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The burden of child maltreatment in the East Asia and Pacific region[★]

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Abstract

This study estimated the health and economic burden of child maltreatment in the East Asia and Pacific region, addressing a significant gap in the current evidence base. Systematic reviews and meta-analyses were conducted to estimate the prevalence of child physical abuse, sexual abuse, emotional abuse, neglect, and witnessing parental violence. Population Attributable Fractions were calculated and Disability-Adjusted Life Years (DALYs) lost from physical and mental health outcomes and health risk behaviors attributable to child maltreatment were estimated using the most recent comparable Global Burden of Disease data. DALY losses were converted into monetary value by assuming that one DALY is equal to the sub-region's per capita GDP. The estimated economic value of DALYs lost to violence against children as a percentage of GDP ranged from 1.24% to 3.46% across sub-regions defined by the World Health Organization. The estimated economic value of DALYs (in constant 2000 US\$) lost to child maltreatment in the EAP region totaled US \$151 billion, accounting for 1.88% of the region's GDP. Updated to 2012 dollars, the estimated economic burden totaled US \$194 billion. In sensitivity analysis, the aggregate costs as a percentage of GDP range from 1.36% to 2.52%. The economic burden of child maltreatment in the East Asia and Pacific region is substantial, indicating the importance of

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Conflict of interest

The authors report no conflicts of interest.

preventing and responding to child maltreatment in this region. More comprehensive research into the impact of multiple types of childhood adversity on a wider range of putative health outcomes is needed to guide policy and programs for child protection in the region, and globally.

Keywords

Child maltreatment; Economic burden; Lifelong consequences; Disability-Adjusted Life Years; East Asia and Pacific region

Introduction

Child maltreatment has been shown to be widely prevalent across the globe (Gilbert et al., 2009; Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002; Pinheiro, 2006). Child maltreatment can have lifelong economic consequences resulting directly or indirectly from associated behavioral problems, mental and physical health conditions, increased risk for violent behaviors, disability from physical injury, reduced health-related quality of life, lower levels of educational achievement and impaired capacity of adults to generate income (Fang, Brown, Florence, & Mercy, 2012; Gilbert et al., 2009). Several review studies have shown that individuals who suffer abuse or neglect as children are more likely to be depressed (Centers for Disease Control and Prevention (CDC), 2006; Cong et al., 2012), to experience other types of mental ill-health (Hillberg, Hamilton-Giachritsis, & Dixon, 2011; Maniglio, 2009), to have suicide ideation and engage in more self-injurious behaviors (Arnow, 2004; Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008; Nelson et al, 2002), to experience more negative health symptoms and problems including chronic diseases and persistent genito-urinary symptoms (both medically explained and unexplained) (CDC, 2006; Molnar, Buka, & Kessler, 2011), and to engage in more health-risk behaviors than their non-abused counterparts (Arnow, 2004; Maas, Herrenkohl, & Sousa, 2008; Maniglio, 2009). Reviews also show that the more severe and frequent the abuse, the stronger the association with poor outcomes across the lifespan (Fry, McCoy, & Swales, 2012).

Reviews by the World Health Organization (WHO) and others have found that the adverse health outcomes resulting from child abuse form a significant portion of the Global Burden of Disease (Gilbert et al, 2009; Krug et al, 2002) with significant economic costs to society (Pinheiro, 2006). Emerging evidence shows that the East Asian region has one of the highest estimated burdens of disease from child sexual abuse relative to other regions globally (Andrews, Corry, Slade, Issakidis, & Swanston, 2004). Given the high prevalence of child maltreatment and the many negative short- and long-term consequences of child maltreatment, the economic costs are likely to be substantial.

Estimating the economic burden of child maltreatment is important for several reasons, including: increasing awareness of the severity of maltreatment, assisting policy makers and government officials in prioritizing funding and developing preventive services and other programs, placing the problem in the context of other public health and social welfare concerns, and providing data for economic evaluations of interventions to reduce or prevent child maltreatment.

Although the past decade has seen considerable growth in international analysis of the prevalence and consequences of child maltreatment, few estimates of the total economic burden – the minimum direct and indirect costs – have been done internationally. Estimates have been published for a handful of countries, such as the U.S. (Fang et al., 2012), Australia (Taylor et al, 2008) and China (Fang et al, 2015), but are not yet available in most developing countries and for most regions of the world, including the East Asia and Pacific (EAP) region.

To inform policies and programs for the prevention of child maltreatment in the EAP region, the authors developed a regional costing model to estimate the burden of child maltreatment. We assembled summative estimates of lifetime prevalence, calculated the magnitude of associations with poor mental and physical health and health-risk behaviors, and thereby estimated (at least to the lower bound) the economic burden, separately for five major types of child maltreatment: physical abuse, sexual abuse, emotional abuse, neglect, and witnessing parental violence. Fig. 1 illustrates the steps of estimating the burden of child maltreatment.

Methods

Systematic Review of Prevalence and Consequences

A systematic review was conducted to identify studies reporting on the prevalence, incidence, and consequences of child maltreatment in the region (Fry et al., 2012; UNICEF, 2012). Definitions of child maltreatment used in the study are presented in Table 1. Studies were included if they were: (a) primary research on the prevalence, incidence, and consequences of child maltreatment in the EAP region in any setting, (b) published between 2000 and November 2010, (c) peer-reviewed and non peer-reviewed journal articles, presentations, dissertations, or research reports, (d) geographic focus in EAP region encompassing the following countries and territories: Brunei Darussalem, Cambodia, China, Cook Islands, Democratic People's Republic of Korea, Fiji, Indonesia, Japan, Kiribati, Republic of Korea, Lao People's Democratic Republic, Malaysia, Republic of the Marshall Islands, Federated States of Micronesia, Mongolia, Myanmar, Nauru, Niue, Commonwealth of Northern Mariana Islands, Republic of Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Thailand, Timor-Leste, Tokelau, Tonga, Tuvalu, Vanuatu, and Viet Nam, (e) published in English or any of the languages of the countries in the EAP region, and (f) included self-reported or parent-reported lifetime prevalence of child maltreatment.

Studies of possible consequences were included if: (a) they were primary research studies that explored the relationship between one of the types of child maltreatment and outcomes in any of the following areas: employment, education, mental health, physical health and health behaviors, aggression, violence, criminality, exposure to further violence and service use, following the categories used in an international systematic review (Gilbert et al., 2009); (b) they included odds ratio (OR) or relative risk (RR) calculations disaggregated by type of maltreatment; (c) populations were not sampled on the basis of the presence of the specified outcome since these cannot be used to calculate an RR for that outcome; and (d) they were retrospective or prospective observational studies. The details of the search

strategy, search terms used, excluded articles, a full description of all child maltreatment studies by country and data extraction can be found elsewhere (UNICEF, 2012).

Meta-analyses to Estimate Prevalence

For prevalence, the systematic review identified 14 child emotional abuse studies, 40 child physical abuse studies, 12 child neglect studies, 40 child sexual abuse studies, and 16 witnessing parental violence studies. All studies are presented in Appendices A.1–A.5 (available at <http://pan.baidu.com/s/12Kp8U>).

Previous studies have noted that the prevalence of child maltreatment differs depending on a number of methodological factors, including method of data collection, number of questions used to assess child maltreatment, definition of childhood and the type of sample assessed (Andrews et al, 2004; Bolen & Scannapieco, 1999; Gorey & Leslie, 1997; Haugaard & Emery, 1989; Wynkoop, Capps, & Priest, 1995). Following the work of Andrews et al. (2004), multiple linear regression analyses were conducted to examine the methodological characteristics that influenced the variability in prevalence: type of sample (household versus school), sample site, respondent type (parent, adult recall, young adult recall, child), sample size, response rate, self-administered or not, number of questions to assess child maltreatment, and definition of childhood.

To allow for the impact of these factors to differ by gender, separate regression models were fitted for all estimates of prevalence for males and for females for each type of child maltreatment. Several studies reported only the overall prevalence of a particular type of child maltreatment, not sex-specific estimates. For these, separate prevalence rates for males and females were imputed for each type of child maltreatment using the following formula:

$$P_{jk,g} = P_{jk,tot} \times \sum_{j \in k} \frac{P_{jk,g} / P_{jk,tot}}{N_k} \quad (1)$$

where $P_{jk,g}$ is the prevalence of a given type child maltreatment (e.g. physical abuse) in study j in sub-region k for gender g ; $P_{jk,tot}$ is the corresponding total prevalence in the same study; and N_k is the number of studies in sub-region k with available prevalence rates for both males and females.

All methodological factors were tested in univariate relationships. Given the relatively small number of studies available for each type of child maltreatment, only methodological variables that are statistically significant at the 15% level or better are included in the final multivariate regression models. A process of backward elimination was then employed to remove the least significant variable at each step until all variables left in the final model were statistically significant at the 15% level or better (for emotional abuse, neglect and witnessing domestic violence, for which the numbers of studies are less than 20) or 10% level or better (for physical abuse and sexual abuse, for which the numbers of studies are greater than 20).

