

## Global Mental Health 2



# Child and adolescent mental health worldwide: evidence for action

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Mental health problems affect 10–20% of children and adolescents worldwide. Despite their relevance as a leading cause of health-related disability in this age group and their longlasting effects throughout life, the mental health needs of children and adolescents are neglected, especially in low-income and middle-income countries. In this report we review the evidence and the gaps in the published work in terms of prevalence, risk and protective factors, and interventions to prevent and treat childhood and adolescent mental health problems. We also discuss barriers to, and approaches for, the implementation of such strategies in low-resource settings. Action is imperative to reduce the burden of mental health problems in future generations and to allow for the full development of vulnerable children and adolescents worldwide.

## Introduction

Children and adolescents constitute almost a third (2·2 billion individuals) of the world's population and almost 90% live in low-income and middle-income countries (LMIC), where they form up to 50% of the population.<sup>1</sup> For young people, neuropsychiatric disorders are a leading cause of health-related burden, accounting for 15–30% of the disability-adjusted life-years (DALYs) lost during the first three decades of life.<sup>2</sup> Despite the widespread recognition of the importance of mental health promotion and prevention in children and adolescents, there is an enormous gap between needs and resource availability.<sup>3</sup>

The failure to address mental health problems, including developmental and intellectual disorders, in children and adolescents in low-resource settings is a public health issue with wide-reaching consequences because such failure also impedes the achievement of basic development

goals in LMIC.<sup>4</sup> Moreover, because evidence shows that a substantial proportion of mental health problems in adults originate early in life,<sup>5,6</sup> the situation has longlasting effects

## Search strategy and selection criteria

We searched PubMed, Embase, PsycInfo, and the Cochrane Library of systematic reviews and clinical trials with the following terms: “child”, “adolescent”, “mental”, “developing” or “low- and middle-income country”, together with specific terms for prevalence; risk, protective and resilience factors; prevention and treatment strategies (webappendix p 19). Citation lists from the studies and reviews retrieved were also hand-searched for further studies. For prevalence studies, we selected original studies addressing the global prevalence of mental disorders in children and adolescents from representative non-referred samples with diagnoses based on any version of the Diagnostic and Statistical Manual of Mental Disorders or International Classification of Diseases. For preventive studies, separate searches were done for non-specific interventions (eg, early childhood interventions, nutritional interventions, child or youth development programmes), externalising disorders, internalising disorders, and intellectual disabilities. Preventive studies were included if they were randomised controlled trials or non-randomised experiments with a concurrent control group; if intervention occurred before the age of 18 years; and if child or adolescent mental health outcomes were assessed. Treatment studies for five groups of child and adolescent mental disorders (externalising disorders [attention-deficit hyperactivity disorder and conduct disorder]; internalising disorders [depression and anxiety disorders]; early onset schizophrenia; mental retardation or intellectual disabilities; and autism or pervasive developmental disorders) were searched. Studies were included only if they were randomised controlled trials. We concentrated on papers published after 2000 (after 1980 for prevalence studies), and prioritised evidence important for and relevant to low-income and middle-income countries, and from systematic reviews and meta-analyses.

## Key messages

- Mental health problems affect 10–20% of children and adolescents worldwide and account for a large portion of the global burden of disease
- Although only 10% of trials come from low-income and middle-income countries (LMIC; where 90% of children and adolescents live), sufficient evidence exists to justify the set-up of services
- The development of services is hampered by lack of government policy, inadequate funding, and a dearth of trained clinicians
- Support of child and adolescent mental health research is needed, particularly in LMIC, including prevalence and longitudinal studies, high-quality clinical trials, and cost-effectiveness analyses
- Early intervention and prevention offer the hope to avoid later adult mental health problems and improve personal wellbeing and productivity

*Lancet* 2011; 378: 1515–25

Published Online

October 17, 2011

DOI:10.1016/S0140-6736(11)60827-1

See [Comment](#) page 1441

See [Online/Comment](#)

DOI:10.1016/S0140-6736(11)60745-9,  
DOI:10.1016/S0140-6736(11)60941-0, and  
DOI:10.1016/S0140-6736(11)61270-1

This is the second in a [Series](#) of six papers about global mental health

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beyond childhood and adolescence. Since mental illnesses are conceptualised as chronic disorders of young people<sup>7</sup> and because a disproportionate number of young people live in LMIC, to address mental health problems in early developmental stages in these countries is a priority for the global health agenda. Besides the arguments of how societal costs can be reduced by early intervention, there is also an ethical responsibility to the most vulnerable young people, who can have their full developmental potential thwarted. Action is urgently needed for children in conflicts, disasters, forced labour, and who live on the streets, or who are affected by trafficking—all of which are frequent in LMIC.

In this report we provide an overview of the evidence and the research gaps in epidemiology, intervention, and implementation strategies for child and adolescent mental health in low-resource settings. We systematically reviewed the published work from LMIC, and present data from disadvantaged populations in high-income countries (HIC) where needed and appropriate. We assess the occurrence of mental health problems in LMIC and their associated protective factors and risk factors. We then present the evidence for preventive interventions and the scarce number of studies for the treatment of childhood mental health problems in LMIC. Finally, we discuss the challenges of service implementation, and the

economic and political aspects of promotion of child and adolescent mental health worldwide.

## Epidemiology

The assessment of the mental health needs of children and adolescents is complex, encompassing epidemiological data gathering, comparisons of data from different areas, and input from people and agencies engaged in the care of this population.<sup>8</sup> Knowledge of the prevalence of mental health problems is often a first step to determine the magnitude of the problem, but the identification of positive and negative factors affecting mental health can also inform early interventions that can reduce the burden of these disorders.

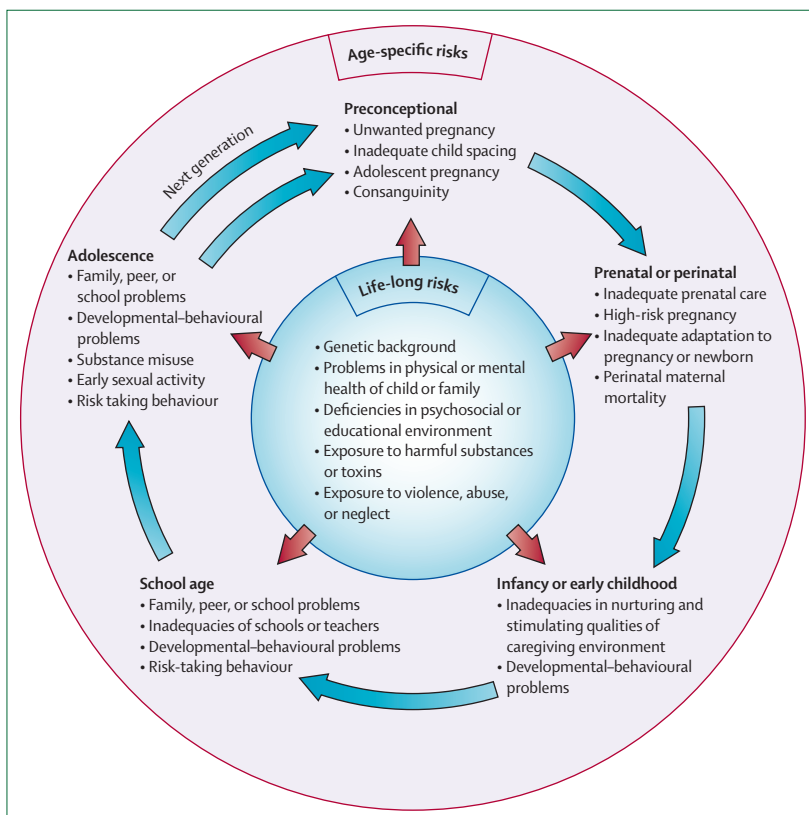
Despite little research, epidemiological studies of the prevalence of childhood and adolescence mental health problems in LMIC show that such problems are common. Our systematic review of original studies in non-referred samples from LMIC showed prevalence of about 10–20% in most of the 16 surveys identified, which is consistent with findings from HIC.

