both at the empirical and conceptual level, is also an important cost-measurement issue. What is seen as “costs” from the perspective of the individual is likely to differ from what the health insurance fund or the government sees as such, which again may have little to do with the relevant costs from a societal perspective. It is important that the cost perspective assumed in any economic evaluation is specified from the outset.

The broadest and most frequently assumed perspective is the societal one. This is the right choice if the main concern is the best possible outcome for society as a whole. The perspectives of individual “players”, such as patients, the insurance fund or other social services, can also be informative; the best possible social outcome may differ from the best possible outcome for each of these players individually. In this case, the social optimum may not be reached because it is incompatible with the incentives of the individual players, and the government may need to provide incentives to induce everybody to also pursue the social optimum.

Attempting to derive cost (or cost–benefit) figures exclusively from a health services perspective will provide an incomplete picture of costs, particularly in the case of mental health, and may substantially underestimate “true” (societal) costs (19). A study conducted in the United Kingdom on children with conduct disorder (20) showed that the greatest part of the cost of mental illness affects sectors outside the health care system, such as social care, education, housing, criminal justice and social security systems (*see also 21*). A mere one sixth of the total cost was found to burden the health service, the remainder falling on schools (special education needs), social care agencies, families (disrupted parental employment, household damage) and

<sup>6</sup> See, for example, Drummond et al. (14) for an in-depth discussion.

the welfare system (disability and similar transfer payments<sup>7</sup>).<sup>8</sup>

In interpreting any of the quantitative evidence presented below, it is important to keep in mind the above-mentioned limitations and problems, which pose severe restrictions on the comparability of cost estimates across different studies.

### Results of systematic review of economic cost estimates

A systematic literature search was performed, collecting the published literature (excluding grey literature) over the past five years (see Box 1 for a description of the search criteria).

#### Box 1. Description of how the literature search was performed

To evaluate the evidence regarding the economic consequences of child and adolescent mental illness in Europe, a comprehensive Medline literature search was conducted of papers published between 1 February 2002 and 1 February 2007 with the following search terms:

- “cost of child and adolescent mental illness”
- “cost” AND the following terms separately (with the criteria that studies will include child and adolescent populations)

<p>“addiction”</p> <p>“ADHD”</p> <p>“affective disorders”</p> <p>“agoraphobia”</p> <p>“anxiety”</p> <p>“autism”</p> <p>“behaviour therapy”</p> <p>“behavioural problems”</p> <p>“CBT”</p> <p>“conduct disorder”</p> <p>“counseling”</p> <p>“deliberate self poisoning”</p> <p>“depression”</p> <p>“developmental delay”</p>	<p>“disruptive behaviour”</p> <p>“Down syndrome”</p> <p>“dysthymia”</p> <p>“educational intervention”</p> <p>“emotional disturbance”</p> <p>“hyperactivity”</p> <p>“insomnia”</p> <p>“manic depression”</p> <p>“mental disability”</p> <p>“mental health”</p> <p>“mental health intervention”</p> <p>“mental retardation”</p> <p>“mood disorder”</p> <p>“music therapy”</p>	<p>“Obsessive Compulsive Disorder”</p> <p>“OCD”</p> <p>“posttraumatic stress”</p> <p>“psychiatric”</p> <p>“psychoeducation”</p> <p>“psychosis”</p> <p>“psychosomatic disorders”</p> <p>“psychotherapy”</p> <p>“psychotropic”</p> <p>“Ritalin”</p> <p>“schizophrenia”</p> <p>“substance abuse”</p> <p>“Tourette’s”</p>
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Only European studies that included economic evaluations on children and adolescents aged below 18 years were selected. Studies that included young people aged less than 18 years but which did not present the costs relevant to the under-18 population separately were not included. Additional relevant publications were found by hand searching “mental illness”-related and health economics journals and by tracking references.

The search led to the identification of only eight studies in the WHO European Region that included economic evaluations of the economic cost/burden of child and adolescent mental illness (Table 2). All studies but one were conducted in the United Kingdom. The reason for this is that the United Kingdom hosts a research centre – the Centre for the Economics of Mental Health (CEMH) at King’s College London – which focuses on economic evaluations of mental health. CEMH conducted six out of the eight economic cost evaluations identified through the literature search.

<sup>7</sup> Note that, as briefly mentioned above, transfer payments are commonly not considered as true economic costs, if a societal perspective is taken.

<sup>8</sup> This finding suggests that the cost of mental illness in young people is probably more dispersed over a variety of sectors than it is in adults, as studies of adults in the United Kingdom have shown that up to two thirds of the total cost of mental health problems falls on the health service (22).

**Table 2**

European studies evaluating the economic consequences of child and adolescent mental illness

Country	Study	Categories of costs/burden that the study included in its economic evaluations					
		Overall	Health system	Social services	Education system	Criminal justice system	Voluntary services
United Kingdom	Barrett et al. (23)	•	•	•	•	•	•
Belgium	De Ridder & De Graeve (24)		•				
United Kingdom	Minnis et al. (25)	•	•	•	•	•	
United Kingdom	Romeo et al. (26)	•	•		•		•
United Kingdom	Clark et al. (27)	•	•	•	•	•	•
United Kingdom	Muntz et al. (28)	•	•	•	•		
United Kingdom	Jäbrink et al. (29)	•			•		•
United Kingdom	Beecham et al. (30)	•	•	•	•		•

The very small number of cost studies indicates the enormous scope for generating more evidence on the economic consequences of child and adolescent mental disorders. The situation is only slightly better for adult mental health in Europe, with only one set of reviews (focusing separately on the economic consequences of psychotic, affective, anxiety and addiction disorders) published in 2004 (31). This set of reviews revealed that economic studies focusing on the burden of adult mental health have been performed in 11 out of the 28 European countries examined; 17 of those countries therefore lack any type of economic data on the burden of mental health for any age.

The comparatively limited interest in economic aspects of mental health is not confined to Europe. Less than 1% of research publications on mental health in low- and middle-income countries globally are devoted to economic evaluations (32). In a review of cost-of-illness (COI) studies on mental health performed globally, only 1 study out of 39 performed in developed countries had focused on children, while none of the 5 studies conducted in developing countries included any evidence on mentally ill children (33).

The relative lack of economic evidence on child and adolescent mental health may be part of a general neglect of research on mental health of children and adolescents. Horwitz et al. (34) examined a database of 45 022 research abstracts and found that, regarding the treatment of depression in primary care settings, there were 15 times more studies focusing on adults than those focusing on children and adolescents. There is also a scarcity of systematic reviews on the currently available epidemiological research on mental illness. According to Wittchen & Jacobi (35), this creates “a core obstacle to the adequate estimation of the total burden associated with these disorders, the degree of met and unmet needs for treatment and intervention, the patterns and costs of treatment, and the health-economic implications and total direct and indirect costs for EU nations”.

The findings of the systematic review are presented below in tables, according to the perspective the cost-estimates are taking. Since not all of the eight studies covered each perspective, the composition of the tables can differ. All costs are converted to euros (1 January 2007 rate). The rate of inflation was calculated using the Consumer Price Index (CPI).

Table 3 presents the results on the estimates of the overall societal cost. Mean annual costs per child range from €7376 to €64 703, depending on the ages included and the conditions examined.

Any attempt to compare the estimated costs is hampered by the large methodological variations among the studies. The methodological differences arise from a variety of sources, ranging from differences in the populations included, the data collection methods employed and the costs included. Also, all the studies examined different age groups and disorders. Age and severity of mental illness, as will be discussed in this paper, can cause considerable variation in costs.