For males, respondent type was a predictor of the prevalence of emotional abuse; number of questions asked to assess child maltreatment was a predictor of the prevalence of neglect;

school versus household based sample, number of questions asked to assess child maltreatment and response rate were three predictors of the prevalence of physical abuse; response rate was a predictor of the prevalence of sexual abuse; probability sample versus non-probability sample and response rate were two predictors of the prevalence of witnessing domestic violence. For females, the significant predictors were respondent type for the prevalence of emotional abuse; number of questions asked to assess child maltreatment for neglect; whether the sample is a probability sample, response rate, and number of questions asked to assess child maltreatment for physical abuse; sample type for sexual abuse; and response rate for witnessing domestic violence. Coefficients and significance levels for the statistically significant variables in the multivariate models for each type of child maltreatment are shown in Appendices B.1–B.5 (available at <http://pan.baidu.com/s/12Kp8U>).

The unstandardized coefficients from regression analyses were used to adjust the raw prevalence estimates for both males and females for each type of child maltreatment. This was achieved by subtracting (or adding) the coefficients from the prevalence for all levels of a variable that were statistically significant. For example, if the prevalence of physical abuse in males (see Appendix B.3) was derived from a household-based survey sample, the adjusted prevalence would be the raw prevalence plus 26.28 percentage points. Implicit in this process of adjustment is the assumption that estimates from the group used as the reference group more closely reflect the true population prevalence. Thus, in the case of physical abuse mentioned above, estimates for males from household-based survey samples were adjusted to more closely reflect the prevalence observed in school-based samples. Similar interpretation applies to other types of child maltreatment and other methodological factors included in the final models. The reference groups for different predictors are based on previous research (Andrews et al., 2004; Bolen & Scannapieco, 1999; Gorey & Leslie, 1997; Haugaard & Emery, 1989; Wynkoop et al., 1995), and can be found in Appendices B.1–B.5.

The estimates of prevalence adjusted for methodological factors were combined within countries using two alternative ways. First, separately for males and females and for each type of child maltreatment, the median value of a set of prevalence estimates within countries were used as the estimates for each country. Second, a set of prevalence estimates within countries were averaged using the sample size of each prevalence estimate as weights.

Previous research has shown that the rates of child maltreatment vary considerably across countries (Gilbert et al., 2012; Kloppen, Mæhle, Kvello, Haugland, & Breivik, 2014). Country-level prevalence data is preferential to estimating the burden of child maltreatment, however, a considerable number of countries in the EAP region have little to no data on child maltreatment. Thus, prevalence estimates were further combined at the “sub-region” level, within which countries share somewhat similar economic or health characteristics.

Following other major health and international development organizations, two groups of classifications were used. First, epidemiological sub-regions defined by the World Health Organization (WHO) were used (Rodgers & Vaughan, 2002). These are based on a division

of 191 Member States of WHO into 14 epidemiological sub-regions based on broader regions and mortality patterns (Rodgers & Vaughan, 2002). The 4 sub-regions related to the UNICEF EAPRO region are shown in Table 2.

Second, this study used World Bank country classifications (<http://data.worldbank.org/about/country-classifications/country-and-lending-groups>). These are broader than the WHO sub-regions and are classified as high income, upper middle income, lower middle income, and low income countries. Examining prevalence and economic burden estimates by the World Bank country classifications allows us to determine if variations in these estimates are associated with the income level of countries. The four sub-regions according to the World Bank country classification are also listed in Table 2.

To combine prevalence estimates between countries within each sub-region, each country estimate was weighted by the population of that country. This meant that prevalence estimates from countries with large populations were given more weight in the final estimates. A combined estimate was obtained for each sub-region by calculating a weighted mean for males and females. Since prevalence studies were not available for some countries in the EAP region, the weighted mean based on available prevalence estimates within each sub-region was used to represent the prevalence estimate for that sub-region (including those countries for which prevalence studies were not available). Thus, the aggregate regional level estimates (prevalence or economic burden) derived from these two country classifications (WHO or World Bank) may differ.

Given the small number of studies available for the correction analysis for each type of child maltreatment, the reliability of the coefficients from the final models is limited. Uncorrected (raw) prevalence estimates were also combined within countries and sub-regions following the same procedure as above to generate alternative prevalence estimates for each sub-region. Thus, there are four sets of prevalence estimates generated for each type of child maltreatment and each sub-region: (1) median value and uncorrected; (2) sample size weighted and uncorrected; (3) median value and corrected; and (4) sample size weighted and corrected.

Calculation of Population Attributable Fractions (PAFs)

PAFs are used to estimate the proportion of morbidity or mortality attributable to a risk factor. All PAF formulas require: (1) RR of a disease or outcome (e.g., depression) given exposure to a risk factor (child maltreatment), or an OR which can be converted into an approximate estimate of the RR; and (2) a measure of prevalence. No studies reported odds ratios or relative risks for the effects of child maltreatment on education and employment or the impacts on service use, information that is required for estimating the PAF for a category of outcome. The set of health outcomes and associated risk behaviors for which there was sufficient information to estimate PAFs was limited to the following: mental disorders, illicit drug use, problem drinking, current smoking, genito-urinary symptoms, sexually transmitted infections, and self-harm.

Few original studies provided estimates of the child maltreatment – outcomes relationships for both males and females, except for the studies related to sexual abuse. Moreover, for the

majority of the child maltreatment – outcomes relationships, only one or two studies within a region could be used for estimating a specific relationship. Thus, the child maltreatment – outcomes relationships were estimated as a whole (not separately by sex) and at the regional level for each type of maltreatment and each selected outcome. The regional estimates were then applied to the sub-regional level with the information of sub-regional prevalence to estimate sub-regional PAFs.

Most studies included in the systematic review reported only ORs, as is common for epidemiologic studies. Moreover, many reported ORs were unadjusted ORs (without adjusting for confounders). If only the unadjusted ORs for a study were available, we produced corresponding estimates of adjusted ORs using an adjustment factor calculated from studies that both adjusted ORs and unadjusted ORs were available in the same study. The following formula was used to calculate an adjustment factor:

$$U = \frac{OR_u}{OR_a}$$

where OR_u represents the unadjusted odds ratios, OR_a represents the odds ratio adjusted for confounders, and U is the bias produced from failure to control for the confounders. For relationships where both OR_u and OR_a were not available, the average of the adjustment factors derived from other outcomes within the same general category of outcomes (mental health and behavior, physical health and sexual behavior, and aggression, violence, and criminal behavior) were applied to adjust those only reporting unadjusted ORs.

The OR is not directly applicable in the common PAF formulas. Approximate RR needed for PAF were calculated with from ORs with a simple formula (Zhang & Yu, 1998). Some studies only had RRs for subcategories of maltreatment. To obtain a unified RR, the relative risks for each level of subcategories were averaged using the number of cases at each level of exposure as weights.

Within the region, the relative risks were combined using meta-analysis with sample size weighting. RR estimates were grouped according to outcomes and then combined within the region. The regional level RRs by type of maltreatment and outcome are presented in Appendices C.1–C.5 (available at <http://pan.baidu.com/s/12Kp8U>).

After completing the above two steps, two pieces of data required to calculate PAFs were obtained: (1) the prevalence of child maltreatment by type of maltreatment and for each sub-region; and (2) the relative risk of a disease or outcome given exposure to child maltreatment at the regional level. A standard PAF formula was used to estimate PAFs:

$$PAF = \frac{P_e(RR - 1)}{(P_e(RR - 1) + 1)}, \quad (2)$$

where P_e is the prevalence of child maltreatment in the population and RR is the relative risk of a given outcome/disease (e.g., depression) associated with child maltreatment. For each sub-region, a PAF was calculated for each type of maltreatment and for each outcome

selected. Appendices D.1–D.5 present PAFs by type of maltreatment, outcome and sub-region (available at <http://pan.baidu.com/s/12Kp8U>).

As mentioned before, there were four sets of prevalence estimates generated for each type of child maltreatment and each sub-region. Correspondingly, there were four sets of PAFs generated based on the four sets of prevalence estimates (see Appendices D.1–D.5): (1) median value and uncorrected; (2) sample size weighted and uncorrected; (3) median value and corrected; and (4) sample size weighted and corrected. Given the small number of studies available for the correction analysis for each type of child maltreatment, the reliability of the coefficients from the correction models is limited. This study used the set of PAFs generated from the “median value and uncorrected” method as the baseline for our estimation of the burden of child maltreatment. Sensitivity analyses of the estimated costs were conducted using the PAFs generated from other three types of methods.