The range of the reported prevalence, however, is very wide (from 1.81% to 39.4%), and heterogeneity in the methodological approaches used might have contributed to these differences (webappendix pp 1–2).<sup>9</sup> Other possible sources of discrepancy between results are different exposures to risk factors and protective factors, and the cultural context in which the mental health problems occur. Culture defines and creates specific sources of distress and impairment and affects how symptoms are interpreted; efforts to compare the presentation of symptoms across different cultures are hampered by the difficulty of disentangling the effect of culture from that of different methodological approaches.<sup>10</sup>

The co-occurrence of risk factors and protective factors restricts the identification of the specific elements responsible for the onset and continuity of mental health problems. Early distal factors (ie, non-specific factors that affect the likelihood of subsequent risks) work together with proximal causes (which directly impinge on the individual) through a probabilistic chain that is conditioned by issues such as dosage, context, and timing. The lifecycle approach (figure 1) provides a model that maps relevant risk factors in a chronological order, from the preconceptional period of one generation to the next generation.

Life-long risk factors are shown at the centre of figure 1 and consist of the genetic background, problems in the physical health and nutritional status of the child,<sup>12</sup> the physical and mental health of carers,<sup>13</sup> loss of carers or being orphaned,<sup>14</sup> being raised in institutions,<sup>15</sup> deficiencies in the psychosocial and educational environment,<sup>16</sup> exposure to harmful substances and toxins,<sup>17</sup> violence,<sup>18</sup> armed conflict and war,<sup>19–21</sup> forced displacement,<sup>22</sup> immigrant status,<sup>23</sup> natural disasters,<sup>24,25</sup> gender disparity,<sup>26</sup> severe physical punishment,<sup>27</sup> and abuse or neglect.<sup>13</sup>

See Online for webappendix



**Figure 1: The lifecycle approach to risk factors for mental disorders**  
Adapted with permission from reference 11.

**Panel 1: Examples of interventions to prevent child and adolescent mental health problems in low-income and middle-income countries**

**Non-specific interventions: universal and targeted interventions in early childhood**

- Benefits to child mental health have been shown from early childhood interventions including: early stimulation interventions;<sup>54-56</sup> interventions to improve carer sensitivity and responsiveness;<sup>57-59</sup> integrated nutrition, health, and stimulation programmes;<sup>60</sup> attendance at a high-quality preschool;<sup>61</sup> and conditional cash transfers to families.<sup>62</sup> These early interventions benefit children exposed to various contextual and biomedical risks including poverty,<sup>57,62</sup> institutionalisation,<sup>59</sup> low birthweight,<sup>56</sup> stunting,<sup>54</sup> and iron-deficiency anaemia.<sup>58</sup>
- Nutritional interventions in early childhood have had mixed results. Prevention of iron-deficiency anaemia in Chilean infants improved behaviour and temperament at 12 months.<sup>63</sup> However, no benefits were reported for iron supplementation, zinc supplementation, or both, for the behaviour of 6–7-year-old Mexican children,<sup>64</sup> and nutritional supplementation of stunted Jamaican children in early childhood did not improve their behaviour at age 11–12 years<sup>65</sup> or their mental health at age 17–18 years.<sup>54</sup>

**Interventions for behavioural disorders: universal**

- School-based preventive interventions for children aged 3–8 years involving teacher training, teaching a class-wide social-emotional curriculum, or both, have shown concurrent improvements in child problem behaviours<sup>66-69</sup> and child competencies.<sup>68</sup> Furthermore, there is evidence that these interventions are well accepted by teachers.<sup>68,70</sup> Integration of a brief behavioural parent training intervention into health services for 2–6-year-old children in Iran improved parent reported practices and child abuse.<sup>71</sup> A community-based preventive programme targeting drug use in China successfully reduced drug use initiation in young men aged 15–19 years.<sup>72</sup>

**Interventions for behavioural disorders: selective**

- Benefits from child training interventions for children aged 7–14 years with behaviour problems were reported for externalising problems<sup>73,74</sup> and social skills.<sup>74</sup>

**Interventions for emotional disorders: universal**

- Interventions involving structured activities have shown benefits for children aged 7–14 years in war-affected communities.<sup>75</sup> A school-based physical activity intervention for 15-year-old students in Chile showed benefits to anxiety and self-esteem but not to depression.<sup>76</sup> A psychosocial intervention to prevent depression in 12–16-year-old adolescents in Mauritius showed short-term benefits to depression, hopelessness, coping skills, and self-esteem. Benefits to coping skills and self-esteem were sustained at follow-up after 6 months.<sup>77</sup>

**Interventions for emotional disorders: selective**

- School-based and camp-based psychosocial group interventions have generally, although not consistently, shown benefits to child and adolescent mental health, including internalising problems, behavioural difficulties, and competencies. Interventions have targeted children aged 7–18 years affected by conflict,<sup>78-81</sup> 10–15-year-old children orphaned by AIDS,<sup>82</sup> and 8–15-year-old children with substantial depressive symptoms.<sup>83</sup> For 5–6-year-old children displaced by war, a combination of group psychosocial intervention and home visits for mothers improved maternal and child mental health.<sup>84</sup>

**Interventions for intellectual disorders: universal**

- Effective interventions to prevent cognitive deficits in low-income and middle-income countries include maternal and child nutritional and micronutrient supplementation, immunisation programmes, reduction of exposure to environmental toxins, prenatal and perinatal maternal health interventions, malaria prevention, and early stimulation programmes.<sup>38,85,86</sup> Other interventions with potential to prevent intellectual disorders include accident and injury prevention, child abuse prevention, and interventions to prevent prenatal alcohol exposure.<sup>85</sup>

**Interventions for intellectual disorders: selective**

- Home-visit programmes to train mothers of 3–6-year-old disabled children in early stimulation activities have shown some benefits to child development.<sup>87</sup>

Age-specific risks can be identified as early as the preconceptional period, which spans the transition from adolescence to adulthood of prospective parents. Research-based evidence from LMIC links adolescent parenting,<sup>28</sup> unintended pregnancy,<sup>29</sup> inadequate birth interval,<sup>30</sup> and parental consanguinity<sup>31</sup> as preconceptional risk factors for child mental health problems. Evidence exists that reduced maternal haemoglobin during the prenatal and perinatal period is related to poor education outcome of offspring, which is measurable even when the child reaches age 30 years.<sup>32</sup> Research is increasing into the effect of maternal prenatal and perinatal physical and

mental distress on child survival and health outcomes, with particular attention to depression.<sup>33,34</sup> Research into the effects of other important and well known perinatal risk factors such as low birthweight is sparse.<sup>35</sup>

Risk factors in infancy and early childhood have not been widely studied. The early years of life are the period of maximum brain growth and of formation of emotional regulatory patterns that affect later mental health outcomes.<sup>36</sup> More than 200 million children younger than 5 years in LMIC do not reach their developmental potential because of stunting, inadequate stimulation, poor care and home stimulation, iodine and iron deficiency, exposure to

### Panel 2: Design and adaptation of effective interventions to prevent child and adolescent mental health problems in low-income and middle-income countries

- Establish the extent of the problem and the perceived need for an intervention within the community.<sup>83,88</sup>
- Choose or design an intervention that targets risk factors and protective factors for child and adolescent mental health in that setting.<sup>72,83</sup>
- Promote ownership of the intervention by the community; for example, by inclusion of key stakeholders in the design or choice of the intervention.<sup>72,76</sup>
- Promote buy-in to the intervention by all stakeholders before implementation (eg, a study<sup>89</sup> reported difficulties with a school dropout intervention due to poor teacher support).
- Use evidence-based interventions with inbuilt cultural flexibility. For example, use interventions that build on existing practices and strengths.<sup>57,66</sup>
- Assess the feasibility and acceptability of the intervention for staff within the setting before implementation (eg, are sufficient resources and time available?).
- Ensure the intervention is acceptable and is perceived as relevant by participants to promote engagement. For example, assess the extent to which the intervention fits in with prevailing attitudes, beliefs, and current practices.<sup>88</sup>
- Pilot and assess the intervention in the new setting, with quantitative and qualitative methods, and use the data to inform any modifications to the intervention before wider implementation.
- Integrate interventions into existing services and use existing staff to promote sustainability (eg, integrate interventions into school settings, health-care services, social services, and community services).
- Provide intervention staff with systematic training and provide ongoing monitoring and support for staff.

violence, HIV/AIDS, malaria, intrauterine growth retardation, or heavy metal exposure.<sup>37,38</sup> Maternal mental health,<sup>39</sup> family history of mental health problems, and lack of appropriate child care<sup>40</sup> are additional risk factors.