**Table 3**

Economic evaluations of the overall cost of child and adolescent mental illness to society

Country	Study	Study population		Mean annual cost (per child)	Range of costs
		Ages included	Mental illness		
United Kingdom	Barrett et al. (23)	13–18	Adolescents who committed criminal offences (31% with mental health needs, two thirds of whom had significant depressive symptoms).	€51 930	Costs ranged from €27 670 for young offenders out in the community to €68 990 for young offenders in secure facilities. Highest costs incurred were for youngsters suffering from depression – €107 784.
United Kingdom	Minnis et al. (25)	5–16	Children in foster care, of which 90% were previously abused or neglected.	€20 248	
United Kingdom	Romeo et al. (26)	3–8	Severe antisocial behaviour	€7 376	
United Kingdom	Clark et al. (27)	8–18	Emotional, behavioural and mental health disturbance	€64 703	Annual costs between individuals range from €1 590 to €245 921.
United Kingdom	Muntz et al. (28)	2–10	Severe behavioural problems	€12 946	
United Kingdom	Jäbrink et al. (29)	4–10	Autistic spectrum disorder	€52 725	Estimated annual costs rise to €65 407 if a different measurement method is used.
United Kingdom	Beecham et al. (30)	4–11	Severe learning disabilities	€24 517	Annual costs between individuals range from €10 931 to €57 780.

All of the studies acquired their cost estimates from a postal questionnaire, an interview, or a combination of both. It is questionable whether studies relying on questionnaires sent to patients recruited by physicians are likely to obtain fully reliable and accurate data, but often this may be the only way of obtaining any cost information. A number of studies gathered their data retrospectively, while others followed the patient population prospectively over a certain period of time. A prospective study can capture the relevant medical and other service utilization information more accurately compared to a retrospective study, where the respondents need to recall their past service use. Four out of the eight studies conducted were prospective studies.

Five out of the eight studies used questionnaires based on the Client Service Receipt Inventory (CSRI) devised in the United Kingdom in 1986 (36). The CSRI is an inventory specially designed to estimate the economic burden of mental illness, physical disability, old age and child and family problems. In all five studies which utilized the CSRI, the inventory was adapted to suit the specific mental condition and age of the patients examined.

Although the majority of studies included a wide range of cost components that are part of the overall economic burden to society, only two of the studies incorporated productivity costs, which typically comprise a significant portion of the overall cost to society.

A further limitation of the existing evidence is that only a relatively small number of mental illnesses have been economically evaluated for children and adolescents, leaving for future research any assessment of the economic impact of some of the most serious mental disorders, such as schizophrenia, Down syndrome and obsessive compulsive disorder (OCD).

In terms of concrete results, a large variation across individuals is observed within studies. In one study, a 200-fold difference between individuals was found (costs ranging from €1590 to €245 921) (27). Large variations in costs have consistently been found in many studies. For example, a study conducted among only ten families of children with conduct disorder found annual estimated costs among cases to range from €8450 to €63 865 (20). Knapp (37) claims this indicates that for a small number of young people, the costs of treating mental illness is especially high compared to the average because such individuals (who have more-severe illness) account for a highly disproportionate number of poor outcomes.

A range of factors may be causing the variation between cost estimates within each study, including the following.

- Severity of mental illness: severity of mental illness was found to be associated with higher costs (30). Children who showed higher Parent Account of Child Symptoms (PACS, a semi-structured interview assessing the severity and frequency of antisocial behaviours) scores incurred substantially more costs. A higher “antisocial behaviour” or “hyperactivity” score incurred an additional annual cost of €1990 and €3100 respectively (26).
- Additional co-morbid mental illnesses/abnormal behaviours: Beecham et al. (30) found that each additional behavioural problem added €580 to the total annual cost. Barrett et al. (23) found that among young offenders, the highest costs incurred were for those suffering from depression (€107 784 compared to €27 076 for those without depression). Clark et al. (27) found that children with mental health problems who also exhibited inappropriate sexual behaviours, as defined by the Salford Needs Assessment Schedule for Adolescents (SNASA), incurred additional annual costs of €47 844. Autistic children who also had intellectual disabilities incurred an additional annual cost of €21 573 (29).
- Age of children and parents: mental health care costs were found to be associated with age, with children of younger age and older parents accruing higher costs (24,30). Every additional year of age of the child was found to reduce mean annual costs by €6999 (27).
- Family structure: parents who were married or lived together incurred on average €245 more health care costs due to their child’s mental illness compared with single parents (24). Children who lived away from their families incurred substantially higher costs (additional annual costs of €37 600) (27).
- Ethnicity: children of Caucasian ethnic background incurred significantly more costs than their non-white counterparts (€34 481 more costs annually) (27).
- Size of reimbursement received: children who were entitled to a higher reimbursement incurred higher societal costs (€915 annually) (24).
- Type of measurement instrument used: Jäbrink et al. (29) demonstrated that using a different measurement instrument would result in a 24% (€12 682) increase in the estimated annual costs.

Cost estimates can also provide a picture of how the overall burden is distributed across various sectors in society – the health system, social services, the education system, the criminal justice system, voluntary services and parents’ productivity costs. Table 4 provides summary information on the distribution of the costs across different sectors. The percentage numbers are not directly comparable across the different rows, since the studies differ in their coverage of sector-specific costs.

A literal interpretation of the numbers in Table 4 (which should be made with caution in light of the differences between the studies) confirms the earlier statement that costs accrued by the health system comprise only a very small proportion of the overall costs (1.5–15%, with an average of 6.1% between studies). A large part of the burden appears to fall on the education system (2.1–91%, with an average of 45% between studies). The criminal justice system also seems to carry a considerable economic burden, especially with respect to young offenders with mental health problems (23) or children in foster care who have been previously abused or neglected (25). Only a very small share of the costs falls on voluntary services.

Productivity costs were found to be the highest on average (55.5% on average between studies), but were only estimated in two studies, indicating that the other studies, which omitted this component, may be underestimating the overall economic burden. The burden to parents is considerable; 50% of the total cost falls on them, either directly or indirectly. Parents of mentally ill children also had substantial income loss (mean annual income losses of €17 671) (29). This finding may suggest that lower-income families, who are more likely to have children with mental disorders (see background paper by Ravens-Sieberer et al.) could be exposed to the risk of (even greater) poverty, as they will be less able to cope with the resulting income loss and increased expenditures.

**Table 4**

Distribution of child and adolescent mental health costs

Country	Study	Health services costs (%)	Social services costs (%)	Education system costs (%)	Criminal justice system costs (%)	Voluntary service costs (%)	Productivity costs (%)	Other costs (%)
United Kingdom	Barrett et al. (23)	1.8	16.8	2.1	70	0.6	-	8.7
United Kingdom	Minnis et al. (25)	1.5	4.5	72	22	-	-	-
United Kingdom	Romeo et al. (26)	8	-	10	-	3	77	2
United Kingdom	Clark et al. (27)	5	51	38	5	1	-	-
United Kingdom	Muntz et al. (28)	5.5	3.5	91	-	-	-	-
United Kingdom	Jäbrink et al. (29)	24		32	-	0.03	34	10
United Kingdom	Beecham et al. (30)	15	13	70	-	2	-	-
Average cost by service sector		6.1	18.8	40.9	32.3	1.3	55.5	6.9

The wide dispersion of costs seen in Table 4 appears to be unique to mental illness in children and adolescents. As a number of European studies have shown, adult mental illness imposes significantly higher costs on the health service than on any other service (22,31). This may be explained to a large extent by the fact that in children and adolescents, a high percentage of the cost falls on the education system, which is not the case with adults.

Table 5 presents specific costs occurring in the health care system. All studies used United Kingdom data except for one Belgian study (24). Costs range from €395 to €2270 across studies, with 43% of the health care cost falling to the parents (24). The highest burden seems to vary, with studies reporting community health services (30), mental health service home visits (28) and inpatient care (26) as the highest costs. Beecham et al. (30) performed a cost evaluation of child and adolescent psychiatric inpatient care in the United Kingdom and estimated the cost to the health system per inpatient day to be €241, with the largest portion accounted for by nursing costs (€93). This study showed that personnel costs absorb two thirds of the total costs of child and adolescent psychiatric inpatient care.