Estimating Economic Burden

For public health policy, it is important to convert child maltreatment-induced losses into dollar terms. Following the work of WHO (2001) and Brown (2008), two steps were used. The first step was to estimate the DALYs lost from deaths, diseases and health risk behaviors attributable to child maltreatment for each type of child maltreatment and for each of these sex and sub-region groups.

Estimating the burden of child maltreatment must include the DALYs lost from fatal cases of maltreatment. Data on the number of children who died from maltreatment were not available for most countries in the UNICEF EAPRO region. However, estimates of suicide and violence-related deaths among children aged 0–14 in 2004 were available by sex and for each of the WHO Member States from the WHO Global Burden of Disease (GBD) study (WHO, 2009a). Previous studies have identified family history of child maltreatment as a risk factor for suicide. However, many other individual, relational, community, and societal factors also contribute to the risk of suicide. Violence-related deaths among children are a more direct expression of child maltreatment. To be conservative, the present study approximated fatal cases of child maltreatment by only including violence-related deaths among children aged 0–14 years.

WHO’s baseline standard in the GBD series is to use a 3% annual discount rate and non-uniform age weights. Under these assumptions, the 2004 GBD estimated that a death in infancy corresponds to 33 Disability-Adjusted Life Years (DALYs), and deaths at ages 5–20 years to around 36 DALYs (WHO, 2004). To be conservative, this study applied 33 DALYs to each fatal case of child maltreatment.

To estimate the DALYs lost from diseases and health risk behaviors attributable to child maltreatment, PAFs for each outcome were multiplied by an appropriate measure of DALYs. DALY data were obtained from the WHO Global Burden of Disease (GBD) estimates for 2004 for each of the WHO Member States belonging to the UNICEF EAPRO region (WHO, 2009a, 2009b). DALY data were available only for three age categories: 0–14 years, 15–59 years, and 60 years and older. Given the possible comorbidity between child maltreatment and other health outcomes, we only used DALY data of those aged 15 years

and older for the estimation of disease-induced DALY losses to avoid the possibility of diseases preceding child maltreatment.

We attempted to match each individual PAF (e.g., “mental disorders”) with the closest possible match from the 2004 update of the WHO Global Burden of Disease project (WHO, 2009a, 2009b). The 2004 GBD used 135 cause (of death, disability, or injury) categories. WHO also published estimates of the impact of 24 major risk factors (e.g., tobacco use), although it is important to note that these estimates apportion the burden from several of the 135 causes to a given risk factor (WHO, 2009b). Since we used data from both sources, to avoid double counting, we removed the contribution of the cause categories to DALY loss under a given risk factor if we had PAFs for these cause categories separately.

Several other considerations were made in “mapping” the PAFs to DALYs. In some cases, we had similar health conditions that were not elsewhere duplicated and the mapping was approximate. For example, the “Peptic ulcer disease” category from the GBD was mapped to PAFs for “stomach pain.” Whenever PAFs for the overall measures were available, they would be mapped to an overall mental health DALY estimate rather than computing individual mental health conditions since there were gaps in the PAFs for many plausible outcomes.

For suicide outcomes, PAFs were available for “suicide attempt” for four types of maltreatment (physical abuse, sexual abuse, emotional abuse, and neglect), but PAFs of “self harm” were available only for two types of maltreatment (physical abuse and emotional abuse). We felt that the “self-inflicted injuries” DALY estimate from the GBD was a better match to the PAFs for “self harm” than for “suicide attempt.” As only PAFs for “suicide attempt” were available for sexual abuse and neglect, we produced estimates of corresponding PAFs for “self harm” by using the average ratio between the PAFs for “self harm” and “suicide attempt” following physical abuse and emotional abuse.

In a handful of cases (tobacco use, alcohol use, and illicit drug use), we used the GBD estimates of the burden of a risk factor in DALYs instead of the individual cause categories. The risk factor estimates were believed to be more complete and accurate matches than the broader approximation made by the cause codes since the risk factor estimates reflect a variety of possible sequelae, for which we often did not have PAF data. Finally, some PAFs were eventually excluded since there were no corresponding GBD cause or risk factor categories. Some of these exclusions may underestimate the burden, making this a conservative approach. Appendix E.1 presents the matching results. Appendix E.2 presents the final disease outcomes or risk factors used for estimating the DALYs loss attributable to each type of child maltreatment. Appendix E.3 presents the list of disease outcomes that are attributable to the risk factors (tobacco use, alcohol use, and illicit drug use). As mentioned previously, the disease outcomes included in Appendix E.3 have excluded those outcomes already counted as separate causes. Appendices E.1–E.3 are available at <http://pan.baidu.com/s/12Kp8U>

The second step was to convert the DALY loss into monetary value according to a method from WHO (2001) and Brown (2008). This method assumes that one DALY is equal to the

sub-region's per-capita GDP; in other words, this is a "human capital" approach to valuing DALYs. Data on population, 2004 gross domestic product (GDP) and 2004 GDP per capita (both in constant 2000 US\$) for all WHO Member States in the UNICEF EAPRO region except for Democratic People's Republic of Korea, Myanmar, Nauru and Niue were obtained from the World Bank (<http://data.worldbank.org/data-catalog/world-development-indicators>). GDP and GDP per capita for Democratic People's Republic of Korea, Myanmar and Nauru were obtained from the United Nations (<http://unstats.un.org/unsd/snaama/selcountry.asp>). GDP data for Niue are unavailable from both the World Bank and the United Nations, but excluding Niue has very limited impact on the sub-regional aggregation since Niue has a population of less than 10,000 persons. GDP by sub-region was derived as the sum of the country GDP in that specific sub-region. GDP per capita by sub-region was obtained by calculating a weighted mean of country GDP per capita in that specific sub-region using the country population as weights.

After merging the DALY loss, GDP and GDP per capita into a single database by sub-region, health outcome and type of maltreatment, the economic value of DALYs lost due to each type of child maltreatment from a specific health outcome was calculated by multiplying the estimated DALY loss in 2004 by the 2004 GDP per capita for each sub-region. In addition, the value of DALYs lost as a percentage of total GDP in 2004 was calculated for each type of child maltreatment and each sub-region.

Results

Tables 3.1–3.5 present the composite prevalence estimates by sub-region and sex for witnessing parental violence, neglect, physical abuse, sexual abuse, and emotional abuse, respectively. Several interesting findings emerge from these tables. First, on average, the prevalence of physical abuse is higher in males than in females while the prevalence of sexual abuse is higher in females than in males. There is no clear pattern of gender difference for witnessing parental violence, neglect, and emotional abuse. Second, differences in prevalence exist between sub-regions. The pattern of results suggests that in general, the WPR_A sub-region has a lower rate of child maltreatment than the WPR_B and SEAR_B sub-regions. Following the World Bank classifications, in general, the highest prevalence of child maltreatment is found in lower middle income countries while high income countries have the lowest prevalence. No prevalence studies on witnessing parental violence, neglect, or emotional abuse are available for low income countries. For physical abuse and sexual abuse, only one prevalence study is available. Thus, there is a large degree of uncertainty around the estimates for the low income sub-region, so the low income group was not included for comparison.

Tables 4.1–4.5 present the baseline population attributable fractions (PAFs) for health outcomes associated with each type of child maltreatment by sub-region and sex. For sexual abuse and emotional abuse, the PAFs are highest for mental disorders. For physical abuse, the PAFs are highest for illicit drug use, whereas the PAFs of neglect are highest for self harm. Witnessing IPV contributes most to both mental disorders and illicit drug use.

Table 5 presents the baseline aggregate costs of child maltreatment by combining the economic value of DALYs lost from child maltreatment deaths with the economic value of DALYs lost from diseases and health risk behaviors, and adding the economic value of DALY loss across different types of maltreatment. The details on the estimation of the economic value of DALYs lost from child maltreatment deaths and the estimation of the economic value of DALYs lost from diseases and health risk behaviors are provided in Appendices F and G.1–G.5, respectively (available at <http://pan.baidu.com/s/12Kp8U>). Appendix F presents the number of child maltreatment deaths, DALYs lost and estimated economic value of DALYs lost due to child maltreatment deaths by sub-region. Appendices G.1–G.5 present the estimated number of DALYs lost from health outcomes attributable to child maltreatment, the estimated economic value of DALYs lost to child maltreatment, and the economic value of DALY loss as a percentage of GDP by sub-region and type of maltreatment.

The estimated economic value of DALYs lost to violence in 2004 as a percentage of GDP ranged from 1.24% to 3.46% across sub-regions (see Table 5). When using the WHO country classifications, the estimated economic value of DALYs (in constant 2000 US\$) lost to child maltreatment in the UNICEF EAPRO region totaled US \$151 billion, accounting for 1.88% of the region's GDP. Updated to 2012 dollars using the gross domestic product (GDP) deflator (<http://databank.worldbank.org/data/database.aspx>), the estimated economic loss would be about US \$194 billion.

