

# Child and adolescent mental disorders: the magnitude of the problem across the globe

Myron L. Belfer

Department of Social Medicine at Harvard Medical School, Boston, MA, USA

**Objective:** Describe objectively the global gaps in policy, data gathering capacity, and resources to develop and implement services to support child mental health. **Methods:** Report on the World Health Organization (WHO) child and adolescent mental health resources Atlas project. The Atlas project utilized key informants and was supplemented by studies that focused on policy. This report also draws on current epidemiological studies to provide a context for understanding the magnitude of the clinical problem. **Results:** Current global epidemiological data consistently reports that up to 20% of children and adolescents suffer from a disabling mental illness; that suicide is the third leading cause of death among adolescents; and that up to 50% of all adult mental disorders have their onset in adolescence. While epidemiological data appears relatively uniform globally, the same is not true for policy and resources for care. The gaps in resources for child mental health can be categorized as follows: economic, manpower, training, services and policy. Key findings from the Atlas project include: lack of program development in low income countries; lack of any policy in low income countries and absent specific comprehensive policy in both low and high income countries; lack of data gathering capacity including that for country-level epidemiology and services outcomes; failure to provide social services in low income countries; lack of a continuum of care; and universal barriers to access. Further, the Atlas findings underscored the need for a critical analysis of the 'burden of disease' as it relates to the context of child and adolescent mental disorders, and the importance of defining the degree of 'impairment' of specific disorders in different cultures. **Conclusions:** The recent finding of substantial gaps in resources for child mental health underscores the need for enhanced data gathering, refinement of the economic argument for care, and need for innovative training approaches. **Keywords:** Burden, epidemiology, international, mental health, public health, service development, social policy, Third World children.

Globally the magnitude of child and adolescent mental health problems challenges resources for care, and fails to be addressed through economic and political initiative. Analyses of magnitude may look at the gap in services, the quantification of child and adolescent mental disorders, the economic costs of impairment, or the lost potential for the individual or society. Clinical and programmatic gaps need to be identified with sufficient specificity to enable systematic analysis and explanation to an audience outside the professional mental health community. For instance, child and adolescent mental health may be viewed as less of a problem in resource-rich countries, yet it is well known that access to care, the prevalence of substance abuse as a co-morbid disorder, the mal-distribution of providers and lack of coherent policies impede care. In resource-poor areas the struggle to define what is meant by a disorder, the competition with other devastating illnesses that result in increased, visible morbidity and mortality and the sometimes virtual absence of providers challenge the prioritization of mental health concerns. This paper will focus on several key issues in determining the magnitude of child and adolescent mental disorders: 1) the problem of identifying the magnitude of the problem given

uncertainties about diagnosis; 2) the challenge to find appropriate metrics to describe the magnitude of the problem in relation to other health-related problems in terms of economic cost and impairment; and 3) the availability of sound data on resources for care.

## Determining magnitude

### Diagnosis

The ICD-10 and DSM-IV diagnostic classifications for children and adolescents are woefully inadequate and of limited applicability in global epidemiological studies. Investigators note that common diagnostic and treatment approaches are grounded in a Western conceptualization of the self (Schwab-Stone, Ruchkin, Vermeiren, & Leckman, 2001). There is a failure to appreciate that the diagnostic categories are constructs derived from the informed opinion of clinicians and researchers, lack the integration of meaningful cultural perspectives, do not account for impairment, and for children do not adequately consider a host of developmental issues.

Beauchaine (2003) notes that developmental psychopathologists have criticized categorical classification systems because they fail to account for within-group heterogeneity in cultural influences.

Conflict of interest statement: No conflicts declared.

© 2008 The Author

Journal compilation © 2008 Association for Child and Adolescent Mental Health.

Published by Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA 02148, USA

Munir and Beardslee (2001) are critical of the DSM and propose a developmental and psychobiologic framework for understanding the role of culture in child and adolescent psychiatry. Appendix I of DSM-IV includes an 'Outline for Cultural Formulation' to assist in evaluating the effect of cultural context on diagnosis and treatment, but the appendix does not enable cultural formulations of child and adolescent psychopathology. Attempts have been made to design cultural case formulations (Novins et al., 1997). Rescorla et al. (2007) describe a multi-national epidemiological study that used both a 'bottom-up', empirically based dimensional approach, and the 'top-down' DSM-IV approach (Bird, 1996). The current discussion of the appropriate diagnostic classification for children with psychopathology (Rutter, 2003), categorical versus dimensional, is discussed in detail in the paper by Achenbach et al. in this volume.

For children and adolescents there is an increasing concern with the propensity to identify co-morbidity, perhaps suggesting an underlying failure of the classification system to reflect disorders as they present in real life (Maj, 2006). Angold et al. (1999) in their review convey the complexity and multiplicity of co-morbid diagnoses. Rutter (2003) underscores the need to achieve a better integration of our newer biological and environmental understanding of the causation of mental disorders in children and adolescents with the diagnostic classification of disorders.

### *Challenges in assessment*

Recent reports of 'epidemics' of autism have highlighted other concerns with the documentation of the magnitude (prevalence) of any child or adolescent mental disorder (Fombonne, 2005). For instance, sound epidemiological data now confirm that there is no evidence of an epidemic of autism anywhere in the world. Fombonne (2005) and Smeeth et al. (2004) report that professionals have become more aware that autism spectrum disorders can occur in people of normal intelligence and that there has been a shift in diagnosis from other disorders, such as mental retardation, to autism. However, this conclusion was reached only when evidence pointed to gaps in methodologies used in case ascertainment, the phenomenon of 'diagnosis shifting' (mental retardation to autism) was clarified, and the supposed causes of the purported epidemics were not proven valid. Autism is not the only disorder where methodologies used for the assessment of the magnitude of a disorder need to be carefully scrutinized. Similar methodological issues have been raised in relation to the diagnoses of attention-deficit/hyperactivity disorder (ADHD), posttraumatic stress disorder (PTSD), and juvenile bipolar disorder (Costello, Foley, & Angold, 2006).

The magnitude of the burden of child and adolescent mental disorders can be documented from

many different perspectives. For example, formal providers have specific nosologies for guidance in 'diagnosing' disorder, whereas lay individuals may carry different cognitive frameworks for deciding which behaviors or emotions are indicative of problems and which ones are considered in the realm of what the individual, immediate family, or larger but informal social group should manage. A consequence of these often discrepant views is a difficulty in ascertaining burden when only identified 'patients' are counted or there is a reliance solely on caregiver reports.