Studies performing evaluations of the economic costs of child and adolescent mental health to social services have found costs to range from €441 to €32 999 (Table 6). Clark et al. (27) reported substantially higher social costs by including cost estimates for the provision of non-domestic accommodation (60% of the children in the study spent time in social services foster or residential care). All other studies found costs incurred to social workers to be the most substantial cost component. Studies performing evaluations on the economic cost of child and adolescent mental health to the education system are summarized in Table 7. Costs were found to range from €758 to €24 587. Clark et al. (27) reported substantially higher social costs by including cost estimations of the provision of accommodation in residential schools. Again, the highest burden varies across studies, with studies reporting the assistance of educational psychologists (30), special needs teachers (28) and learning support at school (25,26) as the highest costs. The presence of co-morbid mental illness is shown to incur an additional annual cost of €28 304 specifically to the education system (29).



**Table 5**

Economic evaluations estimating the cost of child and adolescent mental illness to the health care system

Country	Study	Study population		Mean annual cost (per child)	Comments
		Ages included	Mental illness		
United Kingdom	Barrett et al. (23)	13–18	Adolescents who committed criminal offences (31% with mental health needs, two thirds of whom had significant depressive symptoms)	€617	
Belgium	De Ridder & De Graeve (24)	Under 16	Attention deficit hyperactivity disorder (ADHD)	€1 085	€619 was burden on the public €467 was parents' out-of-pocket costs
United Kingdom	Minnis et al. (25)	5–16	Children in foster care, of whom 90% were previously abused or neglected	€296	Highest costs incurred to gross product, clinical psychologist, child psychiatrist, and hospital paediatrician
United Kingdom	Romeo et al. (26)	3–8	Severe antisocial behaviour	€663	The highest burden was for inpatient care – €355. Attendance to health care occurred predominantly for accident.
United Kingdom	Clark et al. (27)	8–18	Emotional, behavioural and mental health disturbance	€3 499	
United Kingdom	Muntz et al. (28)	2–10	Severe behavioural problems	€724	Highest costs incurred were for child and adolescent mental health service member home visit – €525
United Kingdom	Beecham et al. (30)	4–11	Severe learning disabilities	€3 842	€875 for hospital services €2 810 for community health services €156 for primary care services

There is considerable evidence to show that mental health problems place young people at heightened risk of involvement with the justice system (38–40), causing a heavy burden to the criminal justice system. The Audit Commission (41) estimated that public services in England and Wales spend around €1.5 billion annually processing and dealing with young offenders. Adults who had conduct disorder as children have been shown to generate costs to society that are 10 times greater than a non-morbid control group (42), indicating the huge continuing burden that adolescent mental illness could have over the whole life-course of an individual. It has been estimated that for every €1 of health service expenditure on people referred for addiction treatment (suffering from substance misuse, which is considered a mental illness), another €3 is incurred by the criminal justice system and €10 by the victims of crime (43).

Economic evaluations estimated the costs to the criminal justice system to range from €3235 to €33 850 (Table 8). Barrett et al. (23) reported substantially higher costs by including only adolescents who committed criminal offences. Youth custody (27) and contact with the police (25) were reported as the highest burden. Regarding the burden on voluntary services, all studies found annual costs to be relatively small, ranging from €163 to €647 (Table 9). Most costs were reported to fall on voluntary day care centres (26) or other voluntary organizations (23,30).

**Table 6**

Economic evaluations estimating the cost of child and adolescent mental illness to social services

Country	Study	Study population		Mean annual cost (per child)	Comments
		Ages included	Mental illness		
United Kingdom	Barrett et al. (23)	13–18	Adolescents who committed criminal offences (31% with mental health needs, two thirds of whom had significant depressive symptoms)	€8 163	
United Kingdom	Minnis et al. (25)	5–16	Children in foster care, of whom 90% were previously abused or neglected	€926	Costs incurred from social worker utilization
United Kingdom	Clark et al. (27)	8–18	Emotional, behavioural and mental health disturbance	€32 999	
United Kingdom	Muntz et al. (28)	2–10	Severe behavioural behaviour	€441	Highest costs incurred were for social worker assistance – €327
United Kingdom	Beecham et al. (30)	4–11	Severe learning disabilities	€5 379	Includes costs for social workers, domestic support workers and for respite care

### The transmission from child to adult mental illness: implications for cost estimates and early intervention

An important point the above studies do not adequately capture relates to the fact that most psychiatric disorders have their origins in childhood, so that the costs incurred by a mentally ill adult can in fact be seen as the delayed costs of child mental illness (which would need to be discounted appropriately). The above studies do not take this lifetime perspective on the costs of mental illness and thereby tend to underestimate the total costs.

It has been shown that the risk for developing most adult-onset disorders can be traced back to childhood adversities. Most disorders which manifest themselves in the early years recur in adulthood (44,45).

Studies carried out in the field of depression, conduct disorder and antisocial behaviour have demonstrated the extent to which the presence of mental illness during childhood can lead to increased costs during adulthood, including the following.

- Depression: Knapp et al. (46) showed that children and adolescents who had depression, with or without co-morbid conduct disorder, incur significantly higher inpatient care and criminal justice service utilization rates when in adulthood and, consequently, significantly higher total costs than the general adult population. McCrone et al. (47) performed an economic evaluation to estimate the mean annual cost of treating adults who had depression during childhood and found it to be €1309 (range €0 – €11 080).
- Conduct disorder: Scott et al. (42) carried out a longitudinal study in London that followed 10-year-old children into adulthood. It found that by age 28, costs for individuals with conduct disorder were 10 times higher than for those who faced no conduct problems during childhood. This finding is explained by the fact that once conduct disorder/antisocial behaviour appears in a child, it tends to persist, as 40% of 8-year-olds with conduct disorder are repeatedly convicted of crimes such as theft, vandalism and assault in adolescence (48). Once these individuals enter adulthood, they continue to commit criminal offences, have erratic employment patterns in unskilled jobs and violent relationships with partners (49).

**Table 7**

Economic evaluations estimating the cost of child and adolescent mental illness to the education system

Country	Study	Study population		Mean annual cost (per child)	Comments
		Ages included	Mental illness		
United Kingdom	Barrett et al. (23)	13–18	Adolescents who committed criminal offences (31% with mental health needs, two thirds of whom had significant depressive symptoms)	€1 045	
United Kingdom	Minnis et al. (25)	5–16	Children in foster care, of whom 90% were previously abused or neglected	€14 598	Costs incurred through having learning support at school, contact with educational psychologists, and creating a record of their special education requirements
United Kingdom	Romeo et al. (26)	3–8	Severe antisocial behaviour	€758	Classroom assistance costs – €129 Special need support costs – €16 Educational psychologist costs – €14
United Kingdom	Clark et al. (27)	8–18	Emotional, behavioural and mental health disturbance	€24 587	
United Kingdom	Muntz et al. (28)	2–10	Severe behavioural problems	€11 781	Highest costs incurred were for special needs teacher – €7 344, and special school attendance – €2 943
United Kingdom	Jäbrink et al. (29)	4–10	Autistic spectrum disorder	€17 123	Educational costs for a child with a learning disability are higher than for a child without (€33 737 compared to €5 432)
United Kingdom	Beecham et al. (30)	4–11	Severe learning disabilities	€17 490	Includes costs for educational psychologists and educational social workers

- Antisocial behaviour: increased costs in adulthood can also be the product of increased unemployment, low-paid work and/or a reduced income. Research conducted on a cohort of working class boys, who exhibited antisocial behaviour tendencies at an early age and who subsequently engaged in delinquent behaviour during their adolescence, found them to have a significantly higher probability of experiencing long periods of time out of the workforce, lengthy periods of unemployment and low-paid work and lower levels of expected earnings from employment during adulthood (50).