If using the World Bank classifications, the estimated economic loss of child maltreatment totaled US \$160 billion, accounting for 1.99% of the region's GDP. Update to 2012 dollars, the estimated economic loss would total US \$206 billion.

Comparing the WHO sub-regions based on the economic costs of child maltreatment in 2004 as a percentage of GDP, the WPR_B sub-region suffers the largest burden for all type of child maltreatment except for neglect (see Table 4). For neglect, SEAR_B has the greatest loss: 0.634% compared to 0.047% in the WPR_A group and 0.479% in the WPR_B group. Overall, the aggregate costs of child maltreatment as a percentage of GDP are largest in the WPR_B sub-region: 3.01% compared to 2.56% in the SEAR_B group and 1.24% in the WPR_A group.

When using the World Bank classifications, the aggregate costs of child maltreatment in 2004 as a percentage of GDP are smallest in the high income group: 1.45% compared to 3.12% in the lower middle income group and 3.46% in the upper middle income group. This pattern holds for all types of child maltreatment (Table 5). The aggregate costs of child maltreatment for the low income group only include the costs of physical abuse and sexual abuse and may not be appropriate to be used for comparison with other income groups. However, for the types of child maltreatment where costs are available, the low income group has the greatest losses compared to other income groups for physical abuse (0.815% compared to 0.320%, 0.492% and 0.340% for lower middle income, upper middle income and high income groups, respectively). For neglect, the loss as a percentage of GDP for the low income group is comparable to the lower middle income and upper middle income groups (0.785% compared to 0.865% and 0.815%, respectively).

In sensitivity analysis (Table 6), the aggregate costs of child maltreatment in 2004 as a percentage of GDP were calculated using PAFs generated from the other three methods: sample size weighted and uncorrected; median value and corrected; and sample size weighted and corrected. The magnitudes of percentage of GDP obtained from the other three methods in general are similar to those obtained from the baseline analyses (median value and uncorrected).

Discussion

This is the first study to estimate the burden of child maltreatment in the East Asia and Pacific region. We aggregated data from 364 studies of child neglect, physical, sexual and emotional abuse and witnessing domestic violence. It is clear that maltreatment is a common experience in the region. Its associations with poor physical and mental health and health risk behaviors are substantial and consistent with international research. These ill-health consequences affect not only individuals but by extension families, communities and societies. More child protection systems work is needed in the region to ensure that every child and young person who has experienced violence has access to the best care and legal responses to help ensure recovery and to hold perpetrators accountable.

This analysis of DALYs and economic costs has implications for social policy of governments and advocacy by civil society organizations throughout the region. The estimated scale of the economic loss (between \$192 billion and \$206 billion in 2012 dollars, or just under 2% of GDP) is a significant, yet to some extent preventable, financial burden. Prevention of child abuse and neglect in the Asia Pacific, based on locally developed and/or adapted evidence-based strategies, could reduce severe forms of maltreatment by up to 50%, as appears to be achievable in North America and Europe (Finkelhor, Shattuck, Turner, & Hamby, 2014; Molcho et al, 2009; WHO Regional Office for Europe, 2009). Quantification of the cost–benefit ratios of preventive intervention in this field is highly complex and the outcomes of economic evaluations vary (MacMillan et al, 2009). There is a clear need for more global research. To date, the great majority of evidence about effectiveness of prevention programs comes from outside the world’s most populous region. The present study indicates the scale of the problem and suggests that prevention efforts should be implemented with comprehensive economic evaluation, both to inform local policy and programs and contribute to global analysis.

As with any research study, there are several limitations that should be noted. First, there is a high degree of variation in reported rates of maltreatment, suggesting differing measurement procedures and definitions across studies. Not only do different surveys use different definitions of child maltreatment and different questionnaires, they often use different types of samples, rendering comparative analysis difficult. Publication bias may exist in reporting of prevalence findings by countries in the region, which may have an impact on the findings of the meta-analysis. This publication bias is likely to occur in two ways: both underreporting of very low prevalence estimates in some countries in the region due to the questions such findings raise about the rigor and the presence of bias in study methodologies and the comparison of findings in relation to the global literature, and also the underreporting of very large prevalence estimates for similar methodological reasons and also the

sensitivity of such estimates at a national policy level. Future prevalence research should seek to increase comparability with other studies in the region by using similar instruments at similar ages and to report both any experience of child maltreatment and prevalence estimates for each type of abuse. PAFs may be sensitive to small changes in the underlying parameters (prevalence and RR), and the implications can be significant when multiplied by an aggregate outcome. Although we carefully reviewed all input data to select appropriate studies, our results rest squarely on the quality of available data. This problem is not limited to research into child maltreatment; such challenges generally emerge in the case of any social science research that draws on a wide variety of secondary data sources.

Second, PAFs of health outcomes were matched to the most appropriate burden measures from the 2004 GBD project. We maintained as close to a one-to-one correspondence as possible between PAFs and adverse outcomes. However, not all available child maltreatment consequences studies had matching GBD outcomes, and for those that did, some were limited by the definitions and levels of aggregation used in the GBD categories.

Third, given that only one or two studies within a region could be used for estimating a specific relationship, the child maltreatment – outcomes relationships were estimated at the regional level and then applied to the sub-regional level. In this way, we assumed that RRs or ORs would be similar across the countries within the EAP region. But one might expect outcomes to be worse where there is less support and where institutions (such as schools) may themselves contribute to adverse childhood experiences.

Fourth, we were limited to the 2004 GBD/DALY estimates from WHO instead of 2008 or 2010 data, as country-specific data was available only for the year 2004. In 2008, there were updates for deaths only, not for the “disability” (nonfatal burden) side of DALYs. A significantly revised set of DALY estimates for 2010 was recently published by the Institute for Health Metrics and Evaluation, but as this data is still emerging, they also do not include country-level information at this time.

Fifth, the World Bank classification of countries by income, while useful, masks the substantial variations in income that exists within countries. The unequal distribution of income within countries may be such that certain groups in high-income countries, for example, experience lower standards of living than people in some low-income countries.

The aggregate costs of child maltreatment were calculated by adding the PAFs as well as the economic value of DALY loss across different types of maltreatment. However, many diseases are caused by multiple risk factors, and individual risk factors may interact in their impact on overall risk of disease. As a result, PAFs for individual risk factors often overlap and add up to more than 100%, which may lead to the overestimation of the economic burden.

We recognize the importance of accounting for poly-victimization when estimating the burden of child maltreatment in the region. We have gone back through all the studies in the region and identified only one study that controlled for socio-demographic factors and other forms of abuse (Jirapramukpitak, Prince, & Harpham, 2005). According to this study, the effects (approximate RRs) of child maltreatment on health outcomes on average decrease by

9.8% when controlling for other forms of abuse. This translates to a mean reduction of 17.8% in the aggregate costs of child maltreatment when accounting for poly-victimization. However, Jirapramukpitak et al.'s study is based on a small sample of only 202 young residents, and therefore their findings have limited generality. We are committed to exploring this issue further as it will contribute to improving methodologies in the field of international child protection research.

While it is essential to minimize overestimation, there are many sources of underestimation as well. Many of the serious effects of child maltreatment, like poor educational outcomes and higher level of service use as well as serious health impacts such as those on non-communicable diseases, are not included in the burden estimate because no studies exist. Moreover, no estimates are available of the institutional costs (e.g. police, child welfare services) of child maltreatment in the EAP region. Even for the three remaining consequences (mental health and behavior, physical health and sexual behavior, and violence and criminal behavior), we excluded some outcomes (such as unintended/early pregnancy, intimate partner violence, and conflict with the law) because we were unable to match PAFs with GBD categories as closely as desired.

The present study approximated fatal cases of child maltreatment by only including violence-related deaths among children aged 0–14 years because data on violence-related deaths for WHO Member States were only available for the 0–14 years age group. Violence-related deaths for 15–18 year olds were not included for the estimation of DALYs lost from fatal cases of maltreatment. Moreover, suicide deaths among children aged 0–18 years old were excluded from the estimation, but other literature has shown that some suicide deaths could be caused directly by child maltreatment. Thus, the total incidence of fatal child maltreatment as well as the economic burden of child maltreatment may be underestimated.

The scope of this study required us to use a variety of different measures of burden across many studies and countries. Such combinations invariably introduce a degree of measurement error. On reflection, our best scientific assessment is that the economic burden estimates are conservative, given that we are unable to estimate the costs for a number of major categories of health and social outcomes. Even after conservative assumptions are made, and sensitivity analyses are run using a variety of different techniques, the estimated heavy economic burden of child maltreatment in the EAPRO region underscores the need for vigorous advocacy to improve child protection systems.