Specific issues related to the difficulty in measuring the magnitude of the gap in child and adolescent mental health services include: 1) the lack of capacity to gather consistent, meaningful epidemiological data is largely absent in developing countries; 2) the lack of an agreed framework for considering impairment. Two children with the same diagnosis can have markedly different degrees of impairment depending on family support, culture and other factors. Childhood impairment is defined as a lack of adaptive functioning for that child's developmental stage within each specific cultural context (Canino et al., 1999; Paula, Duarte, & Bordin, 2007). Assessing impairment in children and adolescents is a complex task involving the need for culture-specific tools, and agreement on criteria for impairment that are context relevant (Shaffer et al., 1999); 3) the complexity of identifying the full range of services that might be provided to an affected individual in different service sectors. Child mental health needs are often inter-sectoral. Needs may become apparent or have to be addressed in systems other than health or mental health. Children with mental health problems are often first seen and first treated in the education, social service or juvenile justice systems (Burns et al., 1995). Since a great many problems of youth are identified in the education sector these problems may or may not get recorded as mental health problems or needs. Thus, since services are often under the jurisdiction of ministries other than health it is difficult to collect and aggregate this disparate data and correlate it with individual or community need for services; and 4) some programs are targeted to specific problems and come under the sponsorship of non-governmental organizations which often deliver services independent of government oversight.

### **Epidemiology**

It is challenging to determine the epidemiology of childhood mental disorders in Western society. For instance, how do we understand the observation that children with later birth years had higher rates of ADHD and autism, whereas their risk of diagnosed mental retardation seems significantly decreased in the first years of the 21st century (Chen et al., 2007)? Globally the problem is even

more complex. This section focuses on epidemiology and epidemiological issues that are confronted globally related to the magnitude of disorders and their impact. It is not intended to be definitive in regard to epidemiology, *per se*. Obvious difficulties arise when reporting systems are inadequate (WHO, 2005), the definition or recognition of disorders varies or has different interpretations, there is a need for multiple informants (Paula et al., 2007), and the cultural component of what constitutes a disorder is only now being appreciated by epidemiologists.

As stated earlier, considering the epidemiology of disorders in the traditional manner is not adequate for an appreciation of understanding the burden associated with child and adolescent mental disorders. 'Developmental problems in children who were raised in disadvantaged backgrounds may be at higher risk of being under recognized or under diagnosed because of limited access to medical services, the parents and primary caregivers' inability to recognize early signs of neurodevelopmental disorders, restricted or no opportunity for neurodevelopmental detection in places outside the home (e.g., day care, school, and after-school programs)' (Chen et al., 2007). The deficits in diagnostic nomenclature were identified earlier. Further, Earls (1979) made the distinction between 'scientific epidemiology' and 'public health epidemiology.' It is the latter that is of primary concern in this paper, which focuses on the burden of child and adolescent mental disorders. Developmental epidemiology (Tremblay et al., 2004; Costello et al., 2006; Kellam & Werthamer-Larsson, 1986; Angold et al., 1999) and cultural epidemiology combining traditional epidemiology with qualitative study including 'explanatory models of illness' capture a more comprehensive understanding of the illness experience and the potential for impairment (Weiss, 2001; Raguram, Raghu, Vounatsou, & Weiss, 2004). Thus, there is the need go beyond more circumscribed studies of prevalence and incidence using DSM-IV or ICD-10.

No single study or set of independent studies on the epidemiology of child and adolescent disorders since 1980 is definitive or relevant to all societies. Studies have often had methodological deficiencies or do not represent the current realities of the countries from which the data were earlier reported (Odejide et al., 1989; Hackett & Hackett, 1999). Given the difficulties encountered in obtaining sound epidemiological data there is a danger of becoming a diagnostic nihilist. However, investigators in resource-poor countries have clearly been able to identify disorders that meet a set of defined clinical criteria (Tadesse et al., 1999; Omigbodun, 2004). Rescorla et al. (2007), using multiple epidemiological approaches, suggested more similarities than differences in self-reported problems in 24 very different countries. Polanczyk et al. (2007) in their exhaustive meta-analysis came to the conclusion

that methodological differences, rather than geographic factors, were the primary explanation for the variability in global prevalence rates of ADHD/HD.

### *Overall prevalence*

While many impediments exist for the gathering of sound epidemiological data, particularly in low income countries, most countries today have access to appropriate epidemiologic study guidelines and the ability to have collaborations that can assist in the development of useful data. It is a matter of setting a national priority and allocating resources to ascertain the data.

Giel et al. (1981) demonstrated in four countries (Sudan, Philippines, Colombia, and India) that between 12% and 29% of children aged 5 to 15 years had mental health problems. The types of disorder identified in these resource-poor countries were no different from those encountered in industrialized countries. Mothers readily reported the symptoms that made diagnoses possible. Thabet and Vostanis (1998) reported anxiety symptoms and disorders among children living in the Gaza Strip comparable to previous epidemiologic research in Western societies. There were high rates of anxiety disorders and school-related mental health problems. Thabet and Vostanis found the same prevalence rate (21%) of anxiety-related disorders as Kashani and Orvaschel in their United States population (1990). Thabet and Vostanis (1998) state that their findings do not support the commonly held belief that, in non-Western societies, anxiety and other mental health symptoms are predominantly expressed through somatic symptoms. Citing Nikapota (1991), they state that child mental health symptoms do not differ significantly across cultures, and that culture-specific mental health disorders are rare. The identification of disorders does not necessarily correlate with the magnitude of burden or degree of impairment.

Rescorla et al. (2007), in the previously noted multinational study, showed that girls scored significantly higher than boys on internalizing problems, whereas boys scored significantly higher than girls on externalizing problems. Hackett et al. (1999) and Bird et al. (1989) also found an excess of male patients with externalizing disorders, reflecting the Western view of a male predisposition to externalizing disorders. Gender effects were more consistent across countries for internalizing than externalizing disorders. In the study by Rescorla et al. (2007), adolescents far more consistently reported more problems than their parents. The ranking of problems was similar across countries.

### *Burden*

Is the magnitude of the psychopathology burden increasing? What of attention-deficit/hyperactivity

disorder, autism, and anorexia nervosa? The diagnosis and treatment of these disorders highlight both the weakness and strength of having an international perspective. The recognition and labeling of disorders come as a result of improved international communication, and clearly in some instances the incidence of the disorders bears a relationship to the introduction of Western concepts (Becker, 1995). If the communication about various disorders is tracked then it does appear that magnitude increases with exposure to the media and television. As demonstrated in the case of autism, caution needs to be maintained in assuming that the true magnitude of any disorder is increasing (Fombonne, 2005).