The increased burden child mental illness creates during adulthood is also explained by the fact that the prevalence of certain mental illnesses, such as obsessive compulsive disorder, is known to rise exponentially with increasing age (51). Suffering from a mental illness during childhood generally demonstrates that the individual suffers from the early-onset form of that mental illness, which in most mental illnesses, such as schizophrenia, is considered to be the most severe and, consequently, comes with a higher burden (52).

In summary, child and adolescent mental health problems are closely associated with psychiatric and other problems in adulthood, a feature that a lifetime cost assessment of child or adolescent mental illness should take into account. The close links between child and adult mental illness also indicate that early intervention may be particularly effective and necessary (53–55), an issue that will be expanded in the following section.

**Table 8**

Economic evaluations estimating the cost of child and adolescent mental illness to the criminal justice system

Country	Study	Study population		Mean annual cost (per child)	Comments
		Ages included	Mental illness		
United Kingdom	Barrett et al. (23)	13–18	Adolescents who committed criminal offences (31% with mental health needs, two thirds of whom had significant depressive symptoms)	€33 850	
United Kingdom	Minnis et al. (25)	5–16	Children in foster care, of whom 90% were previously abused or neglected	€4 430	Costs incurred through contact with the police
United Kingdom	Clark et al. (27)	8–18	Emotional, behavioural and mental health disturbance	€3 235	Youth custody accounted for 60% of total costs. Other significant cost drivers were contacts with youth offending team and days in court.

**Table 9**

Economic evaluations estimating the cost of child and adolescent mental illness to voluntary services

Country	Study	Study population		Mean annual cost (per child)	Comments
		Ages included	Mental illness		
United Kingdom	Barrett et al. (23)	13–18	Adolescents who committed criminal offences (31% with mental health needs, two thirds of whom had significant depressive symptoms)	€311	
United Kingdom	Romeo et al. (26)	3–8	Severe antisocial behaviour	€205	Costs incurred to voluntary day care, drop-in and home-based services and voluntary advice services
United Kingdom	Clark et al. (27)	8–18	Emotional, behavioural and mental health disturbance	€655	
United Kingdom	Jäbrink et al. (29)	4–10	Autistic spectrum disorder	€163	
United Kingdom	Beecham et al. (30)	4–11	Severe learning disabilities	€531	Costs incurred to voluntary organizations

## Economic evaluation of interventions to prevent and treat mental illness among children and adolescents

The previous section covered the existing evidence on the economic consequences of child and adolescent mental illness. Such evidence is useful in helping to better understand its far-reaching consequences and thereby to attract greater attention from policy-makers, especially in the non-health domain. At the same time, the cost evidence on its own is very limited from a policy perspective in that it does not provide useful indications as to where or how to invest, and for what “value for money”.

Cost studies typically measure the economic burden associated with the entire prevalence of a disease or condition. To better inform policy decisions, it would be more useful to know what share of the burden of disease could realistically be eliminated by specific interventions and what the costs of such interventions would be. If this type of information was available for a set of interventions, decision-makers would be able to prefer those that would achieve the greatest benefits for the limited amount of resources available. This is the main aim of the economic evaluation of interventions, and is the focus of the present section. A short typology of the different economic evaluation methodologies is presented in Box 2. The purpose of this section is to utilize existing European work on the economic evaluations of interventions to address children’s and adolescents’ mental health problems. First, a systematic review is presented (following the search criteria outlined in Box 1), featuring published studies that focus on child and adolescent mental health interventions directly. Four studies were identified from the literature as being conducted in the last five years. Another seven studies which were conducted before 2002, identified by the Romeo et al. (56) review, were also included, giving a total of 11 studies (Table 10). There follows a presentation of economic evaluations of interventions that captured broader aspects of child well-being, which included, but were not limited to, specific mental health outcomes.

Considering the wide range of mental health problems in childhood and adolescence and the large number of currently available interventions, the total number of studies identified by the literature search is very small. This severely restricts the extent to which solid conclusions can be reached regarding policy formulation or the general cost–effectiveness of interventions on child and adolescent mental health problems. It will be possible to derive firm policy recommendations only when a larger number of interventions have been evaluated.

The identified studies covered several mental health areas, but mostly focused on ADHD and behavioural/emotional problems. Economic evaluations conducted outside the European region (the United States and Canada) appear to have the same areas of focus (56).

Cost–effectiveness is the most frequently applied economic evaluation method. Seven out of the eleven studies were cost–effectiveness studies, one was a cost–utility analysis, and three were cost–offset evaluations (cost–offset evaluations are included here but it must be noted that they do not represent true economic evaluations, since they do not really measure value for money). The small number cost–utility analysis (CUA) studies is disappointing, considering the fact that CUA is becoming one of the favoured tools in economic evaluation of health care as it is the only type of health-economic analysis which incorporates utility scores (the preferences individuals or society may have for any particular set of health outcomes). The scarcity of CUA studies can be partially explained by the fact that there is still difficulty and controversy concerning the way patients’ points of view can be incorporated in an economic analysis and eventually expressed in monetary terms.

Three studies (57–59) reported no significant differences in costs or outcomes between the interventions examined, one (60) reported poorer outcomes but much lower costs, one (59) reported improved outcomes but higher costs, and six (28,61–65) showed improved outcomes and reduced costs for specific interventions. Such findings could prove useful in determining whether a specific intervention should be favoured, as an intervention that has better outcomes and lower costs should be the preferred intervention for health care providers and policy-makers.

For example, out of the cost–offset studies reviewed, the Bagley & Pritchard study (62) is the clearest example of positive outcomes and reduced costs of one intervention compared to another. It demonstrates how a school social work intervention can bring a significant improvement in outcomes in areas such as self-reported theft, truancy, bullying and net exclusions compared to schools where such an intervention was not implemented, while producing a net saving of €418 889. When studies come to such clear positive conclusions regarding certain interventions, it is much easier for policy-makers to be convinced to invest in such interventions. This may happen as long as more studies focus on this intervention, replicating such positive results.

**Box 2. Modes of economic evaluation**

Cost-of-illness analysis	To itemize, value and sum the costs of a particular problem with the aim of giving an idea of its economic burden.
Cost–offset analysis	The costs incurred are compared with the costs saved. User-focused outcomes (such as change in clinical status) are not taken into account.
Cost–minimization analysis	If the interventions have the same consequences, the economic analysis can concentrate on inputs only. This analysis is concerned with the identification of the intervention with the lowest possible costs.
Cost–effectiveness analysis	If the outcome of interest is the same in two programmes, but they have different success in achieving the outcome.
Cost–consequences analysis	The total and component costs are computed and change is measured along every one of the relevant dimensions for each intervention.
Cost–benefit analysis	If neither the consequences nor the outcomes of two programmes is the same. Cost–benefit analysis aims to compare all social costs and consequences across different interventions or against a do-nothing option.
Cost–utility analysis	This analysis is preferred by analysts who have reservations about directly valuing benefits in dollar/euro terms. Utility refers to the preferences individuals or society may have for any particular set of health outcomes. This approach incorporates quality of life adjustments to treatment outcomes.

On the other hand, when an intervention proves to have better outcomes but comes with a higher cost (instead of a net saving), the question arises of whether those additional expenditures to perform the intervention (that would otherwise be spent on other health care areas or to cover the cost of treating more patients) are worth the improved health outcomes they will generate. For example, a study that focused on evaluating the cost–effectiveness of individual versus group psychotherapy for sexually abused girls (66) found individual therapy to bring greater improvement in some symptoms of post-traumatic stress, but it was associated with a higher cost (€1833 more costly). The study measured costs and outcomes over a two-year period, which is relatively long compared to the follow-up periods usually employed by similar type of studies, but it is also possible that relative longer-term service use and cost patterns might differ from those observed over two years.