Further research needs to be conducted on improving study designs and data collection in the region (UNICEF, 2014). Several countries in the region still have little to no data on child maltreatment and only a handful of countries have population-based prevalence studies. More rigorously designed studies using population-based sampling techniques, standardized and tested instruments and good reporting practices are needed. In addition, this and other meta-analyses from the region highlight that survey design (e.g. using face-to-face interviews versus self-completed surveys) impacts prevalence estimates with growing evidence that self-completed surveys result in higher child sexual abuse prevalence estimates and may be more culturally appropriate for the countries in the region (Ji, Finkelhor, & Dunne, 2013; Ramiro, Madrid, & Brown, 2010; WHO Multi-country Study,

2005). Methodological research on the cultural variations of disclosure within studies is required to explore this further in the region. Moreover, studies in the region mostly have short-term outcomes, yet economic analyses usually take a lifetime approach in estimating DALY and monetary loss. This highlights the need for high quality cohort studies in developing country settings.

Despite its limitations, this study adds important new results to gauge the economic burden of child maltreatment and to address the lack of scientific knowledge in the EAP region. Prevention efforts should target the drivers of violence at various levels (individual, relationship, community and society). The burden estimates can also serve as a measure to assess the cost-effectiveness of interventions against child maltreatment.

Future research may build on this study by adding a full sensitivity analysis and estimating confidence bounds, using the 2010 GBD as additional data becomes available. There is also a need for more EAP regional studies of neglect and emotional abuse, and more research into links between adult chronic diseases and child maltreatment. The collection of national data on the prevalence and consequences of child maltreatment should also be a priority to improve national application of this regional costing model.

References

- Andrews, G.; Corry, J.; Slade, T.; Issakidis, C.; Swanston, H. Child sexual abuse. In: Ezzati, M.; Lopez, AD.; Rodgers, A.; Murray, C., editors. Comparative quantification of health risks: Global and regional burden of disease attributable to selected major risk factors. Vol. 2. Geneva: World Health Organization (WHO); 2004.
- Arnov BA. Relationship between child maltreatment, adult health and psychiatric outcomes and medical utilisation. *Journal of Clinical Psychiatry*. 2004; 65:10–15. [PubMed: 15315472]
- Bolen RM, Scannapieco M. Prevalence of child sexual abuse: A corrective meta-analysis. *Social Service Review*. 1999; 73:281–313.
- Brown DW. Economic value of disability-adjusted life years lost to violence: Estimates for WHO Member States. *Revista Panamericana de Salud Pública*. 2008; 24(3):203–209. [PubMed: 19115548]
- Centers for Disease Control and Prevention. Adverse childhood experiences study. Atlanta, GA: National Centers for Injury Prevention and Control, Centers for Disease Control and Prevention; 2006. Available from: <http://www.cdc.gov/NCCDPHP/ACE> Accessed 12.07.12
- Cong E, Li Y, Shao C, Chen J, Wu W, Shang X, Wang Z, Liu Y, Liu L, Gao C, Li Y, Wu J, Deng H, Liu J, Sang W, Liu G, Rong H, Gan Z, Li L, Li K, Pan J, Li Y, Cui Y, Sun L, Liu L, Liu H, Zhao X, Zhang Y, Zhang R, Chen Y, Wang X, Li H, Chen Y, Lin Y, Kendler KS, Flint J, Shi S. Childhood sexual abuse and the risk for recurrent major depression in Chinese women. *Psychological Medicine*. 2012; 42:409–417. [PubMed: 21835095]
- Fang X, Brown DS, Florence CS, Mercy JA. The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse & Neglect*. 2012; 36:156–165. [PubMed: 22300910]
- Fang X, Fry DA, Ji K, Finkelhor D, Chen J, Lannen P, Dunne MP. The burden of child maltreatment in China: a systematic review. *Bulletin of the World Health Organization*. 2015; 93:176C–185C. [PubMed: 25838613]
- Finkelhor D, Shattuck A, Turner HA, Hamby SL. Trends in children's exposure to violence, 2003 to 2011. *JAMA Pediatrics*. 2014; 168(6):540–546. [PubMed: 24781431]
- Fry D, McCoy A, Swales D. The consequences of maltreatment on children's lives: A systematic review of data from the East Asia and Pacific region. *Trauma, Violence Abuse*. 2012; 13:209–233. [PubMed: 22899705]

- Gilbert R, Fluke J, O'Donnell M, Gonzalez-Izquierdo A, Brownell M, Gulliver P, Janson S, Sidebotham P. Child maltreatment: Variation in trends and policies in six developed countries. *Lancet*. 2012; 379:758–772. [PubMed: 22169108]
- Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. *Lancet*. 2009; 373:68–81. [PubMed: 19056114]
- Gorey KM, Leslie DR. The prevalence of child sexual abuse: Integrative review adjustment for potential response and measurement biases. *Child Abuse & Neglect*. 1997; 21:391–398. [PubMed: 9134267]
- Haugaard JJ, Emery RE. Methodological issues in child sexual abuse research. *Child Abuse & Neglect*. 1989; 13:89–100. [PubMed: 2784993]
- Herrenkohl TI, Sousa C, Tajima EA, Herrenkohl RC, Moylan CA. Intersection of child abuse and children's exposure to domestic violence. *Trauma, Violence & Abuse*. 2008; 9:84–99.
- Hillberg T, Hamilton-Giachritsis C, Dixon L. Review of meta-analyses on the association between child sexual abuse and adult mental health difficulties: A systematic approach. *Trauma, Violence & Abuse*. 2011; 12:38–49.
- Ji K, Finkelhor D, Dunne M. Child sexual abuse in China: A meta-analysis of 27 studies. *Child Abuse & Neglect*. 2013; 37:613–622. [PubMed: 23643201]
- Jirapramukpitak T, Prince M, Harpham T. The experience of abuse and mental health in the young Thai population: A preliminary survey. *Social Psychiatry and Psychiatric Epidemiology*. 2005; 40(12):955–963. [PubMed: 16328752]
- Kloppen, K.; Mæhle, M.; Kvello, Ø.; Haugland, S.; Breivik, K. Prevalence of intrafamilial child maltreatment in the Nordic countries: A review. *Child Abuse Review*. 2014. <http://dx.doi.org/10.1002/car.2324>
- Krug, EG.; Dahlberg, LL.; Mercy, JA.; Zwi, AB.; Lozano, R., editors. World report on violence and health. Geneva: World Health Organization (WHO); 2002. Available from: http://www.who.int/violence_injury_prevention/violence/world_report/en/ Accessed 25.06.13
- Maas C, Herrenkohl TI, Sousa C. Review of research on child maltreatment and violence in youth. *Trauma, Violence & Abuse*. 2008; 9:56–67.
- MacMillan HL, Wathen CN, Barlow J, Fergusson DM, Leventhal JM, Taussig HN. Interventions to prevent child maltreatment and associated impairment. *Lancet*. 2009; 373(9659):250–266. [PubMed: 19056113]
- Maniglio R. The impact of child sexual abuse on health: A systematic review of reviews. *Clinical Psychology Review*. 2009; 29:647–657. [PubMed: 19733950]
- Molcho M, Craig W, Due P, Pickett W, Harel-Fisch Y, Overpeck M, HBSC Bullying Writing Group. Cross-national time trends in bullying behaviour 1994–2006: Findings from Europe and North America. *International Journal of Public Health*. 2009; 54(2):S225–S234.
- Molnar BE, Buka SL, Kessler RC. Child sexual abuse and subsequent psychopathology: Results from the National Comorbidity Survey. *American Journal of Public Health*. 2011; 91:753–760. [PubMed: 11344883]
- Nelson EC, Heath AC, Madden PA, Cooper ML, Dinwiddie SH, Bucholz KK, Glowinski A, McLaughlin T, Dunne MP, Statham DJ, Martin NG. Associations between self-reported childhood sexual abuse and adverse psycho-social outcomes. *Archives of General Psychiatry*. 2002; 59:139–145. [PubMed: 11825135]
- Pinheiro, PS. World report on violence against children: United Nations Secretary-General's study on violence against children. Geneva: World Health Organization (WHO), Department of Child and Adolescent Health and Development; 2006. Available from: <http://www.unicef.org/violencestudy/reports.html> Accessed 25.06.13
- Ramiro LS, Madrid BJ, Brown DW. Adverse childhood experiences (ACE) and health-risk behaviors among adults in a developing country setting. *Child Abuse & Neglect*. 2010; 34:842–855. [PubMed: 20888640]
- Rodgers, A.; Vaughan, P. World Health Report 2002: Reducing risks, promoting healthy life. Geneva: World Health Organization; 2002. Available from: <http://www.who.int/whr/2002/en/> Accessed August 2012