Eating disorders previously rare in resource-poor countries such as India (Khandelwal, Sharan, & Saxena, 1995) and Fiji (Becker, 1995) are now more prevalent with globalization, migration, and the introduction of Western values (Littlewood, 1995).

### *Disability Adjusted Life Years (DALYs)*

A widely utilized measure of the magnitude of mental disorders and their impact on society is the Disability Adjusted Life Years (DALY) metric. The Global Burden of Disease project, the progenitor of the DALY measure, shows that the overall burden of psychiatric illness has been seriously underestimated in the past, and that five of the ten leading causes of disability worldwide in 1990 were due to psychiatric conditions (uni-polar depression, alcohol use, bipolar affective disorder, schizophrenia and obsessive-compulsive disorder) (Murray & Lopez, 1996). Because of the methodological approaches used in calculating DALYs, it can be assumed that the burden of childhood psychiatric illness is appreciably more prominent than reported.

Childhood and adolescent mental disorders were not disaggregated from those of adults. DALYs are age-biased, giving the greatest weight to an individual aged 25. All other ages are calculated as a percentage of that full value. For example, one year at age 2 has only 20% of the weight of a year at age 25 (Anand & Hanson, 1997). The justification for this in the conception of the DALY was the need to reflect social roles. An individual at age 25 can be supporting children as well as elderly parents, and is thus theoretically of 'more value' to a society. The last point to consider regarding age preference in the calculation of the DALY is that it measures disease burden at one point in time only. Since it is designed to do so, DALY fails to take into account the future value of child health.

Finally, the concept of DALY has the same problems that other attempts to quantify mental illness have encountered, that is, how to incorporate societal costs. Anand and Hanson (1997) argue that Murray's definition of DALY is too narrowly defined, since the true 'burden of disease' should take into

consideration other people affected by mental disorder, such as family and friends, as well as the need for public services (Anand & Hanson, 1997). As it currently stands, DALY was designed with a 'strongly egalitarian flavor,' and takes only sex and age into account.

### *WHO Atlas Project: Country Resources for Child and Adolescent Mental Health*

The World Health Organization in partnership with its Regional Offices and assisted through a collaboration with the International Association for Child and Adolescent Psychiatry and Allied Professions and the World Psychiatric Association Global Presidential Programme on Child Mental Health for the first time systematically documented the status of services development, training and policy for child and adolescent mental health worldwide through the Atlas project (WHO, 2005).

The child and adolescent mental health Atlas project is one of a series of Atlases documenting mental health services resources. The child and adolescent mental health Atlas presented some unique challenges that reflect the current status of child and adolescent mental health services worldwide.

The Atlas project for children and adolescents contended with some major methodological limitations. The information gathered for the child and adolescent mental health resources Atlas was collected through a survey instrument designed specifically to gain information on youth services, training activities, and provider resources in all regions of the world. Despite concerted efforts, meaningful information was obtained from only 66 countries in comparison to the ability to find substantial data for adult mental health services in all 192 countries (Mental Health Atlas; WHO, 2005). There are multiple reasons for the difficulties encountered. 1) The questionnaire covered a wide range of topics and it was difficult for one person to complete. Key informants were used to gather information rather than attempting to use any uniform source for data. This was done in an effort to obtain data from the individual(s) thought to be most informed about the available resources. 2) There are so many gaps in available services that potential responders were discouraged about the data to be offered. 3) Focal points for child and adolescent mental health at the country level could not be identified.

Given the challenges of data gathering and the gaps in available data the first version of the child and adolescent mental health Atlas was published with the primary purpose to stimulate additional data gathering in a systematic fashion and to encourage the development of needed child and adolescent mental health policy, services and training (Belfer & Saxena, 2006).

Table 1 presents a summary of the Atlas findings.

**Table 1** Salient results from WHO Child Atlas

	High income*	Low income*
National policy	16/18	4/16
Child and adolescent mental-health programme	14/18	0/16
Epidemiological data	8/20	1/16
Annual health survey data about CAMH	12/20	3/16
Stigma as barrier to care	16/20	5/16
Financing of services:		
Consumer/family	0/20	6/16
Tax-based/government	2/20	1/16
International grants	10/20	2/16
Non-governmental organisations	4/20†	0/16
Social services	4/19	0/16
Medication available without cost to family	8/20	3/16

\*World Bank country categories. †Does not reflect emergency or disaster services. CAMH = child and adolescent mental health.

The experience with the Atlas project and the work of the WHO in attempting to develop a global program for child and adolescent mental health led to the identification of key factors essential for understanding and articulating the magnitude of burden of child and adolescent mental disorders. These factors go beyond a simple enumeration of epidemiological findings. These include: policy, financing of care, and economic costs associated with mental disorders

### Policy

A key to the development of all mental health services, especially child and adolescent mental health services, is the development of a country or regional commitment to provide appropriate needed services. This commitment is demonstrated through policy, legislation, and governance.

In 2002 a systematic survey of the literature and use of key informants found that only 7% of countries worldwide (14 of 191) had a clearly articulated specific (stand-alone) child and adolescent mental health policy (Shatkin & Belfer, 2004). The child and adolescent mental health Atlas documented in more detail the presence of child and adolescent mental health policy at the regional, country and local level and found the following information according to income level and region (see Tables 2 and 3).

The identification of an increased number of child and adolescent mental health policies in the Atlas survey results from the inclusion of national policies often integrated into human rights, social welfare, child protection or education. As can be seen in the tables, having a child and adolescent mental health policy, of any type or at any level of government, does not mean that a country or region has an identifiable child and adolescent mental health services program. Ironically, the countries with the highest pro-

**Table 2** Atlas country respondents as a percentage of WHO regional composition and population

WHO region	Number of countries*	Number of country respondents	Population percentage represented (%)
AFRO	46	15 (32.7%)	34.4
AMRO	35	9 (25.7%)	46.8
SEARO	11	3 (27.3%)	71.1
EURO	52	25 (48.1%)	64.7
EMRO	21	8 (38.1%)	38.5
WPRO	27	6 (22.2%)	87.7

\*Countries in WHO regions are listed on the WHO webpage or in the WHO Atlas 2003.