Two of the economic evaluations on interventions focused on children diagnosed with ADHD, examining the cost–utility and cost–effectiveness of methylphenidate treatment. One (64) found methylphenidate treatment to generate a cost–effectiveness ratio of €11 556 to €14 367 per quality-adjusted life-year (QALY) compared to a placebo. The other (65) found methylphenidate to have both better health and cost outcomes compared to behavioural therapy. Combining the findings of both studies suggests that methylphenidate treatment seems to be a sound cost-effective option for treatment of ADHD, although it must also be compared with the other currently available (pharmacological and non-pharmacological) treatments for children who suffer from this disorder.

**Factors which influence the cost–effectiveness of interventions**

It is important to ascertain which factors are influencing the observed differences in the cost–effectiveness of interventions on child and adolescent mental health. In a comprehensive review of mental health economic studies performed in both children and adults (33), the cost of mental health service provision was shown to be influenced by the clinical, social and demographic characteristics of patients, the treatment and service settings (patients, staff, environmental, institutional and management characteristics) before, during and after the intervention, and the preferences of health and social workers.

Related work has identified a number of factors that influence the cost–effectiveness of interventions performed in child and adolescent mental health, including the following.

- The range of mental health services provided: evidence suggests that the range of mental health services provided to children and adolescents is more important than the location/setting of treatment (67,68).
- Intensity and duration: French et al. (67) found that mental health care costs generally reflect intensity and duration of treatment.
- Supportive environment: there is evidence from the substance misuse context showing that interventions are more likely to be successful if the environment is supportive and if the intervention increases the degree to which health care providers feel able and willing to provide such interventions (69). Of course, such interventions may be unsuccessful in many cases due to locality-specific barriers to change, such as in Georgia, where psychiatric hospital closure and transfer to community services may be resisted, as the hospital will most likely be the main employer in a locality (70,71).
- Amount of training and supervision provided: French et al. (67) suggest that training, supervision and a supportive environment increase the likelihood that health professionals will have access to, and be more likely to use faithfully, the latest treatment technologies, with resultant cost benefits.
- Coordination in the provision of treatment: waiting-list delays and poorly coordinated care of different treatment components affect treatment costs, in addition to young people’s motivation, engagement and adherence (72).

When trying to transfer the results of any one study onto a different setting, it is important to be aware of these (and possibly other) factors affecting the cost–effectiveness of interventions to a large extent.

#### **Economic and non-economic evaluations of “broader” child intervention/prevention programmes**

This section focuses on a number of broader interventions that target child and adolescent mental illness as one of several general objectives. Not all of these interventions have been evaluated in economic terms, but the broader perspective they follow presents the scope for further work on economic evaluations. Early interventions are also considered, based on the idea that earlier interventions are more likely to be effective and perhaps even cost effective, an issue that could not be adequately addressed in the studies reviewed above, where the time horizon was commonly rather short. A number of studies have shown that the treatment of mental health problems is most effective when problems are identified early and appropriate treatment begins without delay (73–78). For example, intervening for serious antisocial behaviour in adolescence is considerably less effective than intervening during childhood (49).

Jané-Llopis & Anderson (79) suggest and analyse the multitude of preventive interventions that could be promoted to achieve better mental health outcomes for individuals in childhood, as well as when they enter adulthood (Table 11). (Note that not all of these interventions have undergone an economic evaluation or have been shown to be effective.) This section focuses on a number of broader interventions that target child and adolescent mental illness as one of several general objectives. Not all of these interventions have been evaluated in economic terms, but the broader perspective they follow presents the scope for further work on economic evaluations. Early interventions are also considered, based on the idea that earlier interventions are more likely to be effective and perhaps even cost effective, an issue that could not be adequately addressed in the studies reviewed above, where the time horizon was commonly rather short. A number of studies have shown that the treatment of mental health problems is most effective when problems are identified early and appropriate treatment begins without delay (73–78). For example, intervening for serious antisocial behaviour in adolescence is considerably less effective than intervening during childhood (49).

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What follows is a short summary of some studies that have provided economic evaluations of interventions which target child welfare more generally, including mental health. It appears that there is at least some suggestive economic evidence in favour of a number of early interventions.

**Table 10**

Economic evaluations of interventions on child and adolescent mental health  
Source: Authors; Romeo et al. (56)

Country	Study	Type of evaluation	Mental health problem	Interventions evaluated
United Kingdom, Finland, Greece, Serbia, Cyprus	Knapp et al. (59)	Cost–offset	Families with newborns in need (families characterized by factors known to influence child mental health)	Supportive home visits using the European Early Promotion Project model
United Kingdom	McCrone et al. (47)	Cost–effectiveness	Emotional and behavioural problems arising from sexual abuse	Individual therapy vs group therapy
United Kingdom	Muntz et al. (28)	Cost–effectiveness	Behavioural problems	Intensive practice-based parenting programme vs standard treatment
United Kingdom	Vanoverbeke et al. (65)	Cost–effectiveness	ADHD	Immediate-release methylphenidate (MPH-IR) vs long-acting methylphenidate (MPH) vs behavioural therapy
United Kingdom	Gilmore & Milne (64)	Cost–utility	ADHD	Methylphenidate vs placebo
United Kingdom	Harrington et al. (58)	Cost–effectiveness	Behavioural problems	Community vs hospital-based parental education groups
United Kingdom	Byford et al. (57)	Cost–effectiveness	Deliberate self-poisoning	Home-based social intervention plus routine care vs routine care alone
United Kingdom	Bagley & Pritchard (62)	Cost–offset	Behavioural problems	School social work intervention
Norway	Rund et al. (61)	Cost–effectiveness	Early-onset schizophrenia	Psychoeducational vs standard treatment
Netherlands	Slot et al. (60)	Cost–effectiveness	Antisocial behaviour	Community-based residential treatment vs state correctional institute
Sweden	Gustafsson & Svedin (63)	Cost–offset	Psychosomatic or somatic disorders	Family therapy



Outcome measures	Costs measured	Findings/results
Child, parents and family functioning	Costs of health and social services and criminal justice system	No significant difference was found in costs between interventions in any country or in the cost of interventions between countries. No significant outcomes were found in child and parental outcomes. Significant positive effects were found on child–mother interaction, especially in Greece, while smaller effects were noticed in the United Kingdom and Finland.
Psychiatric symptoms, post-traumatic stress symptoms, and global functioning	Cost of treatment	Greater improvement in some symptoms of post-traumatic stress for the individual therapy group, which was also more costly by €1 833.
Externalist T-scale of the Child Behaviour Checklist	Cost of health, education and social services	At six-month follow up, both groups showed improved behaviour. At four-year follow up, only practice-based treatment showed sustained improvement. Incremental cost–effectiveness ratio (ICER) for parent-based treatment was €329 compared to standard treatment.
Probability of treatment failure or success	Cost of health service	Starting treatment with MPH had the best outcome, followed by MPH-IR and behavioural treatment. The highest costs resulted from behavioural therapy (€2 626). The other two treatments had similar costs (€1 666 for MPH and €1 630 for MPH-IR).
QALY	Cost of health service	Methylphenidate generated a cost–effectiveness ratio of €11 556 to €14 367 per QALY.
Child’s behaviour and parental perceptions of parenting problems	Cost of health, education, social, voluntary and private sector services	No significant difference between groups in outcomes or costs.
Suicidal ideations, hopelessness and family functioning	Cost of health, education and social services	No significant differences between groups in outcome measures or scores.
Cost of school exclusions	Cost of exclusion unit, home tuition, project workers	Significant reduction in self-reported theft, truancy, bullying and net exclusions. Reduction in school exclusion brought a net benefit of €418 889.
Relapses and psychosocial functioning	Costs of treatment and social welfare	Psychoeducational intervention more effective in terms of relapse and cost.
Problems, family relationships, and community participation	Costs of residential centre	Poorer outcomes but much lower costs for community intervention.
Cost of inpatient stays	Cost of treatment	Higher decrease in hospitalization days in treated groups vs controls. Total cost of treatment offset by inpatient-days savings.