Important evidence exists that mental health risk factors specific to the school age period (from ages 5 to 18 years, with variable definitions across countries) are prevalent in LMIC. A representative study of 3005 adolescents in Mexico City showed that 68% had had at least one type of chronic adversity.<sup>13</sup> Risk factors such as perceived obesity,<sup>41</sup> academic difficulties,<sup>16</sup> bullying in school,<sup>42</sup> family dysfunction,<sup>43</sup> child labour,<sup>44</sup> physical and sexual abuse,<sup>13,45</sup> use of tobacco, alcohol, and drugs,<sup>46</sup> pathological use of the internet,<sup>47</sup> teenage pregnancy,<sup>48</sup> and use as a soldier during childhood<sup>49</sup> have been shown to jeopardise the mental health of children, adolescents, and adults.

Many children who experience adverse conditions in their early years, however, grow up to become healthy adults. The idea of resilience differs from the general notion of risk and protective factors because it aims to incorporate innate qualities and differences in an individual that enable them to overcome adversity.<sup>50</sup> Some of these qualities—for example, behavioural and emotional self-regulation—have proved to contribute to the mental health and academic achievement of children.<sup>51</sup> Characteristics of a child's carer system, including emotionally responsive and competent parenting as well as carer resources such as education, mental health, and

relational history (ie, attachment and peer network), are direct proximal predictors of resilience in children.<sup>52</sup>

### Interventions

The incorporation of preventive strategies to reduce the effect of mental health problems needs the adoption of a framework that goes beyond the traditional disease model.<sup>53</sup> Whereas universal interventions are directed at all children in a particular locality or setting, selective and indicated interventions focus on children who are at high risk for development of a mental health problem because of the presence of either proximal risk factors or subclinical symptoms. One of the major challenges of selective and indicated interventions is the characterisation of children and adolescents at whom the interventions should be targeted, which should take into account not only the limited availability of resources, but also the hazards of false-positive identification of at-risk individuals. Panel 1 shows examples of strategies to prevent mental health problems in children and adolescents in LMIC (see webappendix pp 3–17 for full details) and panel 2 provides recommendations of how to design and adapt these interventions.

Most preventive interventions implemented in early childhood in LMIC target overall child development rather than child mental health. However, increasing evidence shows that some of these early interventions can benefit the mental health of children both concurrently and in the long term. An early stimulation programme for stunted children in Jamaica with 2 years of home visits reduced anxiety, depression, and attention deficit, and enhanced self-esteem at age 17–18 years.<sup>54</sup> In Mauritius, 2 years of high-quality preschool from age 3 years reduced conduct disorder and schizotypal symptoms at 17 years of age and criminal offences at age 23 years<sup>61</sup>—these benefits were greatest for children who were undernourished at 3 years.

Undernutrition and micronutrient deficiencies are highly prevalent in LMIC, and are associated with behavioural deficits;<sup>38</sup> however, the results of studies into the effects of supplementation on child behaviour and mental health have been mixed. Other non-specific interventions used in many LMIC that have the potential to improve child and adolescent mental health include healthy schools initiatives, life skills education, and youth development programmes;<sup>89–92</sup> however, these approaches have not been rigorously assessed.

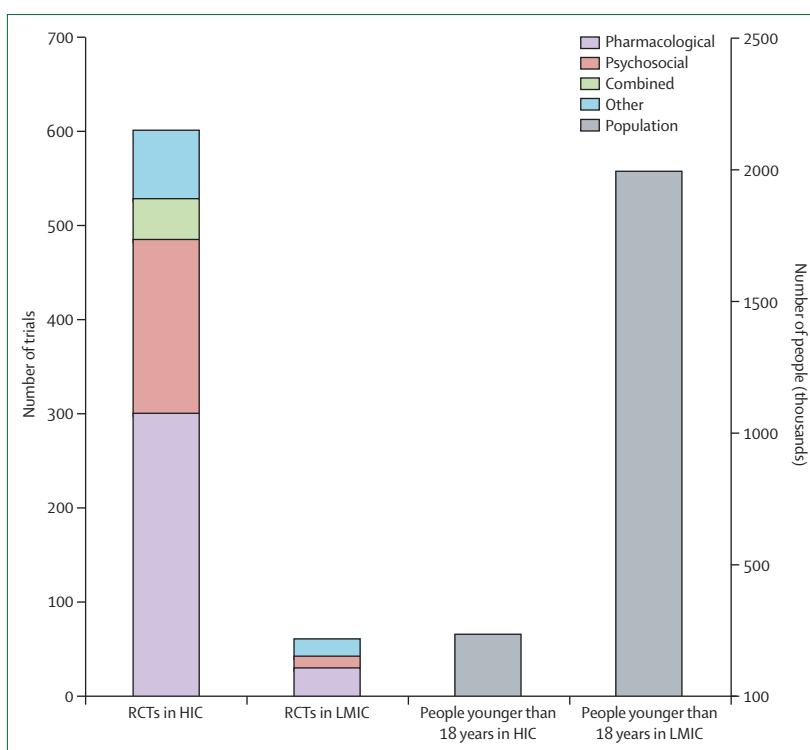
In HIC, proven interventions for prevention of behavioural disorders include parent training in behaviour management, teacher training in classroom management, psychosocial interventions with children, or all three. All these approaches have been used in LMIC. Preventive interventions have been successfully integrated into schools,<sup>66–68,73</sup> health-care settings,<sup>71</sup> and community services;<sup>72</sup> this integration into existing services is likely to be important for the scale-up and sustainability of interventions.

Four school-based interventions to prevent emotional disorders in older children and young adolescents in LMIC all showed benefits.<sup>76,77,82,83</sup> Additionally, there are several studies of interventions for conflict-affected children. A systematic review<sup>93</sup> of interventions for children affected by violence in LMIC showed that most interventions were beneficial by reduction of negative symptoms, increase of protective factors, or both, with effect sizes of 0.27–0.54. However, the overall quality of the studies was poor. Four additional studies were identified by our review.<sup>78–80</sup> Overall, although various approaches have shown some benefits to child and adolescent mental health, published work suggests that there is a gap in research into gender-specific interventions, and that effective interventions for adolescent males are needed.

Previous reviews describe how prevention and amelioration of young children's exposure to risk factors (eg, undernutrition, inadequate cognitive stimulation, iodine deficiency, and iron deficiency) can prevent cognitive deficits.<sup>38</sup> There is little evidence of the effectiveness of selective interventions for children with established intellectual disabilities. Training of parents in enrichment activities is commonly used in community-based rehabilitation programmes, but few controlled studies have been done and small sample sizes make the results difficult to interpret.

Ideally, early interventions would prevent the onset of child and adolescent mental health problems. Nevertheless, once diagnosed, more complex and targeted treatment interventions are usually required. General health surveys<sup>94,95</sup> suggest that local data have a decisive role in modifying professional practice in LMIC—a report on four health priorities (malaria, contraception, diarrhoea, and tuberculosis) noted that health-care providers believe that research done and published in their own country is more likely to change their clinical practice compared with research from HIC.<sup>95</sup> The evidence is most needed where the least knowledge is currently available; although almost 90% of all children and adolescents live in LMIC, only about 10% of randomised controlled mental health trials for this population come from LMIC (figure 2). Of these studies, almost all trials assessed psychopharmacological interventions. The lack of high quality studies assessing psychosocial or combined treatments for childhood mental health problems is confirmed by our review. This deficiency is all the more relevant because these interventions require culture-specific evidence.

Although no randomised controlled trials of psychosocial interventions for childhood externalising problems were identified in LMIC, reports from disadvantaged populations in HIC can provide indirect evidence of effectiveness. A study<sup>96</sup> in low-income urban African-American communities showed that peer-identified teacher opinion leaders enhanced the dissemination and implementation of school-based mental health programmes by promotion of increased teachers' self-reported use of recommended strategies of attention-



**Figure 2: The 10–90% divide in research into treatment for childhood and adolescence mental health disorders** RCTs=randomised controlled trials (between 2001 and 2010). HIC=high-income countries. LMIC=low-income and middle-income countries.

deficit hyperactivity disorder management compared with mental health providers alone. In another study<sup>97</sup> done in an underserved community in the Appalachian region of the USA, a combined psychosocial intervention effectively reduced hyperactivity symptoms and early aggressive and delinquent behaviour.