**Table 3** Presence of national child and adolescent mental health policy and programming by World Bank country income category

World Bank income category	National policy (%)	Child and adolescent mental health program (%)
1 (low)	25.0	0
2	72.2	61.1
3	92.3	46.2
4 (high)	88.9	77.8

portion of children and adolescents in their populations are the countries most likely lacking in a child and adolescent mental health policy in any form. While the WHO AFRO region lags other regions in national child mental health policy development, South Africa and Mozambique have comprehensive, model child mental health policies comparable to the best in any region (WHO, 2005).

Progress toward the development of child and adolescent mental health policy is moving at a slow pace. Of those countries identifying any form of child and adolescent mental health policy, not in the highest income ranking, only 29% (4 of 14) improved their policies in the decade after 1990 (Shatkin & Belfer, 2004).

### Financing of care

Faced with the evidence for the need for child and adolescent mental health services, there has been a universal failure to provide the needed financial resources. Too often there continues to be a reliance on 'soft money' to support child services and rarely are demonstration services brought to scale. Child and adolescent mental health services funding is rarely identifiable in country budgets and in low income countries services are most often paid 'out of pocket' or identified as 'private' financing. Ironically, 'out of pocket' expenditures for child mental health services are 71.4% in African countries versus 12.5% in Europe, reflecting an inverse relationship to overall financial well-being.

Funding for child and adolescent mental health services comes from largely temporary and

vulnerable sources rather than by more stable government allocations in both high and low income countries. It is remarkable that international grants, provided by major foundations, play such a significant role in funding services in high income countries where there might be the expectation of government funding as a dominant source for services support. The development of these grant-supported services reflects to a major extent the level of professional development that permits successful applications, and the presence of the funders in the countries receiving grant support.

None of the low income countries that reported for the Atlas has social insurance, insurance provided by governments for its neediest citizens to access health care and other habilitative services. This is a potential source of funding child and adolescent mental health services as documented in 22.2% of middle and high income countries. Even in countries that have an identifiable budget for child and adolescent mental health services there is no parity with the resources provided for adult mental health services.

#### *Economic cost of child and adolescent mental disorders*

Child and adolescent mental disorders, more so than many other illnesses, have longstanding costs to society. The societal impact is magnified by lost economic productivity and potential destabilization of communities. Children with depression, ADHD and conduct disorder have higher rates of health care utilization (Hankin et al., 1998; Scott et al., 2001; Romeo, Byford, & Knapp, 2005). They also impose costs on society in terms of education, burden on the criminal justice system and social services (Mannuzza et al., 1998; Knapp, 2000), and need for informal care (Egger et al., 1999; Byford et al., 1999). Knapp et al. (1999) examined the hidden costs of children with conduct disorder. This unique study, with albeit a small *n* of 10 children with conduct disorder, showed that they incurred an average annual cost of over £15,000 attributable to the conduct disorder (Knapp, 2000). The study is illustrative of the type of studies that are needed with larger representative populations to underscore the economic costs associated with child and adolescent mental disorders. In this study only 10% of the total costs to society were in the health sector; the rest fell into education (special educational needs), social welfare, family care (through effect on parental employment), and the welfare system. A follow-up into adulthood of children with antisocial behavior showed that the costs of public services were 10 times higher than for those without problems as children. Long-term costs were high not only in direct medical care but also in terms of crime, foster and residential care, and expenditure of state benefits (Scott et al., 2001; Knapp et al., 2002). Leibson and Long (2003) followed a birth cohort of children

with ADHD over 9 years and found that direct medical care costs were more than double for children with ADHD (\$4,306 versus \$1,944) than those without the diagnosis, even when the analysis excluded hospital and emergency department admissions (Leibson et al., 2001). Further, a review of the literature on children with ADHD by Leibson and Long (2003) found that almost all cost analyses have estimated only direct medical costs, without reference to indirect costs.

#### **Contextual concerns associated with appreciating magnitude**

##### *Displacement*

The global problem of displacement from family, home, community, and country is of enormous importance. In 1999, 21.5 million refugees were displaced by war. An additional 30 million, 80% of whom are children and women, were displaced internally (Martin, 1992). Fullilove (1996) emphasizes the importance of 'place' in the healthy development of individuals. Forced migration and loss of parents and relatives in war and natural disaster may contribute to displacement and abandonment, leading to the loss of 'place.' Sampson et al. (1997) describe the importance of the community as a mediator of the impact of violence on children and adolescents through 'collective efficacy.' Collective efficacy is defined as 'social cohesion among neighbors combined with their willingness to intervene on behalf of the common good' (Sampson, Raudenbush, & Earls, 1997). More broadly, Goddard et al. (2004), citing the work of Bandura (1997), defines collective efficacy as 'future oriented judgments about capabilities to organize and execute the course of action required to produce given attainments in specific situations or contexts. Efficacy judgments are beliefs about individual or group capability, not necessarily accurate assessments of those capabilities' (Goddard et al., 2004). The stresses associated with displacement lead to anxiety, depression, suicide, post-traumatic stress disorder, and other problems in vulnerable youth (Ziviç, 1993; Laor et al., 1996; Thabet & Vostanis, 1998; Donnelly & Amaya-Jackson, 2002; Dyregrov et al., 2002).

##### *Soldiering and prostitution*

In the turmoil of some resource-poor countries, children are forced to become child soldiers and sexual slaves. Child soldiers reportedly suffer post-traumatic stress disorder (Singh, 2004; Kuruppuarachchi & Wijeratne, 2004; Magambo & Lett, 2004; McKay & Wessells, 2004; Derluyn et al., 2004; Moszynski, 2003). Huge challenges face those concerned with child mental health in helping to reclaim the lives of former child soldiers (Lamberg, 2004; Bracken, Giller, & Ssekiwanuka, 1996).

Children are trafficked for sex and labor worldwide (IOM, 2001; Inter-American Commission of Women, 2001; International Labor Organization, 1998). An estimated 1 million children are forced into prostitution every year. The total number of prostituted children could be as high as 10 million (Willis & Levy, 2002). While attention is paid to combating the trafficking (Asian, 2003), the management of the psychological sequelae for the children needs further attention. The psychological consequences of child labor are complex and associated with the relationship of children to their families and their assumption of adult roles prematurely.

### *HIV/AIDS*

In sub-Saharan Africa, Russia and parts of Asia, acquired immunodeficiency syndrome (AIDS) is pandemic. An estimated 1.5 million children less than 15 years old are living with human immunodeficiency virus (HIV) infection or AIDS (UNICEF, 2000). Among the 10 most affected countries, all in sub-Saharan Africa, approximately 6,000,000 children younger than the age of 15 years have lost their mother or both parents to AIDS. Those infected but struggling with the illness face the prospect of having to adjust to declining physical and mental functioning and living isolated lives. The mental health consequences of HIV/AIDS globally are similar to those in the US as documented by Munir and Belfer (2004). Neuropsychological dysfunction, including dementia, depression, and other disorders, go largely untreated. However, the continuing lack of recognition of depression, dementia, and other consequences of HIV infection contributes to an increased morbidity.