### Early intervention programmes targeting parents

Parent training programmes in the United States and the United Kingdom have been shown to have large effects (42,80). In certain cases, the cost of such programmes could be as low as €800 per child and they have been shown to save money in the long term (42,81).<sup>9</sup> Interventions involving home visits to first-time mothers (during pregnancy and early infancy) addressing maternal substance use, coping with stress, parental caregiving and links to support systems and health services can achieve health, social and economic gain (83–85). Interventions such as the Prenatal/Early Infancy Project (a nurse-led home visiting programme) improve mental health outcomes in both children and mothers, achieve long-term reductions in child and adolescent problem behaviours (83–85) and are considered to be cost effective, especially when long-term outcomes are taken into account (85,86).

### Preventive preschool education programmes

A preventive preschool education programme in the United States, which focused on children aged 3–4 years who were growing up in poverty, achieved fewer delinquent acts, less use of special education, less reliance on social assistance and better peer relationships. The cost–offset derived from the intervention was US\$ 15 000 per child by age 19 and accrued net benefits were found to rise to US\$ 29 000 by age 27. By age 40, it has been estimated that the programme returned to the public US\$ 17.07 for every dollar spent (87–92).

Karoly et al. (92) conducted a comprehensive cost–offset analysis of early childhood interventions and found that of the six individual programmes they evaluated and found to be effective, only one did not accrue any savings. The other five programmes brought returns to society ranging from €1.26 to €17.07 for every €1.00 spent. A significant finding of this study was that the largest benefit–cost ratios were associated with programmes with longer-term follow up, which allowed measurement of outcomes at older ages. This demonstrates that the benefits from early interventions are long lasting and that the savings the programmes generate can in effect be substantially more than are estimated in short-term follow ups.

**Table 11**

Approaches for prevention and promotion of child and adolescent mental health

Source: adapted from Jané-Llopis & Anderson (79)

Mental health policy and programmes	Public health and public policy
<ul style="list-style-type: none"> <li>• General school skill-building programmes (such as life skills, problem solving)</li> <li>• Changing school environment</li> <li>• Holistic school interventions combining skill building and changes in the environment</li> <li>• Cognitive behavioural programmes for children at risk of depression</li> <li>• Stress-management techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Home visiting, healthy development</li> <li>• Parenting interventions</li> <li>• Taxation of alcohol and tobacco</li> <li>• Comprehensive and media community interventions for alcohol</li> <li>• Reduction of means to commit suicide</li> <li>• Policies to reduce economic insecurity</li> <li>• Social policies to promote social support and inclusion and prevent social exclusion</li> <li>• Access to preschool education</li> <li>• Housing improvement</li> </ul>

<sup>9</sup> For an extensive review of the effectiveness and cost–effectiveness of parent training programmes for the treatment of conduct disorders in children, see Dretzke et al. (82).

It is clear that more work could be done on early intervention programmes, but the nature of such interventions, with the long-time horizon over which the resulting benefits will be accrued and will have to be monitored, is likely to reduce their attractiveness to policy-makers, who want quick results, and to researchers, who may not have the resources to undertake long-term studies.

## Limitations of the study

Only some of the potentially relevant economic aspects (or issues where an economic perspective might add potential value) could be covered in this paper. For instance, the inefficiency of the current health system in terms of mental health care provision for children and adolescents has not been addressed. Evidence exists of large unmet needs and barriers to care and problems created (93–97). The socioeconomic distribution of child and adolescent mental illness has not been considered (this issue is addressed by the background paper by Ravens-Sieberer et al.), nor has the economic justification for public intervention in this specific area been discussed. This is a potentially significant issue as the presence of higher costs or the evidence of cost–effectiveness by themselves do not provide a sufficient justification for government to step in and carry out such interventions. Other work exists, however, most notably Beeharry et al. (98), which develops a fairly good case for government involvement based on strict economic criteria.

## Conclusion

The main purpose of the background paper has been to assess the available European evidence on the economic consequences of child and adolescent mental illness and the economic evaluations of interventions. Overall, very sparse evidence was found on both issues, the majority coming from the United Kingdom. Given the limits to transferability of results from one country to another, this poses severe restrictions on the extent to which other European countries can make reference to such country-specific information (33).

With increasing requests to prove value for money in public spending, it is possible that the lack of economic evidence has contributed to the low budgetary priority on child and adolescent mental health policy. At the same time, it must be acknowledged that while economic evidence is an important input into decision-making, it is clearly not the only relevant issue.

Despite the limited evidence, certain important findings stand out, which can be summarized as follows.

- An interesting, possibly striking, finding regards the costs of mental illness among children and adolescents falling to a very large extent on sectors outside the health care system. Only 6% of cost falls on the health system. This may provide a rationale for other sectors to become more involved in addressing the problem.
- The evidence suggests that productivity costs seem to take the highest burden. Unfortunately, only two of the studies within the sample have considered this issue. Should this result be shown to hold more generally, the policy implications would be to support low-income families with children with mental illness, as they would be affected most by such a burden.
- Only a few types of mental illnesses, out of the wide range, have been economically evaluated, leaving a lack of any type of cost information for many serious mental illnesses (such as schizophrenia).
- The economic burden of a mental illness can vary greatly between individuals. A variety of factors that can affect the cost of illness have been suggested, such as the severity of the mental illness, age, family structure, ethnicity and the presence of co-morbid mental illness.
- There are close links between child and adult mental illness – the presence of mental illness during childhood may lead to up to 10 times higher costs during adulthood, which indicates that early intervention may be particularly effective and necessary.
- It is very difficult to derive solid conclusions about the general cost–effectiveness of interventions on child and adolescent mental health problems, as only a very limited number of economic evaluations have been conducted. Certain studies are indicative of cost–effectiveness and improved outcomes that specific interventions can achieve, such as the Bagley & Pritchard study (62) on a school social work intervention.
- Consequently, more research is needed to better understand the size and distribution of the cost burden (especially in European countries outside the United Kingdom) and to provide more comprehensive and comparable assessments of the

“return” on investing in child and adolescent mental health via the different, narrow and broad options available. There appears to be a particular “return” to more investment in economic evaluation of early child interventions.