For internalising problems, group cognitive behavioural therapy was effective for the treatment of obsessive-compulsive disorder in Brazilian children and adolescents.<sup>98</sup> A multisystemic therapy in a predominantly African-American population reduced rates of attempted suicide significantly more than did emergency hospital admittance.<sup>99</sup> In addition to the preventive interventions for children and adolescents affected by conflict, some evidence is also available for the treatment of post-traumatic stress disorder in LMIC; participation in a group intervention led by supervised schoolteachers reduced symptoms in war-traumatised high school students in Kosovo.<sup>100</sup>

Other initiatives have been launched to provide evidence-based information to overcome the 10–90% divide in treatment of childhood and adolescence mental health problems; the WHO mhGAP intervention guide<sup>101</sup> includes methods for the assessment and management of various disorders in childhood and adolescence. The manual also contains specific guidelines for the management of developmental and behavioural disorders, such as family orientation, advice to teachers,

For the WHO mhGAP intervention guide see [http://www.who.int/mental\\_health/mhGAP](http://www.who.int/mental_health/mhGAP)



and community-based rehabilitation. The integrated services programme of the World Psychiatric Association Presidential Programme on Child Mental Health provides two sets of evidence-based techniques to address internalising and externalising problems in school-age children.<sup>102,103</sup> These two manuals discuss how to implement brief interventions, and constitute a valuable resource that can be further used for the implementation of integrated, evidence-based systems of care according to local needs.<sup>103</sup> An additional resource is the review<sup>104</sup> of the treatment of attention-deficit hyperactivity disorder, which was part of the *Public Library of Science* series of packages of care for mental, neurological, and substance disorders in LMIC.

## Discussion

We have shown that the prevalence of mental health problems in children in LMIC is similar to those in HIC. Because most children live in LMIC, these proportions have a public health importance. We have also shown that although there are large gaps in research into effective prevention and treatment of these disorders, sufficient evidence from LMIC and from resource-poor settings in HIC exists to justify the set-up of services that can make these interventions available to a large number of children who need them.

Despite these findings, the published work has several limitations and gaps exist in research into child and adolescent mental health. Although, clearly, child and adolescent mental health problems are common, future studies should address the imprecision of prevalence estimates to allow for improvement in services planning. Meta-regression approaches can help to detect reasons for variability between estimates—for example, the definitions of impairment and severity vary across surveys. More consistent prevalence could be recorded with the same methodology or instrument (webappendix pp 1–2). Multinational child and adolescent studies applying standardised methods based on the International Classification of Diseases criteria could be undertaken in different cultures, as is done for adults.<sup>105</sup> Importantly, intellectual and developmental disorders should be included in these studies (their exclusion might have led to an underestimation of the prevalence of mental health problems in many of the surveys reviewed in our report). Dimensional scales have also proved to be valuable to assess mental health problems both in HIC and in LMIC.<sup>106</sup>

Not much research has been done on resilience and protective factors in LMIC. In view of the increased exposure to many risk factors in these countries, the study of such positive elements can inform the design of interventions that aim to prevent or reduce risk factors at specific times in life. Because most risk factors were identified in cross-sectional or case-control studies, prospectively assessed cohorts are also needed to confirm and further understand the developmental trajectories of

child and adolescent mental health problems from at-risk states to full blown presentations.

Methodologically sound assessments of the effectiveness of interventions to prevent or treat mental health problems in LMIC are sparse for all groups of disorders, and for the assessment of indigenously developed interventions. Heterogeneity between LMIC should also be taken into account when interpreting data. Most evidence for prevalence and preventive strategies comes from middle-income countries (webappendix pp 1–17). For the treatment studies, for example, 58 of a total of 670 randomised controlled trials for child and adolescent mental health problems were from middle-income countries and only one came from a low-income country. Regional differences within LMIC should also be considered.

Scaling up of interventions so that they can benefit large populations requires systems that can sustain such an expansion. Attempts to integrate child mental health into existing systems have yielded important lessons. Jordans and colleagues<sup>107</sup> described several challenges in the implementation of interventions for children in low-income settings—integration needs a high degree of intersectorial collaboration, which is not easy; interventions that work in one area may not work in another because of cultural differences; where schools are the entry-point for intervention, children who do not attend might be missed; and the cost-effectiveness of such a model has not been determined.

Recognition that mental and physical health are indivisible is crucial<sup>108</sup>—infectious diseases, malnutrition, and poor obstetric practices all have an effect on a child's mental health. Additionally, maternal depression and lack of psychosocial stimulation affect infant growth and cognitive and socioemotional development.<sup>109</sup> Integration of child mental health with other paediatric and primary care services such as the Integrated Management of Childhood Illness and the Mother and Child Health Programmes might benefit both child mental health outcomes and physical outcomes.

The intervention studies we reviewed also support the argument that child and adolescent mental health services are not restricted to the health sector, and that several other agencies are affected by mental health issues and have an important role in supporting mental health.<sup>110</sup> These systems include education, social care, and criminal justice. For example, in LMIC the onset of impulse control disorders and substance misuse leads to the early cessation of education, which results in long-term marginalisation of the individual and a burden on society.<sup>111</sup> Although collaboration between agencies presents opportunities for joint work, such an approach raises important challenges. A common language for child mental health has to be developed between professionals from various backgrounds; networking and communication between agencies has to be fostered; innovative mechanisms to train and supervise the

For the Integrated Management of Childhood Illness see [http://www.who.int/child\\_adolescent\\_health/topics/prevention\\_care/child/imci/en/index.html](http://www.who.int/child_adolescent_health/topics/prevention_care/child/imci/en/index.html)

non-specialist workforce and frontline staff have to be developed; and joint ownership should not prevent the emergence of strong local leaders who can work together and also influence national and international policy in this neglected area. The development of community-based approaches to care that incorporate good child mental health practices is feasible in LMIC.<sup>8</sup> Programmes fostering participation by young people and incorporating a rights-based focus lead to healthy behaviours.<sup>112</sup>

The Atlas of Child and Adolescent Mental Health Resources presented information for 66 countries and reported that less than a third of countries had an individual or government entity with sole responsibility for child mental health programming; furthermore, funding for child mental health services was rarely identifiable in the countries' budgets.<sup>113</sup> The dependence on non-governmental organisation support for the development of services can allow governments to neglect the need to incorporate child mental health services in their national budgets.<sup>113,114</sup> The failure of governments to support services has led to a disproportionate reliance on out-of-pocket expenditures to support child and adolescent mental health in LMIC.<sup>113</sup> The privatisation of mental health services in LMIC with poorly developed and inadequate funding has further compounded the difficulty of development of systems of care.<sup>109</sup> The demanded co-payments have hampered access to care, and the movement of the most experienced clinicians to the private sector has drained valuable resources from the public sector. Other issues in the provision of mental health services in LMIC, including stigma, lack of trained workforce, and priorities for research in mental health are reviewed in detail in this, and previous, *Lancet* Series on global mental health.

To develop child mental health services in LMIC, one needs to understand the decision-making processes and intersectoral competition to develop specific economic arguments to gain the attention of policy makers and affect resource allocation.<sup>115</sup> For example, if provision of community-based child mental health services results in a reduced school drop-out rate and an enhanced ability to join the workforce and be self-supporting, then these benefits can be conveyed to governments and foster a change in resource allocation and not increase the cost of services.

Economic research has documented the long-term consequences of childhood mental health problems in HIC, both in terms of achievement scores and education,<sup>116</sup> and adult health and labour market outcomes.<sup>117</sup> The economic argument for early investment in disadvantaged children was put forward when Carneiro and Heckman<sup>118</sup> investigated the rate of return from investment at different times of life and showed that early prevention is often more cost effective than later remediation. Webappendix p 18 shows an extension of the original idea<sup>119</sup>—that investments made in the womb have a higher return than those made at later ages; the returns from earlier investments can be reaped

### Panel 3: Global child and adolescent mental health: evidence and recommendations

#### Epidemiology: available evidence

- Mental disorders affect 10–20% of children and adolescents worldwide
- Heterogeneity in prevalence studies prevents direct comparisons between countries or meta-analytic approaches
- Risk factors for mental disorders identified in LMIC are similar to those found in HIC; research on resilience is still scarce in LMIC

#### Epidemiology: future directions

- Prevalence studies should ideally be connected with, and serve as a basis to plan services
- Nationally representative surveys from LMIC and multinational standardised prevalence studies should be done
- Assessment of risk factors and protective factors with a developmental approach enables connection with intervention models

#### Intervention: available evidence

- An increasing number of preventive strategies have been successfully tested in many LMIC
- Whereas 90% of the children and adolescents live in LMIC, only 10% of the mental health randomised trials come from these countries
- Packages and manuals (such as the mhGAP guide) are available for the management of childhood mental disorders in LMIC