These children and adolescents, living as orphans, are vulnerable because of the loss of parent figures, malnutrition, and disenfranchisement from societies that have a stigmatizing view of AIDS-affected and HIV-infected persons. As documented by Carlson and Earls (1997), whether through social policy as evidenced in the Leagane children of Romania or as the consequence of the pandemic of AIDS, the rearing of children in orphanages or in other situations that deprive children of appropriate stimulation and nurturance has long-lasting consequences. (See the paper by Raviola, Earls, and Carlson in this issue.)

### *Substance abuse*

Substance abuse in children and adolescents is seen worldwide (Belfer & Heggenhougen, 1995). In resource-poor countries, the problem is of no less importance than in Western countries. It exacts a tremendous toll in terms of morbidity and mortality. Illicit drugs, and psychoactive substances not defined as drugs of abuse (e.g., khat, inhalants, and alcohol), are used by youth regardless of economic circumstance or religious prohibition. Homeless

street children are particularly vulnerable to substance abuse and other high-risk behavior (Raffaelli & Larson, 1999; Senanayake, Ranasinghe, & Bala-suriya, 1998). Forster et al. (1996) studied the activities of children found wandering on the streets of Porto Alegre, Brazil, aiming to describe their drug habits and practice of thefts or mendicancy. Regular abuse of inhalants was reported much more frequently by the street subgroup of children, reaching a prevalence of 40%. Thievery was reported only by the street children who used illicit drugs. Road accidents are common among those using drugs (WHO, 2004).

### *Violence and abuse*

Violence to and by children and adolescents is all too prevalent (WHO, 2002). Bullying and corporal punishment have now been reported worldwide (Remschmidt, 2007; Djeddah et al., 2000). Garbarino (1999) articulated a comprehensive model for understanding youth violence. His concept sees the family, neighborhood and community as 'hosts' for a potential epidemic of violence, including the extreme of youth homicide.

The costs of interpersonal violence are high (WHO, 2004). School violence is of particular concern. There are wide variances in the incidence of school violence between countries (Akiba et al., 2002). In comparing findings from a survey of adolescents, using identical measures except for translation, conducted in two European countries and the US, violence exposure was associated in all three samples with increased levels of smoking and substance (alcohol, marijuana and hard drug) use (Vermeiren et al., 2003). Omigbodun (2004) provided evidence that abuse and corporal punishment are a risk factor for mental disorders. (See the paper by Patel et al. in this volume for more details.)

There are conflicting views on the impact of trauma on mental functioning (Mollica et al., 1997; Sack et al., 1999; Weine et al., 1998). While resiliency is often highlighted, many investigators identify specific long-term consequences that impact functioning (Laor et al., 1996; Terr, 1983; Abdel-Mawgoud & al-Haddad, 1997; Almqvist & Brandell-Forsberg, 1997). Sack et al. (1999), Abdel-Mawgoud and al-Haddad (1997), and Almqvist and Brandell-Forsberg (1997) identify PTSD as persistent. Laor et al. (1996) identifies depression and externalizing behaviors along with PTSD as long-term consequences of exposure to violence.

### *Youth suicide*

Youth suicide presents a problem in understanding an act which in Western countries is overwhelmingly associated with defined mental illness, but elsewhere in the world is not so clearly identified with a mental illness. In the face of overwhelming

helplessness, suicide may appear to be the only escape, with no clearly labeled mental illness. In some resource-poor countries the balance in determining suicidal risk may rest with environmental stressors and the perception of 'no way out.' Unrealistic expectations for success or happiness may lead to suicide (Bertolote, 2003, pers. comm.). According to Murthy (2000), the traditional protective effect of religion in certain cultures does not operate in the younger generation Chan et al. (2001) regard suicide in contemporary China as a response to globalization, in which 'Chinese' values are closely identified with the global culture. The high suicide rate is a reflection not of psychiatric disorder but of socio-cultural factors. Suicide is viewed by those without demonstrable mental illness as a solution to personal dilemmas that thwart expectations. From this perspective, in India and in other resource-poor countries, the motive of the suicidal individual is not to achieve an exalted goal or fear thereof, but rather to have enough dowry to marry, and not be isolated because of rape, or to be successful in passing an examination.

### Disability

Disability – physical or mental – is all too common in resource-poor countries, especially after conflict. In Cambodia, for example, about one out of every 40 have physical disabilities, 20 to 35 children per thousand children below age 18 might be mentally retarded (102,000 to 178,500) and 14 to 60 per thousand have epilepsy (154,000 to 408,000) (UNESCO, 2003). However, the disproportionate rate of mental retardation in low socioeconomic status (SES) groups is not limited to poor countries. As reported by Chen et al. (2007), the more rural and the lower SES of the children the greater is their chance of receiving the diagnosis of mental retardation at school age.

In resource-poor countries mental retardation and epilepsy dominate services of child mental health. Mental retardation and epilepsy are the most common mental disorders in India (Malhotra & Chaturvedi, 1984). The rate of serious mental retardation in some resource-poor countries ranges from 5 to 16.2 per 1,000 population (Stein, Durkin, & Belmont, 1986), significantly higher than the rate in the West. Cerebral palsy and postnatal causes of mental retardation are much more common in transitional societies than in developed countries. Untreated epilepsy impedes participation in society. Unfortunately, although the cost of medication is relatively low, access to care is limited. The care of the mentally retarded varies widely in resource-poor countries. In some a special effort is made to provide meaningful vocational education, especially in agrarian economies. All too often, the moderately and severely retarded are relegated to sub-standard institutions where disease and premature death are rife.

### Conclusion

Child and adolescent mental disorders are unquestionably ubiquitous and burdensome. The task of determining the 'magnitude of the problem' globally is challenging. The lack of data-gathering capacity for epidemiological study is a major deficit. Limits of the child and adolescent diagnostic schema; inadequacies in cultural and cross-cultural understanding; and understanding the importance of impairment significantly erode not only proper assessment but the development of appropriate services (Paula et al., 2007). In addition, all of these limitations have undermined the development of effective advocacy, limited policy development and reduced the likelihood of sustaining appropriate services for children and adolescents with mental disorders. The conditions of poverty, physical and sexual abuse, war and displacement, forced prostitution, child soldiering, HIV and other diseases present to varying degrees across the globe with an impact on the magnitude of mental health problems yet to be adequately determined.