- Taylor, P.; Moore, P.; Pezzullo, L.; Tucci, J.; Goddard, C.; De Bortoli, L. The cost of child abuse in Australia. Melbourne: Australian Childhood Foundation and Child Abuse Prevention Research Australia; 2008.
- United Nations Children's Fund (UNICEF). Child maltreatment: Prevalence, incidence and consequences in the East Asia and Pacific region. A systematic review of research. Bangkok: UNICEF EAPRO; 2012. Strengthening Child Protection Series, No 1 Available from: http://www.unicef.org/eapro/Child_Maltreatment.pdf Accessed 25.06.13
- United Nations Children's Fund (UNICEF). Violence against children in East Asia and the Pacific: A regional review and synthesis of findings. Bangkok: UNICEF EAPRO; 2014. Strengthening Child Protection Series, No. 4 Available from: http://www.unicef.org/eapro/Violence_against_Children_East_Asia_and_Pacific.pdf Accessed 22.12.14
- World Bank. World development indicators dataset. 2015. Available from: <http://data.worldbank.org/data-catalog/world-development-indicators> Accessed 12.06.13
- World Health Organization (WHO). Commission on macroeconomics and health. In J. D. Sachs (Chair). Macroeconomics and health: Investing in health for economic development. 2001. Available from: <http://whqlibdoc.who.int/publications/2001/924154550x.pdf> Accessed 25.08.12
- World Health Organization (WHO). The world health report 2004 – Changing history. Geneva: World Health Organization (WHO); 2004. Available from: <http://www.who.int/whr/2004/en/> Accessed 25.06.13
- World Health Organization (WHO). WHO multi-country study on women's health and domestic violence against women: Summary report of initial results on prevalence, health outcomes and women's responses. 2004. Available from: http://www.who.int/gender/violence/who_multicountry_study/summary_report/summary_report_English2.pdf Accessed 19.06.13
- World Health Organization (WHO). The global burden of disease: 2004 update. Geneva: World Health Organization (WHO); 2009a. Available from: http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/ Accessed 25.06.13
- World Health Organization (WHO). Global health risks: Mortality and burden of diseases attributable to selected major risks. Geneva: World Health Organization (WHO); 2009b. Available from: http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/ Accessed 25.06.13
- World Health Organization (WHO) Regional Office for Europe. European report on preventing child maltreatment. Copenhagen: WHO Regional Office for Europe; 2009. Available from: http://www.euro.who.int/_data/assets/pdf_file/0019/217018/European-Report-on-Preventing-Child-Maltreatment.pdf Accessed 28.01.15
- Wynkoop TF, Capps SC, Priest BJ. Incidence and prevalence of child sexual abuse: A critical review of data collection procedures. *Journal of Child Sexual Abuse*. 1995; 4:49–66.
- Zhang J, Yu KF. What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. *JAMA*. 1998; 280:1690–1691. [PubMed: 9832001]

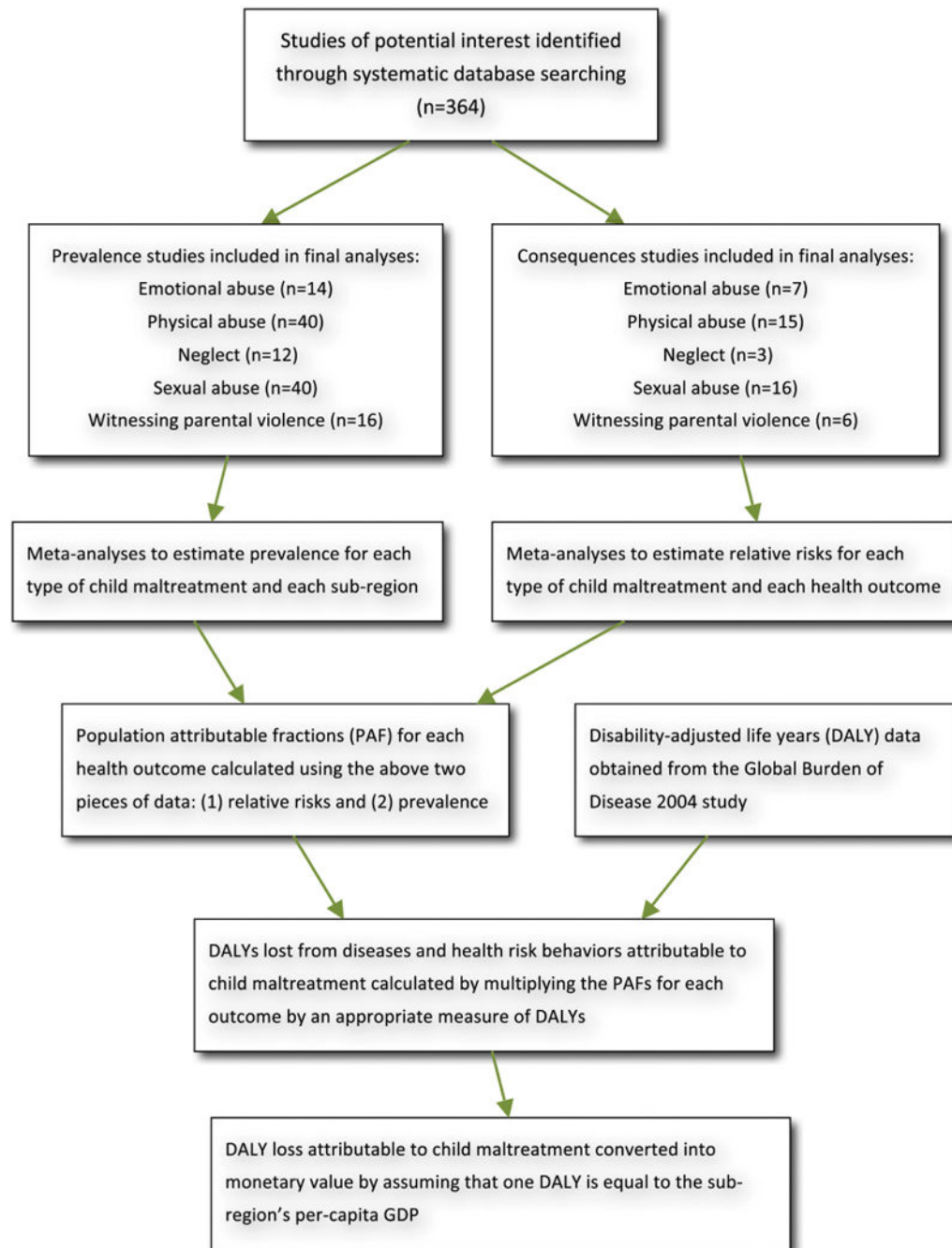


Fig. 1.
A flow diagram for the steps of estimating the burden of child maltreatment.

Table 1

Definitions of child maltreatment used in this study.

Violence against children	The UN defines violence against children in line with article 19 of the CRC: “all forms of physical or mental violence, injury and abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse.”
Physical abuse	That which results in actual or potential physical harm from an interaction or lack of an interaction, which is reasonably within the control of a parent or person in a position of responsibility, power or trust. There may be single or repeated incidents.
Sexual abuse	Child sexual abuse is the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared and cannot give consent, or that violate the laws or social taboos of society. Child sexual abuse is evidenced by this activity between a child and an adult or another child who by age or development is in a relationship of responsibility, trust or power, the activity being intended to gratify or satisfy the needs of the other person.
Emotional abuse	Emotional abuse involves the failure to provide a developmentally appropriate, supportive environment, including the availability of a primary attachment figure, so that the child can develop a stable and full range of emotional and social competencies commensurate with her or his personal potentials and in the context of the society in which the child dwells. There may also be acts toward the child that cause or have a high probability of causing harm to the child’s health or physical, mental, spiritual, moral or social development. These acts must be reasonably within the control of the parent or person in a relationship of responsibility, trust or power. Acts include restriction of movement, patterns of belittling, denigrating, scapegoating, threatening, scaring, discriminating, ridiculing or other non-physical forms of hostile or rejecting treatment.
Neglect	Neglect can be defined as the failure to provide for the development of the child in all spheres: health, education, emotional development, nutrition, shelter, and safe living conditions, in the context of resources reasonably available to the family or caretakers and causes or has a high probability of causing harm to the child’s health or physical, mental, spiritual, moral or social development. This includes the failure to properly supervise and protect children from harm as much as is feasible.
Witnessing parental violence	The systematic review included studies, which measured childhood exposure to parental intimate partner violence, often in the home, as perpetrated by either or both parents toward each other.

Definitions are from the *UN Convention on the Rights of the Child and the World Report on Violence and Health, World Health Organization, 2002*. The sexual abuse definition is from the Report of the Consultation on Child Abuse Prevention, 29–31 March 1999. Geneva, World Health Organization, 1999 (document WHO/HSC/PVI/99.1).

Table 2

Sub-regions based on the World Health Organization (WHO) and World Bank classifications.