#### Intervention: future directions

- Culturally appropriate and scalable interventions still need to be developed further and tested to close the 10–90% gap
- Additional randomised clinical trials on psychosocial treatments are needed, with harmonised measurements and outcomes to ease comparisons across studies
- Future intervention studies should collect data for cost-effectiveness analyses

#### Implementation: available evidence

- Less than a third of countries have an entity in charge of mental health programmes for children and adolescents
- Initial experience suggests that integration with existing, community-based systems is feasible
- Investments in children and adolescents yields high returns in terms of developmental potential realised, adult disorder prevented or less severe, and economic advantage for healthy individuals

#### Implementation: future directions

- Early interventions and rehabilitative or curative interventions need to develop side-by-side, which can be made efficient by task sharing
- Partnership with physical health programmes and agencies outside the health sector (eg, education, social care, criminal justice) is advised
- Awareness programmes and mobilisation of potential stakeholders should be considered as part of any child and adolescent mental health service development

LMIC=low-income and middle-income countries. HIC=high-income countries.

over long periods, and since capabilities (cognition, and physical and mental health) show both self-productivity and cross-productivity,<sup>120</sup> an early investment has many positive effects. The crucial role of promotion of good health early in life and the importance of prevention is made clear in a recent economic framework for analysing the effects of interventions.<sup>121</sup> The framework assesses distributional and heterogeneous effects of interventions, and allows these differential effects to be a function of

For the *Atlas of Child and Adolescent Mental Health Resources* see [http://www.who.int/mental\\_health/resources/Child\\_ado\\_atlas.pdf](http://www.who.int/mental_health/resources/Child_ado_atlas.pdf)

For the 2007 *Lancet Series on global mental health* see <http://www.thelancet.com/series/global-mental-health>

early capabilities, consistent with evidence from preventive strategies.<sup>61</sup>

More evidence on cost-effectiveness is needed, starting from the addition of cost analysis to existing effectiveness studies and the inclusion of the effects of social and economic policy on mental health.<sup>122,123</sup> Notably, only two of the many interventions identified in our report are accompanied by cost-benefit ratios; and because evidence suggests an increased effectiveness of long and intensive interventions, to take costs into account is imperative. Assessment of interventions should also account for spillover effects, both within the household and locally,<sup>124</sup> which is especially important because of the high cost of improvement of the health of people with mental health problems, and the fact that such benefits are not usually accounted for by the DALY methodology.<sup>125</sup>

The findings from the Atlas of Child and Adolescent Mental Health Resources<sup>126</sup> suggest that governmental child mental health policies are scarce worldwide. LMIC lack the policies to guide system implementation, thus hampering service development, and undermining efforts to ensure accountability for the manner in which resources for programme development are allocated. The UN resolution on a World Fit for Children<sup>127</sup> endorses the commitment that “every child has the right to develop his or her potential to the maximum extent possible to become physically healthy, mentally alert, socially competent, emotionally sound and ready to learn”. LMIC too often identify their ratification of the UN Convention on the Rights of the Child as proof of their commitments to child and adolescent mental health services and to child and adolescent wellbeing in general. However, evidence suggests that endorsement of the Convention is not correlated with the development of specific policies or programmes to support child and adolescent mental health services.<sup>113</sup>

The World Report on Violence and Health<sup>128</sup> identified abuse and neglect in the early years of life as leading to emotional difficulties and mental health problems and urged for the protection of children from harm. Subsequently, the UN Convention on the Rights of Persons with Disability<sup>129</sup> was adopted, which includes provisions for those affected by mental illness and can affect country-level advocacy for the development of child mental health services and for the humane treatment of those with mental health problems. The effect of the UN Convention on the Rights of Persons with Disability has not yet been assessed.

As well as political will,<sup>130</sup> the key to the development of child and adolescent mental health policy is the education of the population about the need for such services in order to improve the quality of life for individuals, families, and communities. The World Psychiatric Association Presidential Programme on Child Mental Health, a collaboration between the World Psychiatric Association, WHO, and the International Association for

Child and Adolescent Psychiatry and Allied Professions, developed and field-tested an awareness manual.<sup>131</sup> This instrument is a valuable guide that helps communities and individuals who want to promote child mental health to develop advocacy programmes leading to policy.

Last, it is striking that the major international non-governmental organisations and UN agencies, with the exception of WHO, fail to acknowledge or only infrequently focus on child mental health. These entities work in settings where children are at risk or have mental distress and disorder. The aversion to embrace more formal child mental health interventions in favour of psychosocial approaches too often leads to a failure to alleviate personal suffering or ameliorate the potential for community or societal disruption. Furthermore, the lack of specific interventions leads to long-term negative effects on educational attainment, chronic disability, and lost productivity. Broad psychosocial strategies need to be coupled with targeted interventions in the organisation of mental health systems. Child and adolescent policy development is as dependent on the mobilisation of potential stakeholders as it is on the mobilisation of financial resources.<sup>132</sup>

The promotion of child and adolescent mental health is a worldwide challenge, but a potentially rewarding one. Accumulating evidence suggests that early interventions can provide long-term health and socioeconomic benefits by prevention of the onset of mental health problems and their development into chronic disorders. Panel 3 summarises this evidence and presents recommendations for the promotion of child and adolescent mental health. These issues are even more relevant in LMIC, where the proportion of children and adolescents in the population is high and the resources are scarce. The situation in LMIC also presents a window of opportunity, because many LMIC are currently going through a demographic transition, and intervention today is likely to result in a decreased burden in the future.

#### Contributors

All authors contributed to the writing of the report. AR and CK developed the outline for the review. CK, IE, LAR, and OO did searches and prepared the section on prevalence, risk, and protective factors. CK, HB-H, and SS did searches and prepared the section on prevention and treatment. AR, GC, MB, and NU did searches and prepared the section on service delivery, and economic and political aspects of child and adolescent mental health. CK prepared the initial draft of the report, supervised by AR. All authors read and approved the final version of the report.

#### Conflicts of interest

CK took part in two meetings for attention-deficit hyperactivity disorder sponsored by Novartis and Shire. CK also took part in a meeting on the promotion of editorial capacity among editors from low-income and middle-income countries sponsored by Deva. LAR was on the speakers' bureau and acted as consultant for Eli-Lilly, Janssen-Cilag, Novartis, and Shire in the past 3 years (received less than US\$10 000 per year, which is less than 5% of LAR's gross income per year). LAR also received travel awards (air tickets and hotel costs) from Novartis and Janssen-Cilag in 2010 for taking part of two child psychiatric meetings. The ADHD and Juvenile Bipolar Disorder Outpatient Programs chaired by LAR received unrestricted educational and research support from the following pharmaceutical companies in the past 3 years; Abbott, Eli-Lilly, Janssen-Cilag, Novartis, and Shire.



## Acknowledgments

CK has received a scholarship from the Brazilian Research Council (CNPq). HB-H was supported by a Wellcome Trust Fellowship (#080534/Z/06/Z).