### Acknowledgement

The author gratefully acknowledges the review and contributions of Mary Schwab-Stone, MD, MPH of the Yale Child Study Center to this paper.

### Correspondence to

Myron L. Belfer, Department of Social Medicine, Harvard Medical School, 641 Huntington Ave, Boston MA 02115, USA; Email: myron\_belfer@hms.harvard.edu

### References

- Abdel-Mawgoud, M., & al-Haddad, M.K. (1997). Heroin addiction in Bahrain: 15 years experience. *Addiction*, 91, 1859–1864.
- Akiba, M., LeTendre, G.K., Baker, D.P., & Goesling, B. (2002). Student victimization: National and school system effects on violence in 37 nations. *American Education Research Journal*, 39, 829–853.
- Almqvist, K., & Brandell-Forsberg, M. (1997). Refugee children in Sweden: Post-traumatic stress disorder in Iranian preschool children exposed to organized violence. *Child Abuse and Neglect*, 21, 351–366.
- Anand, S., & Hanson, K. (1997). Disability-adjusted life years: A critical review. *Journal of Health Economics*, 16, 685–702.
- Angold, A., Costello, E.J., Framer, E.M.Z., Burns, B., & Erkanli, A. (1999). Impaired but undiagnosed. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 129–137.
- Asian, D.B. (2003). *Combating trafficking of women and children in South Asia – Regional synthesis paper for*



- Bangladesh, India, and Nepal. Manila: Asian Development Bank.
- Bandura, A. (1997). *Self efficacy: The exercise of control*. New York: W.H. Freeman and Company.
- Beauchaine, T.P. (2003). Taxometrics and developmental psychopathology. *Developmental Psychopathology*, 15, 501–527.
- Becker, A.E. (1995). *Body, self and society – the view from Fiji*. Philadelphia: University of Pennsylvania Press.
- Belfer, M.L., & Heggenhougen, K. (1995). Substance abuse. In R. Desjarlais, L. Eisenberg, B. Good, & A. Kleinman (Eds.), *World mental health: Problems and priorities in low-income countries* (pp. 87–115). New York: Oxford University Press.
- Belfer, M.L., & Saxena, S. (2006). Child and adolescent mental health resources. Findings from the WHO Child Atlas Project. *Lancet*, 367, 551–552.
- Bird, H.R. (1996). Epidemiology of childhood disorders in a cross-cultural context. *Journal of Child Psychology and Psychiatry*, 37, 35–49.
- Bird, H.R., Gould, M.S., Yager, T., Staghezza, B., & Canino, G. (1989). Risk factors for maladjustment in Puerto Rican children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 28, 847–850.
- Bracken, P.J., Giller, J.E., & Ssekiwanuka, J.K. (1996). The rehabilitation of child soldiers: Defining needs and appropriate responses. *Medicine, Conflict and Survival*, 12, 114–125.
- Burns, B.J., Costello, E.J., Angold, A., Tweed, D., Stangl, D., Farmer, E.M., & Erklani, A. (1995). Children's mental health services use across services sectors. *Health Affairs*, 14, 147–159.
- Byford, S., Harrington, R., Torgerson, D., Kerfoot, M., Dyer, E., Harrington, V., et al. (1999). Cost-effectiveness analysis of a home-based social work intervention for children and adolescents who have deliberately poisoned themselves. Results of a randomized control study. *British Journal of Psychiatry*, 154, 156–162.
- Canino, G., Costello, E.J., & Angold, A. (1999). Assessing functional impairment and social adaptation of child mental health services research: A review of measures. *Mental Health Services Research*, 1, 93–108.
- Carlson, M., & Earls, F. (1997). Psychological and neuroendocrinological sequelae of early social deprivation in institutionalized children in Romania. In C.S. Carter, I.I. Lederhendler, & B. Kirkpatrick (Eds.), *The integrative neurobiology of affiliation* (pp. 419–428). New York: Academy of Sciences.
- Chan, K.P., Hung, S.F., & Yip, P.S. (2001). Suicide in response to changing societies. *Child and Adolescent Psychiatric Clinics of North America*, 10, 777–795.
- Chen, C-Y., Chieh-Yu, L., Su, W-C., Huang, S-L., & Lin, K-M. (2007). Factors associated with the diagnosis of neurodevelopmental disorders: A population-based longitudinal study. *Pediatrics*, 119, e435–e443.
- Costello, E.J., Foley, D.L., & Angold, A. (2006). 10-year research update: The epidemiology of child and adolescent psychiatric disorders: II. Developmental epidemiology. *Journal of the American Academy of Child and Adolescent Psychiatry*, 45, 8–25.
- Derluyn, I., Broekaert, E., Schuyten, G., & De, T.E. (2004). Post-traumatic stress in former Ugandan child soldiers. *Lancet*, 363, 861–863.
- Djeddah, C., Facchin, P., Ranzato, C., & Romer, C. (2000). Child abuse: Current problems and key public health challenges. *Social Science and Medicine*, 51, 905–915.
- Donnelly, C.L., & Amaya-Jackson, L. (2002). Post-traumatic stress disorder in children and adolescents: Epidemiology, diagnosis and treatment options. *Paediatric Drugs*, 4, 159–170.
- Dyregrov, A., Gjestad, R., & Raundalen, M. (2002). Children exposed to warfare: A longitudinal study. *Journal of Traumatic Stress*, 15, 59–68.
- Earls, F. (1979). Epidemiology and child psychiatry: Historical and conceptual development. *Comprehensive Psychiatry*, 20, 256–269.
- Egger, H.L., Costello, E.J., Erkanli, A., & Angold, A. (1999). Somatic complaints and psychopathology in children and adolescents: Stomachaches, musculoskeletal pains, and headaches. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 852–860.
- Fombonne, E. (2005). Epidemiology of autistic disorder and other pervasive developmental disorders. *Journal of Clinical Psychiatry*, 66(Suppl. 10), 3–8.
- Forster, L.M., Tannhauser, M., & Barros, H.M. (1996). Drug use among street children in southern Brazil. *Drug and Alcohol Dependence*, 43, 57–62.
- Fullilove, M.T. (1996). Psychiatric implications of displacement: Contributions from the psychology of place. *American Journal of Psychiatry*, 153, 1516–1523.
- Garbarino, J. (1999). *Lost boys: Why our sons turn violent and how we can save them*. New York: Free Press.
- Giel, R., de Arango, M.V., Climent, C.E., et al. (1981). Childhood mental disorders in primary health care: Results of observations in four developing countries. *Pediatrics*, 68, 677–683.
- Goddard R.D., Hoy W.K., & Hoy, A.W. (2004). Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. *Educational Researcher*, 33, 3–13.
- Hackett, R., & Hackett, L. (1999). Child psychiatry across cultures. *International Review of Psychiatry*, 11, 225–235.
- Hackett, R.J., Hackett, L., Bhakta, P., & Gowers, S. (1999). The prevalence and associations of psychiatric disorder in children in Kerala, South India. *Journal of Child Psychology and Psychiatry*, 40, 801–807.
- Hankin, B.L., Abramson, L.Y., Moffitt, T.E., Silva, P.A., McGee, R., & Angell, K.E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences. I: A 10-year longitudinal study. *Journal of Abnormal Psychology*, 107, 128–140.
- Inter-American Commission of Women. (2001). *Trafficking of women and children for sexual exploitation in the Americas – an introduction to trafficking in the Americas*.
- International Labor Organization, International Program on the Elimination of Child Labor. (1998). *Combating trafficking in children for labour exploitation in the Mekong sub-region: A proposed framework for ILO-IPEC action and proceedings of a Mekong sub-regional consultation*. ILO/IPEC.