## References

1. Patel V et al. Mental health of young people: a global public-health challenge. *Lancet*, 2007, 369:9569:1302–1313.
2. WHO European strategy for child and adolescent health and development. Copenhagen, WHO Regional Office for Europe, 2005 ([http://www.euro.who.int/childhealthdev/strategy/20060919\\_1](http://www.euro.who.int/childhealthdev/strategy/20060919_1), accessed 22 May 2008).
3. Rutter M, Smith DJ. *Psychosocial disorders in young people: time trends and their courses*. Chichester, John Wiley & Sons, 1995.
4. Collishaw S et al. Time trends in adolescent mental health. *The Journal of Child Psychology and Psychiatry*, 2004, 45:8:1350–1362.
5. *The ICD–10 classification of mental and behavioural disorders*. Geneva, World Health Organization, 1992.
6. *Diagnostic and statistical manual of mental disorders*, 4th ed. Washington, DC, American Psychiatric Association, 2000.
7. WHO resource book on mental health: human rights and legislation. Geneva, World Health Organization, 2005.
8. Knapp M. Economic outcomes and levers: impacts for individuals and society. *International Psychogeriatrics*, 2007, 19:3:483–495.
9. Musgrove P. Public spending on health care: how are different criteria related? *Health Policy*, 1999, 47:207–223.
10. Hauck K, Smith PC, Goddard M. What to buy? Revisiting priority setting in health care. In: Preker AS, Langenbrunner JC, eds. *Spending wisely: buying health services for the poor*. Washington, DC, The World Bank, 2005:61–77.
11. Chisholm D. The economic consequences of depression. In: Dawson A, Tyle A, eds. *Depression: social and economic timebomb*. London, British Medical Journal Books on behalf of the WHO Regional Office for Europe, 2001:121–129.
12. Byford S, Knapp M. What is best value? The health economic evidence. In: Williams R, Kerfoot M, eds. *Child and adolescent mental health services: strategy, planning, delivery and evaluation*. Oxford, Oxford University Press, 2005:143–157.
13. Brent RJ. *Cost–benefit analysis and health care evaluations*. Cheltenham, Edward Elgar, 2003:31.
14. Drummond MF et al. *Methods for economic evaluation of health care programmes*, 3rd ed. Oxford, Oxford University Press, 2005.
15. Wimo A et al. Assessment of informal services to demented people with the RUD instrument. *International Journal of Geriatric Psychiatry*, 2000, 15:969–971.
16. Beecham JK, Knapp MRJ. Costing psychiatric interventions. In: Thornicroft G, ed. *Measuring mental health needs*, 2nd ed. London, Gaskell/Royal College of Psychiatrists, 2001.
17. Wimo A et al. Resource utilisation and cost analysis of memantine in patients with moderate to severe Alzheimer’s disease. *Pharmacoeconomics*, 2003, 21:327–340.
18. Knapp M et al. Economic barriers to better health practice and policy. *Health Policy Plan*, 2006, 21:3:157–170.
19. Hill P. Local specialist and adolescent mental health services. In: Rutter M, Taylor E, eds. *Child and adolescent psychiatry*, 4th ed. Oxford, Blackwell Publishing, 2004.
20. Knapp M, Scott S, Davies J. The cost of antisocial behaviour in younger children. *Clinical Child Psychology and Psychiatry*, 1999, 4:457–473.
21. Knapp M. Hidden costs of mental illness. *British Journal of Psychiatry*, 2003, 183:477–478.
22. Byford S et al. Cost–effectiveness of intensive v. standard care management for severe psychotic illness: UK700 case management trial. *British Journal of Psychiatry*, 2000, 176:537–543.
23. Barrett B et al. Mental health provision for young offenders: service use and cost. *British Journal of Psychiatry*, 2006, 188:541–546.
24. De Ridder A, De Graeve D. Healthcare use, social burden and costs of children with and without ADHD in Flanders, Belgium. *Clinical Drug Investigation*, 2006, 26:2:75–90.
25. Minnis H et al. Children in foster care: mental health, service use and costs. *European Child and Adolescent Psychiatry*, 2006, 15:63–70.
26. Romeo R, Knapp M, Scott S. Economic cost of severe antisocial behaviour in children – and who pays it. *British Journal of Psychiatry*, 2006, 188:547–553.
27. Clark AF et al. Children with complex mental health problems: needs, costs and predictors over one year. *Child and Adolescent Mental Health*, 2005, 10:4:170–178.
28. Muntz R et al. Economic evaluation of treatments for children with severe behavioural problems. *The Journal of Mental Health Policy and Economics*, 2004, 7:177–189.
29. Jäbrink K, Fombonne E, Knapp M. Measuring the parental, service and cost impacts of children with autistic spectrum disorder: a pilot study. *Journal of Autism and Developmental Disorders*, 2003, 33:4:395–402.
30. Beecham J et al. Children with severe learning disabilities: needs, services and costs. *Children & Society*, 2002, 16:168–181.
31. Jönsson B, Olesen J. A review of European studies on the economic burden of brain diseases. *The European Journal of Health Economics*, 2004, Suppl 1:S4.
32. Saxena S et al. Brief report – mental health research on low- and middle-income countries in indexed journals: a preliminary assessment. *The Journal of Mental Health Policy and Economics*, 2004, 8:1:127–131.
33. Shah A, Jenkins R. Mental health economic studies from developing countries reviewed in the context of those from developed countries. *Acta Psychiatrica Scandinavica*, 2000, 101:87–103.
34. Horwitz AM et al. Barriers to health care research for children and youth with psychosocial problems. *Journal of the American Medical Association*, 2002, 288:1508–1512.
35. Wittchen HU, Jacobi F. Size and burden of mental disorders in Europe – a critical review and appraisal of 27 studies. *European Neuropsychopharmacology*, 2005, 15:357–376.
36. Beecham JK, Knapp MRJ. Costing psychiatric interventions. In: Thornicroft G, Brewin C, Wing JK, eds. *Measuring mental health needs*. London, Gaskell, 1992:203–227.
37. Knapp M. Economic evaluation and conduct disorders. In: Hill J, Maughan B, eds. *Conduct disorders in childhood and adolescence*. Cambridge, Cambridge University Press, 2000:478–506.
38. Elliott DS, Huizinga D, Menard S. *Multiple problem youth: delinquency, substance abuse, and mental problems*. New York, NY, Springer Verlag, 1989.
39. Ellickson P, Saner H, McGuigan KA. Profiles of violent youth: substance use and other concurrent problems. *American Journal of Public Health*, 1997, 87:6: 985–991.
40. Arseneault L et al. Mental disorders and violence in a total birth cohort: results from the Dunedin Study. *Archives of General Psychiatry*, 2000, 57:10:979–986.