## References

- Unicef. Statistics and monitoring. 2008. <http://www.unicef.org/statistics> (accessed Dec 25, 2010).
- Lopez AD, Disease Control Priorities Project. Global burden of disease and risk factors. New York, NY: Oxford University Press; and Washington, DC: World Bank; 2006.
- Belfer ML. Child and adolescent mental disorders: the magnitude of the problem across the globe. *J Child Psychol Psychiatry* 2008; **49**: 226–36.
- Sachs JD, McArthur JW. The Millennium Project: a plan for meeting the Millennium Development Goals. *Lancet* 2005; **365**: 347–53.
- Kim-Cohen J, Caspi A, Moffitt TE, Harrington H, Milne BJ, Poulton R. Prior juvenile diagnoses in adults with mental disorder: developmental follow-back of a prospective-longitudinal cohort. *Arch Gen Psychiatry* 2003; **60**: 709–17.
- Kessler RC, Angermeyer M, Anthony JC, et al. Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry* 2007; **6**: 168–76.
- Kuehn BM. Mental illness takes heavy toll on youth. *JAMA* 2005; **294**: 293–95.
- Rahman A, Mubbashar M, Harrington R, Gater R. Developing child mental health services in developing countries. *J Child Psychol Psychiatry* 2000; **41**: 539–46.
- Polanczyk G, de Lima MS, Horta BL, Biederman J, Rohde LA. The worldwide prevalence of ADHD: a systematic review and meta-regression analysis. *Am J Psychiatry* 2007; **164**: 942–48.
- Canino G, Alegria M. Psychiatric diagnosis—is it universal or relative to culture? *J Child Psychol Psychiatry* 2008; **49**: 237–50.
- Ertem IO. Monitoring and supporting child development. In: Rudolph CD, Rudolph AM, Lister GE, First L, Gershon AA, eds. *Rudolph's pediatrics* (22nd edn). Columbus: McGraw Hill Professional, 2010: 36.
- Zashikhina A, Hagglof B. Mental health in adolescents with chronic physical illness versus controls in Northern Russia. *Acta Paediatr* 2007; **96**: 890–96.
- Benjet C. Childhood adversities of populations living in low-income countries: prevalence, characteristics, and mental health consequences. *Curr Opin Psychiatry* 2010; **23**: 356–62.
- Ruiz-Casares M, Thombs BD, Rousseau C. The association of single and double orphanhood with symptoms of depression among children and adolescents in Namibia. *Eur Child Adolesc Psychiatry* 2009; **18**: 369–76.
- Erol N, Simsek Z, Münir K. Mental health of adolescents reared in institutional care in Turkey: challenges and hope in the twenty-first century. *Eur Child Adolesc Psychiatry* 2010; **19**: 113–24.
- Arun P, Chavan BS. Stress and suicidal ideas in adolescent students in Chandigarh. *Indian J Med Sci* 2009; **63**: 281–87.
- Roy A, Bellinger D, Hu H, et al. Lead exposure and behavior among young children in Chennai, India. *Environ Health Perspect* 2009; **117**: 1607–11.
- Panther-Brick C, Eggerman M, Gonzalez V, Safdar S. Violence, suffering, and mental health in Afghanistan: a school-based survey. *Lancet* 2009; **374**: 807–16.
- Harel-Fisch Y, Radwan Q, Walsh SD, et al. Psychosocial outcomes related to subjective threat from armed conflict events (STACE): findings from the Israeli-Palestinian cross-cultural HBSC study. *Child Abuse Negl* 2010; **34**: 623–38.
- Layne CM, Olsen JA, Baker A, et al. Unpacking trauma exposure risk factors and differential pathways of influence: predicting postwar mental distress in Bosnian adolescents. *Child Dev* 2010; **81**: 1053–76.
- Qouta S, Punamäki RL, Miller T, El-Sarraj E. Does war beget child aggression? Military violence, gender, age and aggressive behavior in two Palestinian samples. *Aggress Behav* 2008; **34**: 231–44.
- Mels C, Derluyn I, Broekaert E, Rosseel Y. The psychological impact of forced displacement and related risk factors on Eastern Congolese adolescents affected by war. *J Child Psychol Psychiatry* 2010; **51**: 1096–104.
- Wong ST, Homma Y, Johnson JL, Saewyc E. The unmet health needs of East Asian high school students: are homestay students at risk? *Can J Public Health* 2010; **101**: 241–45.
- Jia Z, Tian W, He X, Liu W, Jin C, Ding H. Mental health and quality of life survey among child survivors of the 2008 Sichuan earthquake. *Qual Life Res* 2010; **19**: 1381–91.
- Li X, Huang X, Tan H, Liu A, Zhou J, Yang T. A study on the relationship between posttraumatic stress disorder in flood victim parents and children in Hunan, China. *Aust N Z J Psychiatry* 2010; **44**: 543–50.
- Rudatsikira E, Muula AS, Siziya S, Twa-Twa J. Suicidal ideation and associated factors among school-going adolescents in rural Uganda. *BMC Psychiatry* 2007; **7**: 67.
- Bordin IA, Duarte CS, Peres CA, Nascimento R, Curto BM, Paula CS. Severe physical punishment: risk of mental health problems for poor urban children in Brazil. *Bull World Health Organ* 2009; **87**: 336–44.
- Rodriguez JD, da Silva AA, Bettiol H, Barbieri MA, Rona RJ. The impact of perinatal and socioeconomic factors on mental health problems of children from a poor Brazilian city: a longitudinal study. *Soc Psychiatry Psychiatr Epidemiol* 2011; **46**: 381–91.
- Iranfar S, Shakeri J, Ranjbar M, Nazhadjafar P, Razaie M. Is unintended pregnancy a risk factor for depression in Iranian women? *East Mediterr Health J* 2005; **11**: 618–24.
- Bella H, Al-Almaie SM. Do children born before and after adequate birth intervals do better at school? *J Trop Pediatr* 2005; **51**: 265–70.
- Abu-Rabia S, Maroun L. The effect of consanguineous marriage on reading disability in the Arab community. *Dyslexia* 2005; **11**: 1–21.
- Fararouei M, Robertson C, Whittaker J, et al. Maternal Hb during pregnancy and offspring's educational achievement: a prospective cohort study over 30 years. *Br J Nutr* 2010; **104**: 1363–68.
- Medhin G, Hanlon C, Dewey M, et al. The effect of maternal common mental disorders on infant undernutrition in Butajira, Ethiopia: the P-MaMiE study. *BMC Psychiatry* 2010; **10**: 32.
- Harpham T, Huttly S, De Silva MJ, Abramsky T. Maternal mental health and child nutritional status in four developing countries. *J Epidemiol Community Health* 2005; **59**: 1060–64.
- O'Shea TM, Allred EN, Dammann O, et al. The ELGAN study of the brain and related disorders in extremely low gestational age newborns. *Early Hum Dev* 2009; **85**: 719–25.
- Shonkoff JP, Boyce WT, McEwen BS. Neuroscience, molecular biology, and the childhood roots of health disparities: building a new framework for health promotion and disease prevention. *JAMA* 2009; **301**: 2252–29.
- Graham-McGregor S, International Child Development Committee. Early child development in developing countries. *Lancet* 2007; **369**: 824.
- Walker SP, Wachs TD, Gardner JM, et al. Child development: risk factors for adverse outcomes in developing countries. *Lancet* 2007; **369**: 145–57.
- Anselmi L, Piccinini CA, Barros FC, Lopes RS. Psychosocial determinants of behaviour problems in Brazilian preschool children. *J Child Psychol Psychiatry* 2004; **45**: 779–88.
- Heymann J. *Forgotten families: ending the growing crisis confronting children and working parents in the global economy*. Oxford: Oxford University Press, 2006.
- Lo WS, Ho SY, Mak KK, Wong YM, Lai YK, Lam TH. Prospective effects of weight perception and weight comments on psychological health among Chinese adolescents. *Acta Paediatr* 2009; **98**: 1959–64.
- Chaux E, Molano A, Podlesky P. Socio-economic, socio-political and socio-emotional variables explaining school bullying: a country-wide multilevel analysis. *Aggress Behav* 2009; **35**: 520–29.
- Lee S, Guo WJ, Tsang A, et al. The prevalence of family childhood adversities and their association with first onset of DSM-IV disorders in metropolitan China. *Psychol Med* 2011; **41**: 85–96.
- Bandeali S, Jawad A, Azmatullah A, et al. Prevalence of behavioural and psychological problems in working children. *J Pak Med Assoc* 2008; **58**: 345–49.
- Curto BM, Paula CS, do Nascimento R, Murray J, Bordin IA. Environmental factors associated with adolescent antisocial behavior in a poor urban community in Brazil. *Soc Psychiatry Psychiatr Epidemiol* 2010; published online Oct 8. DOI:10.1007/s00127-010-0291-2.