- International Organization for Migration (IOM). (2001). *Trafficking in women and children from the Republic of Armenia: A study*. Yerevan: International Organization for Migration.
- Kashani J.H., & Orvaschel, H. (1990). A community study of anxiety in children and adolescents. *American Journal of Psychiatry*, 147, 313–318.
- Kellam, S.G., & Werthamer-Larsson, L. (1986). Developmental epidemiology: A basis for prevention. In M. Kessler & S.E. Goldston (Eds.), *A decade in progress in primary prevention* (pp. 154–180). Hanover, NH: University Press of New England.
- Khandelwal, S.K., Sharan, P., & Saxena S. (1995). Eating disorders: An Indian perspective. *International Journal of Social Psychiatry*, 41, 132–146.
- Knapp, M. (2000). Schizophrenia costs and treatment cost-effectiveness. *Acta Psychiatrica Scandinavica Supplement*, 407, 15–18.
- Knapp, M., McCrone, P., Fombonne, E., Beecham, J., & Wostear, G. (2002). The Maudsley long-term follow-up of child and adolescent depression: 3. Impact of comorbid conduct disorder on service use and costs in adulthood. *British Journal of Psychiatry*, 180, 19–23.
- Knapp, M., Scott, S., & Davis, J. (1999). The cost of antisocial behavior in younger children. *Clinical Child Psychology and Psychiatry*, 4, 457–473.
- Kuruppuarachchi, K., & Wijeratne, L.T. (2004). Post-traumatic stress in former Ugandan child soldiers [comment]. *Lancet*, 363, 1648.
- Lamberg, L. (2004). Reclaiming child soldiers' lost lives. *Journal of the American Medical Association*, 292, 553–554.
- Laor, N., Wolmer, L., Mayes, L.C., Golomb, A., Silverberg, D.S., Weizman, R., et al. (1996). Israeli preschoolers under Scud missile attacks. A developmental perspective on risk-modifying factors. *Archives of General Psychiatry*, 53, 416–423.
- Leibson, C.L., Katusic, S.K., Barabaresi, W.J., et al. (2001). Use and costs of medical care for children and adolescents with and without attention deficit/hyperactivity disorder. *Journal of the American Medical Association*, 285, 60–66.
- Leibson, C.L., & Long, K.H. (2003). Economic implications of attention-deficit hyperactivity disorder for healthcare systems. *Pharmacoeconomics*, 21, 1239–1262.
- Littlewood, R. (1995). Psychopathology and personal agency: Modernity, culture change and eating disorders in South Asian societies. *British Journal of Medical Psychology*, 68, 5–63.
- Magambo, C., & Lett, R. (2004). Post-traumatic stress in former Ugandan child soldiers.[comment]. *Lancet*, 363, 1647–1648.
- Maj, M. (2006). The aftermath of the concept of 'psychiatric comorbidity'. *Psychotherapy and Psychosomatics*, 74, 67–68.
- Malhotra, S., & Chaturvedi, S.K. (1984). Patterns of childhood psychiatric disorders in India. *Indian Journal of Pediatrics*, 51, 235–240.
- Mannuzza, S., Klein, R.G., Bessler, A., Malloy, P., & LaPadulla, M. (1998). Adult psychiatric status of hyperactive boys grown up. *American Journal of Psychiatry*, 155, 493–498.
- Martin, F. (1992). *Refugee women*. London: Zed Press.
- McKay, S., & Wessells, M.G. (2004). Post-traumatic stress in former Ugandan child soldiers.[comment]. *Lancet*, 363, 1646–1647.
- Mollica, R.F., Poole, C., Son, L., Murray, C.C., & Tor, S. (1997). Effects of war trauma on Cambodian refugee adolescents' functional health and mental health status. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1098–1106.
- Moszynski, P. (2003). Child soldiers forgotten in Angola. *British Medical Journal*, 326, 1003.
- Munir, K.M., & Beardslee, W.R. (2001). A developmental and psychobiologic framework for understanding the role of culture in child and adolescent psychiatry. *Child and Adolescent Psychiatric Clinics of North America*, 10, 667–677.
- Munir, K.M., & Belfer, M.L. (2004). HIV and AIDS: Global and United States perspectives. In J.M. Wiener & M.K. Dulcan (Eds.), *Textbook of child and adolescent psychiatry* (pp. 869–890). Washington, DC: American Psychiatric Publishing.
- Murray, C.J., & Lopez, A.D. (Eds.). (1996). *The global burden of disease*. Geneva: World Health Organization.
- Murthy, R.S. (2000). Approaches to suicide prevention in Asia and the Far East. In K. Hawton & K. Van Heeringen (Eds.), *International handbook of suicide and attempted suicide* (pp. 625–637). London: Wiley.
- Nikapota, A.D. (1991). Child psychiatry in developing countries. *British Journal of Psychiatry*, 158, 743–751.
- Novins, D.K., Bechtold, D.W., Sack, W.H., Thompson, J., Carter, D.R., & Manson, S.M. (1997). The DSM-IV outline for cultural formulation: A critical demonstration with American Indian children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1244–1251.
- Odejide, A.O., Oyewunmi, L.K., & Ohaeri, J.U. (1989). Psychiatry in Africa: An overview. *American Journal of Psychiatry*, 146, 708–716.
- Omigbodun, O.O. (2004). Psychosocial issues in a child and adolescent psychiatric clinic population in Nigeria. *Social Psychiatry and Psychiatric Epidemiology*, 39, 667–672.
- Paula, C.S., Duarte, C.S., & Bordin, I.A.S. (2007). Prevalence of mental health problems in children and adolescents from the outskirts of Sao Paulo City: Treatment needs and service evaluation. *Revista Brasileira de Psiquiatria*, 29, 11–17.
- Polanczyk, G., Silva de Lima, M., Horta, B.L., Biederman, J., & Rohde, L.A. (2007). The worldwide prevalence of ADHD: A systematic review and metaregression analysis. *American Journal of Psychiatry*, 164, 942–948.
- Raffaelli, M., & Larson, R.W. (1999). *Homeless and working youth around the world: Exploring developmental issues*. San Francisco: Jossey-Bass.
- Raguram, R., Raghu, T.M., Vounatsou, P., & Weiss, M.G. (2004). Schizophrenia and the cultural epidemiology of stigma in Bangalore, India. *Journal of Nervous and Mental Disease*, 192, 734–744.
- Remschmidt, H. (2007). School violence: Epidemiology, background, and prevention. In H. Remschmidt, B. Nurcombe, M.L. Belfer, N. Sartorius, & A. Okasha (Eds.), *The mental health of children and adolescents: An area of global neglect* (pp. 179–191). Chichester: Wiley.