Group classification	Sub-region	Countries to be included
WHO classifications	Southeast Asia Region, Group B (SEAR-B)	Indonesia, Thailand
	Southeast Asia Region, Group D (SEAR-D)	Democratic People's Republic of Korea, Myanmar
	Western Pacific Region, Group A (WPR-A)	Brunei Darussalam, Japan, Singapore
	Western Pacific Region, Group B (WPR-B)	Cambodia, China, Cook Islands, Fiji, Kiribati, Lao People's Democratic Republic, Malaysia, Republic of Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam
World Bank classifications	Low income countries	Democratic People's Republic of Korea, Myanmar, Cambodia
	Lower middle income countries	Indonesia, Fiji, Kiribati, Lao People's Democratic Republic, Republic of Marshall Islands, Mongolia, Nauru, Papua New Guinea, Philippines, Samoa, Solomon Islands, Tonga, Vanuatu, Viet Nam
	Upper middle income countries	China, Cook Islands, Niue, Palau, Thailand, Tuvalu
	High income countries	Brunei Darussalam, Japan, Republic of Korea, Malaysia, Federated States of Micronesia, Singapore

Table 3.1

Witness DV prevalence estimates (%) by sub-region and sex.

Sex		WHO classifications ^a						World Bank classifications ^b			
		WPR_B	WPR_A	SEAR_B	SEAR_D	L	LM	UM	H		
Males	Uncorrected	11.69	9.97	11.41	-	-	37.10	10.22	9.42		
	Sample size weighted	14.00	9.96	7.68	-	-	38.88	12.38	9.41		
Females	Uncorrected	17.07	25.38	13.24	-	-	28.48	12.97	15.95		
	Sample size weighted	21.91	25.32	8.49	-	-	31.97	15.84	15.94		
Corrected for methodological factors	Uncorrected	12.75	11.40	8.82	-	-	34.94	11.37	10.44		
	Sample size weighted	16.74	14.50	5.95	-	-	34.89	15.47	12.67		
Corrected for methodological factors	Uncorrected	12.75	13.22	10.06	-	-	26.24	11.38	10.44		
	Sample size weighted	15.50	16.40	6.16	-	-	27.87	15.07	12.69		

^aSEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B.^bL, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.

Table 3.2

Neglect prevalence estimates (%) by sub-region and sex.

Sex		WHO classifications ^d				World Bank classifications ^b			
		WPR_B	WPR_A	SEAR_B	SEAR_D	L	LM	UM	H
Males	Uncorrected	24.75	2.61	39.93	-	-	24.28	25.44	9.55
	Sample size weighted	25.59	2.61	39.93	-	-	24.28	26.38	9.55
Corrected for methodological factors	Median	24.75	23.00	39.93	-	-	24.28	25.44	26.17
	Sample size weighted	25.59	23.00	39.93	-	-	24.28	26.38	26.17
Females	Uncorrected	25.07	2.01	39.82	-	-	27.07	24.97	12.68
	Sample size weighted	22.54	2.01	39.82	-	-	27.07	22.15	12.68
Corrected for methodological factors	Median	25.07	17.70	39.84	-	-	27.07	24.97	32.32
	Sample size weighted	22.54	17.70	39.84	-	-	27.07	22.15	32.32

^aSEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B.

^bL, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.

Table 3.3

Physical abuse prevalence estimates (%) by sub-region and sex.

Sex		WHO classifications ^d						World Bank classifications ^b					
		WPR_B	WPR_A	SEAR_B	SEAR_D	L	LM	UM	H				
Males	Uncorrected	16.75	9.35	19.40	-	50.50	16.32	15.84	17.41				
	Sample size weighted	7.04	15.80	29.48	-	50.50	26.35	4.80	16.76				
Corrected for methodological factors	Median	18.36	7.27	45.68	-	19.00	21.15	19.80	10.36				
	Sample size weighted	7.46	7.03	45.72	-	19.00	34.95	5.25	7.87				
Females	Uncorrected	12.78	9.87	12.10	-	36.40	12.23	12.51	11.21				
	Sample size weighted	6.03	14.57	19.53	-	36.40	22.63	3.85	15.42				
Corrected for methodological factors	Median	13.17	9.24	16.11	-	17.31	11.71	7.25	11.01				
	Sample size weighted	4.62	12.57	22.67	-	17.31	17.45	1.16	13.00				

^aSEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B.^bL, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.

Table 3.4

Sexual abuse prevalence estimates (%) by sub-region and sex.

Sex		WHO classifications ^d				World Bank classifications ^b			
		WPR_B	WPR_A	SEAR_B	SEAR_D	L	LM	UM	H
Males	Uncorrected	16.26	9.97	11.41	–	18.90	17.42	10.44	0.77
	Sample size weighted	16.26	9.96	7.68	–	18.90	15.03	6.28	3.91
Corrected for methodological factors	Median	10.11	0.77	6.42	–	14.36	16.25	7.73	0.77
	Sample size weighted	6.13	3.10	3.33	–	16.46	14.58	4.79	3.09
Females	Uncorrected	17.65	7.58	11.75	–	13.50	22.75	16.74	7.59
	Sample size weighted	10.22	11.14	13.62	–	13.50	18.91	9.22	11.15
Corrected for methodological factors	Median	18.95	7.58	15.71	–	13.50	25.06	18.14	7.59
	Sample size weighted	12.71	11.14	15.41	–	13.50	21.86	11.74	11.15

^aSEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B.^bL, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.

Table 3.5

Emotional abuse prevalence estimates (%) by sub-region and sex.

Sex		WHO classifications ^d						World Bank classifications ^b			
		WPR_B	WPR_A	SEAR_B	SEAR_D	L	LM	UM	H		
Males	Uncorrected	49.92	11.60	34.00	-	-	30.86	53.39	8.35		
	Sample size weighted	18.71	11.60	50.14	-	-	28.44	19.65	8.35		
Corrected for methodological factors	Median	51.65	35.89	24.91	-	-	41.81	52.94	23.67		
	Sample size weighted	21.09	35.89	46.25	-	-	37.44	20.41	23.67		
Females	Uncorrected	37.30	16.00	30.20	-	-	30.16	38.09	20.29		
	Sample size weighted	17.69	16.00	42.57	-	-	27.68	17.13	20.29		
Corrected for methodological factors	Median	45.26	34.84	22.13	-	-	41.12	44.66	41.60		
	Sample size weighted	19.96	34.84	38.82	-	-	35.89	18.08	41.60		

^aSEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B.^bL, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.

Population attributable fractions for health outcomes associated with physical abuse by sub-region and sex (based on the “median value and uncorrected” method).

Table 4.1

	Mental disorder	Stomach pain	Health outcome				Self harm
			Illicit drug use	Current smoker	Problem drinking		
Males							
WHO classifications							
SEAR_B	11.4%	4.1%	23.8%	6.9%	14.2%	14.9%	
SEAR_D	–	–	–	–	–	–	
WPR_A	5.8%	2.0%	13.1%	3.4%	7.4%	7.8%	
WPR_B	10.0%	3.6%	21.2%	6.0%	12.5%	13.1%	
World Bank classifications							
L	25.0%	10.0%	44.8%	16.1%	30.0%	31.2%	
LM	9.7%	3.5%	20.8%	5.8%	12.2%	12.8%	
UM	9.5%	3.4%	20.3%	5.7%	11.9%	12.5%	
H	10.3%	3.7%	21.9%	6.2%	12.9%	13.5%	
Females							
WHO classifications							
SEAR_B	7.4%	2.6%	16.3%	4.4%	9.3%	9.8%	
SEAR_D	–	–	–	–	–	–	
WPR_A	6.1%	2.1%	13.7%	3.6%	7.7%	8.2%	
WPR_B	7.8%	2.7%	17.1%	4.6%	9.8%	10.3%	
World Bank classifications							
L	19.4%	7.4%	36.9%	12.2%	23.6%	24.7%	
LM	7.5%	2.6%	16.5%	4.4%	9.4%	9.9%	
UM	7.6%	2.7%	16.8%	4.5%	9.6%	10.1%	
H	6.9%	2.4%	15.3%	4.1%	8.7%	9.2%	

Table 4.2

Population attributable fractions for health outcomes associated with sexual abuse by sub-region and sex (based on the “median value and uncorrected” method).