- 46 Miller M, Borges G, Orozco R, et al. Exposure to alcohol, drugs and tobacco and the risk of subsequent suicidality: findings from the Mexican Adolescent Mental Health Survey. *Drug Alcohol Depend* 2010; **113**: 110–17.
- 47 Lam LT, Peng ZW. Effect of pathological use of the internet on adolescent mental health: a prospective study. *Arch Pediatr Adolesc Med* 2010; **164**: 901–16.
- 48 Freitas GV, Cais CF, Stefanello S, Botega NJ. Psychosocial conditions and suicidal behavior in pregnant teenagers: a case-control study in Brazil. *Eur Child Adolesc Psychiatry* 2008; **17**: 336–42.
- 49 Kohrt BA, Jordans MJ, Tol WA, et al. Social ecology of child soldiers: child, family, and community determinants of mental health, psychosocial well-being, and reintegration in Nepal. *Transcult Psychiatry* 2010; **47**: 727–53.
- 50 Rutter M. Implications of resilience concepts for scientific understanding. *Ann N Y Acad Sci* 2006; **1094**: 1–12.
- 51 Goldstein S, Brooks RS, eds. Handbook of resilience in children. New York: Springer, 2006.
- 52 Wyman PA, Cowen EL, Work WC, Hoyt-Meyers L, Magnus KB, Fagen DB. Caregiving and developmental factors differentiating young at-risk urban children showing resilient versus stress-affected outcomes: a replication and extension. *Child Dev* 1999; **70**: 645–59.
- 53 Institute of Medicine (USA) Committee on Prevention of Mental Disorders and Substance Abuse Among Children Youth and Young Adults: Research Advances and Promising Interventions, O'Connell ME, Boat TF, Warner KE, National Research Council (USA) Board on Children Youth and Families. Preventing mental, emotional, and behavioral disorders among young people: progress and possibilities. Washington: National Academies Press, 2009.
- 54 Walker SP, Chang SM, Powell CA, Simonoff E, Grantham-McGregor SM. Effects of psychosocial stimulation and dietary supplementation in early childhood on psychosocial functioning in late adolescence: follow-up of randomised controlled trial. *BMJ* 2006; **333**: 472.
- 55 Kagitcibasi C, Sunar D, Bekman S, Baydar N, Cemalcilar Z. Continuing effects of early enrichment in adult life: The Turkish Early Enrichment Project 22 years later. *J Appl Dev Psychol* 2009; **30**: 764–79.
- 56 Walker SP, Chang SM, Younger N, Grantham-McGregor SM. The effect of psychosocial stimulation on cognition and behaviour at 6 years in a cohort of term, low-birthweight Jamaican children. *Dev Med Child Neurol* 2010; **52**: e148–54.
- 57 Klein P, Rye H. Interaction-oriented early intervention in Ethiopia. The MISC approach. *Infants Young Child* 2004; **17**: 340–54.
- 58 Lozoff B, Smith JB, Clark KM, Perales CG, Rivera F, Castillo M. Home intervention improves cognitive and social-emotional scores in iron-deficient anemic infants. *Pediatrics* 2010; **126**: e884–94.
- 59 The St. Petersburg-USA Orphanage Research Team. The effects of early social-emotional and relationship experience on the development of young orphanage children. *Monogr Soc Res Child Dev* 2008; **73**: 1–297.
- 60 Armecin G, Behrman J, Duazo P, et al. Early childhood development through an integrated program: evidence from the Philippines. 3922: May 2006. World Bank Policy Research Working Paper; 2006. <http://go.worldbank.org/G7ARQFQUH0> (accessed Aug 26, 2011).
- 61 Raine A, Mellinger K, Liu J, Venables P, Mednick SA. Effects of environmental enrichment at ages 3–5 years on schizotypal personality and antisocial behavior at ages 17 and 23 years. *Am J Psychiatry* 2003; **160**: 1627–35.
- 62 Fernald LC, Gertler PJ, Neufeld LM. 10-year effect of Oportunidades, Mexico's conditional cash transfer programme, on child growth, cognition, language, and behaviour: a longitudinal follow-up study. *Lancet* 2009; **374**: 1997–2005.
- 63 Lozoff B, De Andraca I, Castillo M, Smith JB, Walter T, Pino P. Behavioral and developmental effects of preventing iron-deficiency anemia in healthy full-term infants. *Pediatrics* 2003; **112**: 846–54.
- 64 Kordas K, Stoltzfus RJ, López P, Rico JA, Rosado JL. Iron and zinc supplementation does not improve parent or teacher ratings of behavior in first grade Mexican children exposed to lead. *J Pediatr* 2005; **147**: 632–9.
- 65 Chang SM, Walker SP, Grantham-McGregor S, Powell CA. Early childhood stunting and later behaviour and school achievement. *J Child Psychol Psychiatry* 2002; **43**: 775–83.
- 66 Baker-Henningham H, Walker S, Powell C, Gardner JM. A pilot study of the Incredible Years Teacher Training programme and a curriculum unit on social and emotional skills in community pre-schools in Jamaica. *Child Care Health Dev* 2009; **35**: 624–31.
- 67 Baker-Henningham H, Walker SP, Powell C, Gardner JM. Preventing behaviour problems through a universal intervention in Jamaican basic schools: a pilot study. *West Indian Med J* 2009; **58**: 460–64.
- 68 Mishara B, Ystgaard M. Effectiveness of a mental health promotion program to improve coping skills in young children: Zippy's friends. *ECRQ* 2006; **21**: 110–23.
- 69 Lin H, Wang YF, Wu YP. A control study of a school-based life skills education on prevention of behavior problems in third-grade schoolchildren. *Beijing Da Xue Xue Bao* 2007; **39**: 319–22 (in Chinese).
- 70 Baker-Henningham H, Walker S. A qualitative study of teacher's perceptions of an intervention to prevent conduct problems in Jamaican pre-schools. *Child Care Health Dev* 2009; **35**: 632–42.
- 71 Oveisi S, Ardabili HE, Dadds MR, et al. Primary prevention of parent-child conflict and abuse in Iranian mothers: a randomized-controlled trial. *Child Abuse Negl* 2010; **34**: 206–13.
- 72 Wu Z, Detels R, Zhang J, Li V, Li J. Community-based trial to prevent drug use among youths in Yunnan, China. *Am J Public Health* 2002; **92**: 1952–57.
- 73 Wang Y, Liu C, Wang YF. Effectiveness of social skills training among children with behavior problems: a randomized controlled trial. *Beijing Da Xue Xue Bao* 2007; **39**: 315–58 (in Chinese).
- 74 Ison MS. Training in social skills: an alternative technique for handling disruptive child behavior. *Psychol Rep* 2001; **88**: 903–11.
- 75 Loughry M, Ager A, Flouri E, Khamis V, Afana AH, Qouta S. The impact of structured activities among Palestinian children in a time of conflict. *J Child Psychol Psychiatry* 2006; **47**: 1211–18.
- 76 Bonhauser M, Fernandez G, Püschel K, et al. Improving physical fitness and emotional well-being in adolescents of low socioeconomic status in Chile: results of a school-based controlled trial. *Health Promot Int* 2005; **20**: 113–22.
- 77 Rivet-Duval E, Heriot S, Hunt C. Preventing adolescent depression in Mauritius: a universal school-based approach. *Child Adolesc Ment Health* 2010; **16**: 86–91.
- 78 Jordans MJ, Komproe IH, Tol WA, et al. Evaluation of a classroom-based psychosocial intervention in conflict-affected Nepal: a cluster randomized controlled trial. *J Child Psychol Psychiatry* 2010; **51**: 818–26.
- 79 Layne CM, Saltzman WR, Poppleton L, et al. Effectiveness of a school-based group psychotherapy program for war-exposed adolescents: a randomized controlled trial. *J Am Acad Child Adolesc Psychiatry* 2008; **47**: 1048–62.
- 80 Tol WA, Komproe IH, Susanty D, Jordans MJ, Macy RD, De Jong JT. School-based mental health intervention for children affected by political violence in Indonesia: a cluster randomized trial. *JAMA* 2008; **300**: 655–62.
- 81 Layne C, Pynoos R, Saltzman W, et al. Trauma/grief-focused group psychotherapy: school-based postwar intervention with traumatized Bosnian adolescents. *Group Dyn* 2001; **5**: 277–90.
- 82 Kumakech E, Cantor-Graae E, Maling S, Bajunirwe F. Peer-group support intervention improves the psychosocial well-being of AIDS orphans: cluster randomized trial. *Soc Sci Med* 2009; **68**: 1038–43.
- 83 Yu D, Seligman M. Preventing depressive symptoms in Chinese children. *Prev Treat* 2002; **5**: 1–39.
- 84 Dybdahl R. Children and mothers in war: an outcome study of a psychosocial intervention program. *Child Dev* 2001; **72**: 1214–30.
- 85 Durkin M, Schneider H, Pathania V, et al. Learning and developmental disabilities. In: Jamison D, Breman J, Measham A, et al, eds. Disease control priorities in developing countries. 2nd edn. Washington DC: Oxford University Press; and New York: World Bank, 2006; 933–51.
- 86 Engle PL, Black MM, Behrman JR, et al. Strategies to avoid the loss of developmental potential in more than 200 million children in the developing world. *Lancet* 2007; **369**: 229–42.
- 87 Shin JY, Nhan NV, Lee SB, Crittenden KS, Flory M, Hong HT. The effects of a home-based intervention for young children with intellectual disabilities in Vietnam. *J Intellect Disabil Res* 2009; **53**: 339–52.