- Rescorla, L., Achenbach, T.M., Almqvist, F., Bird, H., et al. (2007). Epidemiological comparisons of problems and positive qualities reported by adolescents in 24 countries. *Journal of Consulting and Clinical Psychology*, 75, 351–358.
- Romeo, R., Byford, S., & Knapp, M. (2005). Annotation: Economic evaluations of child and adolescent mental health interventions: A systematic review. *Journal of Child Psychology and Psychiatry*, 46, 919–930.
- Rutter, M. (2003). Categories, dimensions, and the mental health of children and adolescents. *Annals of the New York Academy of Sciences*, 1008, 11–21.
- Sack, W.H., Him, C., & Dickason, D. (1999). Twelve-year follow-up study of Khmer youths who suffered massive war trauma as children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 1173–1179.
- Sampson, R.J., Raudenbush, S.W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, 277, 918–924.
- Schwab-Stone, M., Ruchkin, V., Vermeiren, R., & Leckman, P. (2001). Cultural considerations in the treatment of children and adolescents: Operationalizing the importance of culture in treatment. *Child and Adolescent Psychiatric Clinics of North America*, 10, 729–743.
- Scott, S., Knapp, M., Henderson, J., et al. (2001). Financial cost of social exclusion: Follow-up study of anti-social children into adulthood. *British Medical Journal*, 322, 191–195.
- Senanayake, M.P., Ranasinghe, A., & Balasuriya, C. (1998). Street children – a preliminary study. *Ceylon Medical Journal*, 43, 191–193.
- Shaffer, D., Fisher, P.W., & Lucas, C.P. (1999). Respondent-based interviews. In D. Shaffer, C.P. Lucas, & J.E. Richters (Eds.), *Diagnostic assessment in child and adolescent psychopathology* (pp. 3–33). New York: Guilford Press.
- Shatkin, J.P., & Belfer, M.L. (2004). The global absence of child and adolescent mental health policy. *Child and Adolescent Mental Health*, 9, 104–108.
- Singh, S. (2004). Post-traumatic stress in former Ugandan child soldiers. [comment]. *Lancet*, 363, 1648.
- Smeeth, L., Cook, C., Fombonne, E., Heavey, L., Rodrigues, L.C., Smith, P.G., & Hall, A.J. (2004). Rate of first recorded diagnosis of autism and other pervasive developmental disorders in United Kingdom general practice, 1988 to 2001. *BMC Medicine*, 2, 39.
- Stein, Z., Durkin, M., & Belmont, L. (1986). 'Serious' mental retardation in developing countries: An epidemiologic approach. *Annals of the New York Academy of Sciences*, 477, 8–21.
- Tadesse, B., Kebede, D., Tegegne, T., & Alem A. (1999). Childhood behavioural disorders in Ambo district, western Ethiopia. I. Prevalence estimates. *Acta Psychiatrica Scandinavica Supplement*, 397, 92–97.
- Terr, L.C. (1983). Chowchilla revisited: The effects of psychic trauma four years after a school-bus kidnapping. *American Journal of Psychiatry*, 140, 1543–1550.
- Thabet, A.A., & Vostanis, P. (1998). Social adversities and anxiety disorders in the Gaza Strip. *Archive Diseases of Children*, 78, 439–442.
- Tremblay, R.E., Nagin, D.S., Séguin, J.R., et al. (2004). Physical aggression during early childhood: Trajectories and predictors. *Pediatrics*, 114, e43–e50.
- UNICEF. (2000). *The state of the world's children*. New York: UNICEF.
- United Nations, Economic and Social Commission (UNESCO) for Asia and the Pacific. (2003). *Focus on ability, celebrate diversity – highlights of the Asian and Pacific decade of disabled persons, 1993–2003*. New York: United Nations.
- Vermeiren, R., Schwab-Stone, M., Deboutte, D., Leckman, P., & Ruchkin, V. (2003). Violence exposure and substance use in adolescents: Findings from three countries. *Pediatrics*, 111, 535–540.
- Weine, S.M., Vojvoda, D., Becker, D.F., McGlashan, T.H., Hodzic, E., Laub, D., et al. (1998). PTSD symptoms in Bosnian refugees 1 year after resettlement in the United States. *American Journal of Psychiatry*, 155, 562–564.
- Weiss, M.G. (2001). Cultural epidemiology: An introduction and overview. *Anthropology and Medicine*, 8, 5–29.
- Willis, B.M., & Levy, B.S. (2002). Child prostitution: Global health burden, research needs, and interventions. *Lancet*, 359, 1417–1422.
- World Health Organization. (2002). *World report on violence and health*. Geneva: World Health Organization.
- World Health Organization. (2004). *WHO guide to mental and neurological health in primary care – a guide to mental and neurological ill health in adults, adolescents and children* (2nd edn). London: Royal Society of Medicine Press.
- World Health Organization. (2005). *Child and adolescent Atlas: Resources for child and adolescent mental health*. Geneva: World Health Organization.
- Zivić, I. (1993). Emotional reactions of children to war stress in Croatia. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 709–713.

Manuscript accepted 3 October 2007