41. *Misspent youth*. London, Audit Commission, 1996.
42. Scott S et al. Multicentre controlled trial of parenting groups for childhood antisocial behaviour in clinical practice. *British Medical Journal*, 2001, 323:194–198.
43. Healey S et al. Economic burden of drug dependency: social costs incurred by drug users at intake to the National Treatment Outcome Research Study. *The British Journal of Psychiatry*, 1998, 173:160–165.
44. Costello JE, Egger H, Angold A. 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: i. methods and public health burden. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2005, 44:10: 972–986.
45. Costello JE, Foley DL, Angold A. 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: ii. developmental epidemiology. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2005, 45:1:8–25.
46. Knapp M et al. The Maudsley long-term follow-up of child and adolescent depression: 3. Impact of comorbid conduct disorder on service use and costs in adulthood. *The British Journal of Psychiatry*, 2002, 180:19–23.
47. McCrone P, Knapp M, Fombonne E. The Maudsley long-term follow-up of child and adolescent depression: predicting costs in adulthood. *European Child and Adolescent Psychiatry*, 2005, 14:407–413.
48. Farrington DP. The development of offending and antisocial behaviour from childhood: key findings from the Cambridge study in delinquent development. *Journal of Child Psychology and Psychiatry*, 1995, 36:929–964.
49. Rutter M, Giller H, Hagell A. *Antisocial behaviour by young people*. Cambridge, Cambridge University Press, 1998.
50. Healey A, Knapp M, Farrington DP. Adult labour market implications of antisocial behaviour in childhood and adolescence: findings from a UK longitudinal study. *Applied Economics*, 2004, 36:93–105.
51. Heyman I et al. Prevalence of obsessive-compulsive disorder in the British nationwide survey of child mental health. *International Review of Psychiatry*, 2003, 15:1–2:178–184.
52. Schulz SC et al. Treatment and outcomes in adolescents with schizophrenia. *Journal of Clinical Psychiatry*, 1998, 59:Suppl 1:50–56.
53. House of Commons Health Committee. *Child and adolescent mental health services*. Fourth report, Session 1996/1997, HC 26–I. London, HMSO, 1997.
54. Maughan B, Rutter M. Continuities and discontinuities in antisocial behaviour from childhood to adult life. In: Ollendick TH, Pronz RJ, eds. *Advances in clinical child psychology*. New York, NY, Plenum, 1998:1–47.
55. *Bright futures: promoting children and young people's mental health*. London, Mental Health Foundation, 1999.
56. Romeo R, Byford S, Knapp M. Annotation: economic evaluations of child and adolescent mental health interventions: a systematic review. *Journal of Child Psychology and Psychiatry*, 2005, 46:9:919–930.
57. Byford S et al. Cost–effectiveness analysis of a home-based social work intervention for children and adolescents who have deliberately poisoned themselves: results of a randomised controlled trial. *The British Journal of Psychiatry*, 1999, 174:56–62.
58. Harrington R et al. Randomised comparison of the effectiveness and cost of community and hospital-based mental health services for children with behavioural disorders. *British Medical Journal*, 2000, 321:1047–1050.
59. Knapp M et al. Primary prevention of child mental health problems using primary health care professionals: cost comparisons. *The International Journal of Mental Health Promotion*, 2005, 7:1:95–102.
60. Slot NW, Jagers HD, Dangel RF. Cross-cultural replication and evaluation of the teaching family model of community-based residential treatment. *Behavioural Residential Treatment*, 1992, 7:351–354.
61. Rund BR et al. The Psychosis Project: outcomes and cost–effectiveness of a psychoeducational treatment programme for schizophrenic adolescents. *Acta Psychiatrica Scandinavica*, 1994, 89:211–218.
62. Bagley C, Pritchard C. The reduction of problem behaviours and school exclusion in at-risk youth: an experimental study of school social work with cost benefit analyses. *Child Family Social Work*, 1998, 3:219–226.
63. Gustafsson PA, Svedin CG. Cost–effectiveness: family therapy in a paediatric setting. *Family Systems Medicine*, 1998, 6:162–175.
64. Gilmore A, Milne R. Methylphenidate in children with hyperactivity: review and cost–utility analysis. *Pharmacoepidemiology and Drug Safety*, 2001, 10:85–94.
65. Vanoverbeke N et al. A cost analysis of the management of attention-deficit/hyperactivity disorder (ADHD) in children in the UK. *Journal of Medical Economics*, 2003, 6:79–94.
66. McCrone P et al. Cost–effectiveness of individual versus group psychotherapy for sexually abused girls. *Child and Adolescent Mental Health*, 2005, 10:1:26–31.
67. French M et al. The economic cost of outpatient marijuana treatment for adolescents: findings from a multisite field experiment. *Addiction*, 2002, 97:Suppl 1:84–97.
68. Knapp M et al. *An international review of cost–effectiveness studies for mental disorders*. Washington, DC, Fogarty International Centre of the National Institutes of Health, 2004.
69. Deehan A, Marshall E, Strang J. Tackling alcohol misuse: opportunities and obstacles in primary care. *British Journal of General Practice*, 1998, 48:1779–1782.
70. Sharashidze M et al. Georgia mental health country profile. *International Review of Psychiatry*, 2004, 16:1–2:107–116.
71. Knapp M et al. Cognitive stimulation therapy for people with dementia: cost–effectiveness analysis. *The British Journal of Psychiatry*, 2006, 16:1143–1148.
72. Tucker J, Davidson J. Waiting to see the doctor: the role of time constraints in the utilization of health and behavioral health services. In: Bikel W, Vuchinich R, eds. *Reframing health behavior change with behavioral economics*. Hillsdale, NJ, Earlbaum, 2000:219–264.
73. Kaufmann RK, Dodge JM. *Prevention and early intervention for young children at risk for mental health and substance abuse problems and their families: a background paper*. Washington, DC, National Technical Assistance Center for Children's Mental Health, 1997.
74. Duffy A (2000) Toward effective early intervention and prevention strategies for major affective disorders: a review of antecedents and risk factors. *The Canadian Journal of Psychiatry*, 2000, 45:4:340–348.
75. Butter EM, Wunn J, Mulick JA. Early intervention critical to autism treatment. *Pediatric Annals*, 2003, 32:10:677–684.
76. Reasor JE, Farrell SP. Early childhood mental health: services that can save a life. *Journal of Pediatric Nursing*, 2004, 19:140–144.
77. Hamilton Wilson JE, Hobbs H, Archie S. The right stuff for early intervention in psychosis: time, attitude, place, intensity, treatment, & cost. *Journal of Psychosocial Nursing and Mental Health Services*, 2005, 43:6:22–28.
78. Misfud C, Rapee RM. Early intervention for childhood anxiety in a school setting: outcomes for an economically disadvantaged population. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2005, 44:10:996–1004.
79. Jané-Llopis E, Anderson P. A policy framework for the promotion of mental health and the prevention of mental disorders. In: Knapp M et al., eds.

*Mental health policy and practice across Europe*. New York, NY, Open University Press, 2007:188–214.

80. Kazdin AE. Parent management training: evidence, outcomes, and issues. *Journal of the American Academy of Child and Adolescent Psychiatry*, 1997, 36:10–18.
81. Greenwood PW et al. *Diverting children from a life of crime: measuring costs and benefits*. Santa Monica, CA, Rand Publications, 1996.
82. Dretzke J et al. The effectiveness and cost-effectiveness of parent training/education programmes for the treatment of conduct disorder, including oppositional defiant disorder, in children. *Health Technology Assessment*, 2005, 9:50:iii,ix–x:1–233.
83. Olds DL. The Prenatal/Early Infancy Project: a strategy for responding to the needs of high-risk mothers and their children. *Prevention in Human Services*, 1997, 7:59–87.
84. Olds DL et al. Long-term effects of nurse home visitation on children's criminal and antisocial behaviour: 15-year follow-up of a randomized controlled trial. *Journal of the American Medical Association*, 1998, 280:8:1238–1244.
85. Olds DL. Prenatal and infancy home visiting by nurses: from randomized trials to community replication. *Prevention Science*, 2002, 3:3:153–172.
86. Brown H, Sturgeon S. Healthy start of life and reducing early risks. In: Hosman C, Jané-Llopis E, Saxena S, eds. *Prevention of mental disorders: effective strategies and policy options*. Oxford, Oxford University Press, 2006.
87. Schweinhart LJ, Weikart DP. Perry preschool effects nine years later: what do they mean? In: Begab M, Haywood HC, Garber HL, eds. *Psychological influences in retarded performance*. Baltimore, MD, University Park, 1981.
88. Barnett WS. Benefit-cost analysis of the Perry Preschool Program and its policy implications. *Educational Evaluation and Policy Analysis*, 1985, 7:333–342.
89. Barnett WS. Benefit cost-analysis of preschool education: findings from a 25-year follow-up. *American Journal of Orthopsychiatry*, 1993, 63:4:500–508.
90. Barnett WS. *Lives in the balance: age-27 benefit-cost analysis of the high/scope Perry Preschool Program*. Ypsilanti, MI, High/Scope Foundation, 1996.
91. Karoly LA et al. *Investing in our children: what we know and don't know about the costs and benefits of early childhood interventions*. Washington, DC, RAND Corporation, 1998.
92. Karoly LA, Kilburn MR, Cannon JS. *Early childhood interventions: proven results, future promise*. Santa Monica, CA, RAND Corporation, 2005.
93. Burns BJ et al. Children's mental health service use across service sectors. *Health Affairs (Millwood)*, 1995, 14:3:147–159.
94. Leaf PJ et al. Mental health service use in the community and schools: results from the four-community MECA study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 1996, 35:889–897.
95. Wu P et al. Depressive and disruptive disorders and mental health service utilization in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 1999, 38:1081–1090.
96. Briggs-Gowan MJ et al. Mental health in pediatric settings: distribution of disorders and factors related to service use. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2000, 39:841–849.
97. Sawyer M et al. The mental health of young people in Australia: key findings from the child and adolescent component of the national survey of mental health and well-being. *Australian and New Zealand Journal of Psychiatry*, 2001, 35:806–814.
98. Beeharry G et al. *Outlining the scope for public sector involvement in mental health*. Washington, DC, World Bank HNP Discussion Paper, August 2002.