- 88 Baker-Henningham H. Transporting evidence-based interventions across cultures: using focus groups with teachers and parents of preschool children to inform the implementation of the Incredible Years Teacher Training Programme in Jamaica. *Child Care Health Dev* 2011; **37**: 649–61.
- 89 Cunningham W, Cohan L, Naudeau S, McGinnis L. Supporting youth at risk: a policy toolkit for middle-income countries. Washington: World Bank, 2008.
- 90 Mangrulkar L, Whitman C, Posner M. Life skills approach to child and adolescent healthy human development. Washington: Pan American Health Organization, 2001.
- 91 Naudeau S, Cunningham W, Lundberg MK, McGinnis L, World Bank. Programs and policies that promote positive youth development and prevent risky behaviors: an international perspective. *New Dir Child Adolesc Dev* 2008; **2008**: 75–87.
- 92 Graeff-Martins AS, Oswald S, Comassetto JO, et al. A package of interventions to reduce school dropout in public schools in a developing country—a feasibility study. *Eur Child Adolesc Psychiatry* 2006; **15**: 442–29.
- 93 Jordans M, Tol W, Komproe I, de Jong J. Systematic review of evidence and treatment approaches: psychosocial and mental health care for children in war. *Child Adolesc Ment Health* 2009; **14**: 2–14.
- 94 Page J, Heller RF, Kinlay S, et al. Attitudes of developing world physicians to where medical research is performed and reported. *BMC Public Health* 2003; **3**: 6.
- 95 Guindon GE, Lavis JN, Becerra-Posada F, et al. Bridging the gaps between research, policy and practice in low- and middle-income countries: a survey of health care providers. *CMAJ* 2010; **182**: E362–72.
- 96 Atkins MS, Frazier SL, Leathers SJ, et al. Teacher key opinion leaders and mental health consultation in low-income urban schools. *J Consult Clin Psychol* 2008; **76**: 905–08.
- 97 Owens JS, Murphy CE, Richerson L, Girio EL, Himawan LK. Science to practice in underserved communities: the effectiveness of school mental health programming. *J Clin Child Adolesc Psychol* 2008; **37**: 434–47.
- 98 Asbahr FR, Castillo AR, Ito LM, Latorre MR, Moreira MN, Lotufo-Neto F. Group cognitive-behavioral therapy versus sertraline for the treatment of children and adolescents with obsessive-compulsive disorder. *J Am Acad Child Adolesc Psychiatry* 2005; **44**: 1128–36.
- 99 Huey SJ, Henggeler SW, Rowland MD, et al. Multisystemic therapy effects on attempted suicide by youths presenting psychiatric emergencies. *J Am Acad Child Adolesc Psychiatry* 2004; **43**: 183–90.
- 100 Gordon JS, Staples JK, Blyta A, Bytyqi M, Wilson AT. Treatment of posttraumatic stress disorder in postwar Kosovar adolescents using mind-body skills groups: a randomized controlled trial. *J Clin Psychiatry* 2008; **69**: 1469–76.
- 101 The Lancet. Mental health: WHO minds the GAP. *Lancet* 2010; **376**: 1274.
- 102 Graeff-Martins AS, Flament MF, Fayyad J, Tyano S, Jensen P, Rohde LA. Diffusion of efficacious interventions for children and adolescents with mental health problems. *J Child Psychol Psychiatry* 2008; **49**: 335–52.
- 103 Jensen PS. Disseminating child & adolescent mental health treatment methods: an international feasibility study. *Rev Bras Psiquiatr* 2006; **28**: 1–2.
- 104 Flisher AJ, Sorsdahl K, Hatherill S, Chehil S. Packages of care for attention-deficit hyperactivity disorder in low- and middle-income countries. *PLoS Med* 2010; **7**: e1000235.
- 105 Demyttenaere K, Bruffaerts R, Posada-Villa J, et al. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 2004; **291**: 2581–90.
- 106 Ivanova MY, Dobrean A, Dopfner M, et al. Testing the 8-syndrome structure of the child behavior checklist in 30 societies. *J Clin Child Adolesc Psychol* 2007; **36**: 405–17.
- 107 Jordans MJ, Tol WA, Komproe IH, et al. Development of a multi-layered psychosocial care system for children in areas of political violence. *Int J Ment Health Syst* 2010; **4**: 15.
- 108 Prince M, Patel V, Saxena S, et al. No health without mental health. *Lancet* 2007; **370**: 859–77.
- 109 Eisenberg L, Belfer M. Prerequisites for global child and adolescent mental health. *J Child Psychol Psychiatry* 2009; **50**: 26–35.
- 110 Goodman R. Child mental health: who is responsible? *BMJ* 1997; **314**: 813–14.
- 111 Lee S, Tsang A, Breslau J, et al. Mental disorders and termination of education in high-income and low- and middle-income countries: epidemiological study. *Br J Psychiatry* 2009; **194**: 411–17.
- 112 Earls F, Raviola GJ, Carlson M. Promoting child and adolescent mental health in the context of the HIV/AIDS pandemic with a focus on sub-Saharan Africa. *J Child Psychol Psychiatry* 2008; **49**: 295–312.
- 113 Belfer ML, Saxena S. WHO Child Atlas project. *Lancet* 2006; **367**: 551–52.
- 114 Miller G. Mental health in developing countries. The unseen: mental illness's global toll. *Science* 2006; **311**: 458–61.
- 115 Harper G, Cetin FC. Child and adolescent mental health policy: promise to provision. *Int Rev Psychiatry* 2008; **20**: 217–24.
- 116 Currie J, Stabile M. Mental health in childhood and human capital. In: Gruber J, ed. The problems of disadvantaged youth: an economic perspective. Chicago: The University of Chicago Press, 2009.
- 117 Conti G, Heckmann JJ, Urzua S. The educational-health gradient. *Am Econ Rev* 2010; **100**: 234–38.
- 118 Carneiro P, Heckman JJ. Human capital policy. In: Heckman JJ, Krueger A, eds. Inequality in America: what role for human capital policy? Cambridge: MIT Press, 2003.
- 119 Doyle O, Harmon CP, Heckman JJ, Tremblay RE. Investing in early human development: timing and economic efficiency. *Econ Hum Biol* 2009; **7**: 1–6.
- 120 Heckman JJ. The economics, technology, and neuroscience of human capability formation. *Proc Natl Acad Sci USA* 2007; **104**: 13250–55.
- 121 Conti G, Heckman JJ. Understanding the early origins of the education-health gradient: a framework that can also be applied to analyze gene–environment interactions. *Perspect Psychol Sci* 2010; **5**: 585–605.
- 122 Zechmeister I, Kilian R, McDaid D, Group M. Is it worth investing in mental health promotion and prevention of mental illness? A systematic review of the evidence from economic evaluations. *BMC Public Health* 2008; **8**: 20.
- 123 Lund C, Breen A, Flisher AJ, et al. Poverty and common mental disorders in low and middle income countries: a systematic review. *Soc Sci Med* 2010; **71**: 517–28.
- 124 Angelucci M, Di Maro V. Program evaluation and spillover effects. IDB Technical Note 136, Office of Strategic Planning and Development Effectiveness working papers 1003. Washington, DC: Inter-American Development Bank, 2010.
- 125 Laxminarayan R, Chow J, Shahid-Salles S. Intervention cost-effectiveness: overview of main messages. In: Jamison D, ed. Disease control priorities in developing countries. 2nd edn. Washington: World Bank, 2006.
- 126 Shatkin J, Belfer M. The global absence of child and adolescent mental health policy. *Child Adolesc Ment Health* 2004; **9**: 104–08.
- 127 UN. Convention on the Rights of the Child. <http://www.unicef.org/crc> (accessed Aug 26, 2011).
- 128 Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. Geneva: World Health Organization, 2002.
- 129 UN. Convention on the rights of persons with disability. <http://www.un.org/disabilities/default.asp?navid=14&pid=150> (accessed Aug 26, 2011).
- 130 Richmond J, Kotelchuk M. Political influences: re-thinking national health policy. In: Maguire C, Foley R, Gorr A, eds. Preventing reading difficulties in young children. Washington: National Academy Press, 1983.
- 131 Hoven CW, Doan T, Musa GJ, et al. Worldwide child and adolescent mental health begins with awareness: a preliminary assessment in nine countries. *Int Rev Psychiatry* 2008; **20**: 261–70.
- 132 Funk M, Minoletti A, Drew N, Taylor J, Saraceno B. Advocacy for mental health: roles for consumer and family organizations and governments. *Health Promot Int* 2006; **21**: 70–5.