	Health outcome						
	Mental disorder	Current smoker	Illicit drug use	Problem drinking	Genito-urinary symptom	Sexually transmitted infection	Self harm
Males							
WHO classifications							
SEAR_B	18.3%	7.9%	16.0%	10.0%	3.1%	8.6%	9.0%
SEAR_D	–	–	–	–	–	–	–
WPR_A	16.3%	7.0%	14.3%	8.8%	2.7%	7.6%	7.0%
WPR_B	24.2%	10.9%	21.4%	13.6%	4.4%	11.8%	12.7%
World Bank classifications							
L	27.0%	12.4%	24.0%	15.5%	5.0%	13.4%	17.9%
LM	25.5%	11.6%	22.5%	14.5%	4.7%	12.5%	12.5%
UM	17.0%	7.3%	14.9%	9.2%	2.8%	7.9%	8.9%
H	1.5%	0.6%	1.3%	0.7%	0.2%	0.6%	0.6%
Females							
WHO classifications							
SEAR_B	18.7%	8.1%	16.4%	10.2%	3.2%	8.8%	9.0%
SEAR_D	–	–	–	–	–	–	–
WPR_A	12.9%	5.4%	11.2%	6.8%	2.1%	5.8%	5.7%
WPR_B	25.7%	11.7%	22.8%	14.6%	4.7%	12.6%	12.9%
World Bank classifications							
L	20.9%	9.2%	18.4%	11.6%	3.6%	10.0%	13.4%
LM	30.8%	14.6%	27.5%	18.1%	6.0%	15.7%	15.2%
UM	24.7%	11.2%	21.8%	14.0%	4.5%	12.1%	12.4%
H	12.9%	5.4%	11.2%	6.9%	2.1%	5.9%	5.8%

Population attributable fractions for health outcomes associated with neglect by sub-region and sex (based on the “median value and uncorrected” method).

Table 4.3

		Health outcome			
		Mental disorder	Illicit drug use	Current smoker	Self harm
Males	WHO classifications				
	SEAR_B	22.2%	21.3%	5.9%	30.2%
	SEAR_D	-	-	-	-
	WPR_A	1.8%	1.7%	0.4%	3.3%
	WPR_B	15.0%	14.4%	3.8%	24.4%
	World Bank classifications				
	L	-	-	-	-
	LM	14.8%	14.2%	3.7%	22.5%
	UM	15.4%	14.7%	3.9%	25.0%
	H	6.4%	6.1%	1.5%	10.0%
Females	WHO classifications				
	SEAR_B	22.1%	21.3%	5.9%	29.5%
	SEAR_D	-	-	-	-
	WPR_A	1.4%	1.3%	0.3%	2.6%
	WPR_B	15.2%	14.5%	3.8%	23.5%
	World Bank classifications				
	L	-	-	-	-
	LM	16.2%	15.5%	4.1%	23.9%
	UM	15.1%	14.5%	3.8%	23.5%
	H	8.3%	7.9%	2.0%	13.5%

Population attributable fractions for health outcomes associated with emotional abuse by sub-region and sex (based on the “median value and uncorrected” method).

Table 4.4

	Mental disorder	Health outcome		
		Illicit drug use	Current smoker	Self harm
Males				
WHO classifications				
SEAR_B	28.6%	25.4%	12.8%	23.6%
SEAR_D	–	–	–	–
WPR_A	12.0%	10.4%	4.8%	9.6%
WPR_B	37.0%	33.3%	17.7%	31.2%
World Bank classifications				
L	–	–	–	–
LM	26.7%	23.6%	11.7%	21.9%
UM	38.6%	34.8%	18.7%	32.7%
H	9.0%	7.7%	3.5%	7.1%
Females				
WHO classifications				
SEAR_B	26.2%	23.2%	11.5%	21.6%
SEAR_D	–	–	–	–
WPR_A	15.9%	13.8%	6.4%	12.7%
WPR_B	30.5%	27.2%	13.8%	25.4%
World Bank classifications				
L	–	–	–	–
LM	26.2%	23.2%	11.5%	21.5%
UM	31.0%	27.6%	14.1%	25.8%
H	19.3%	16.9%	8.0%	15.6%

Population attributable fractions for health outcomes associated with witnessing IPV by sub-region and sex (based on the “median value and uncorrected” method).

Table 4.5

		Health outcome			
		Mental disorder	Illicit drug use	Current smoker	Problem drinking
Males	WHO classifications				
	SEAR_B	10.5%	10.5%	2.3%	5.7%
	SEAR_D	-	-	-	-
	WPR_A	9.3%	9.3%	2.0%	5.0%
	WPR_B	10.7%	10.7%	2.3%	5.8%
	World Bank classifications				
	L	-	-	-	-
	LM	27.6%	27.6%	7.0%	16.3%
	UM	9.5%	9.5%	2.0%	5.1%
	H	8.8%	8.8%	1.9%	4.7%
Females	WHO classifications				
	SEAR_B	8.3%	8.3%	1.8%	4.4%
	SEAR_D	-	-	-	-
	WPR_A	10.5%	10.5%	2.3%	5.7%
	WPR_B	11.6%	11.6%	2.5%	6.3%
	World Bank classifications				
	L	-	-	-	-
	LM	26.4%	26.4%	6.6%	15.5%
	UM	10.4%	10.4%	2.3%	5.6%
	H	9.7%	9.7%	2.1%	5.2%

Table 5

Estimated economic value of DALYs lost to child maltreatment in 2004 as a percentage of gross domestic product (GDP) (based on the “median value and uncorrected” method).

Sub-region	Economic value of DALYs lost from CM deaths		Economic value of DALYs lost from health outcomes								Aggregate costs			
	(million US\$)	% GDP	Physical abuse (million US\$)	% GDP	Sexual abuse (million US\$)	% GDP	Neglect (million US\$)	% GDP	Emotional abuse (million US\$)	% GDP	Witnessing IPV (million US\$)	% GDP	(million US\$)	% GDP
WHO sub-regions														
SEAR_B	45.9	0.013%	1,153.1	0.332%	1,921.6	0.554%	2,199.3	0.634%	2,688.3	0.774%	877.1	0.253%	8,885.3	2.56%
SEAR_D	–	–	–	–	–	–	–	–	–	–	–	–	–	–
WPR_A	123.0	0.002%	10,532.2	0.208%	19,967.9	0.393%	2,400.3	0.047%	18,273.6	0.360%	11,822.2	0.233%	63,119.2	1.24%
WPR_B	186.8	0.007%	9,082.9	0.347%	21,037.3	0.803%	12,558.3	0.479%	27,567.0	1.052%	8,456.1	0.323%	78,888.4	3.01%
Total	355.7	0.004%	20,768.2	0.258%	42,926.8	0.534%	17,157.9	0.213%	48,528.9	0.603%	21,155.4	0.263%	150,892.9	1.88%
World Bank sub-regions														
L	5.2	0.023%	186.9	0.815%	179.9	0.785%	–	–	–	–	–	–	372.0	1.62%
LM	42.0	0.012%	1,104.1	0.320%	2,986.3	0.865%	1,507.8	0.437%	2,542.7	0.736%	2,594.0	0.751%	10,776.9	3.12%
UM	119.0	0.006%	9,186.4	0.492%	15,212.1	0.815%	9,787.4	0.525%	23,432.4	1.256%	6,744.0	0.361%	64,481.2	3.46%
H	246.1	0.004%	19,834.9	0.340%	12,168.0	0.209%	13,511.6	0.232%	24,499.4	0.420%	14,407.1	0.247%	84,667.1	1.45%
Total	412.3	0.005%	30,312.4	0.376%	30,546.2	0.379%	24,806.8	0.308%	50,474.5	0.626%	23,745.1	0.295%	160,297.2	1.99%

Note: The aggregate costs of child maltreatment for the low income group only include the costs of physical abuse and sexual abuse and may not be appropriate to be used for comparison with other income groups. SEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B. L, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.

Table 6

Sensitivity analysis of aggregate costs of child maltreatment in 2004 as a percentage of gross domestic product (GDP).

Sub-region	Aggregate costs					
	Median value and uncorrected (million US\$)	% GDP	Median value and corrected (million US\$)	% GDP	Sample size weighted and uncorrected (million US\$)	Sample size weighted and corrected (million US\$)
WHO sub-regions						
SEAR_B	8,885.3	2.56%	9,177.5	2.64%	9,799.9	9,914.5
SEAR_D	—	—	—	—	—	—
WPR_A	63,119.2	1.24%	95,680.4	1.89%	72,511.6	104,427.7
WPR_B	78,888.4	3.01%	80,090.5	3.06%	62,663.0	56,660.8
Total	150,892.9	1.88%	184,951.1	2.30%	109,114.7	171,005.6
World Bank sub-regions						
L	372.0	1.62%	253.0	1.10%	372.0	263.1
LM	10,776.9	3.12%	11,120.6	3.22%	10,871.0	11,382.9
UM	64,481.2	3.46%	65,310.2	3.50%	40,662.6	42,840.2
H	84,667.1	1.45%	126,199.0	2.17%	91,877.7	135,068.9
Total	160,297.2	1.99%	202,882.8	2.52%	143,783.2	189,555.1

Note: The aggregate costs of child maltreatment for the low income group only include the costs of physical abuse and sexual abuse and may not be appropriate to be used for comparison with other income groups. SEAR-B, Southeast Asia Region, Group B; SEAR-D, Southeast Asia Region, Group D; WPR-A, Western Pacific Region, Group A; WPR-B, Western Pacific Region, Group B. L, low income countries; LM, lower middle income countries; UM, upper middle income countries; H, high income countries.