

# Supplemental Information

## MATERIALS AND METHODS

### Systematic Review

To obtain population data on the prevalence of violence against children, the following databases were searched: Ovid Medline, Global Health, Embase, and CINAHL. Different search terms were used to obtain data for high income countries and low income countries. Vocabulary terms specific to each database designed to capture “violence against children” were used. A sample search strategy in Medline via Ovid for data from high income countries follows:

1. child abuse/ or child abuse, sexual/
  2. neglect or bully or bullies or “child abuse” or maltreat\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
  3. ((emotional or sexual or physical) adj2 violence).mp.
  4. ((emotional or sexual or physical) adj2 abuse).mp.
  5. (violence adj2 child\$).mp.
  6. 1 or 2 or 3 or 4 or 5
  7. Health Surveys/ or exp Population Surveillance/ or exp Behavioral Risk Factor Surveillance System/
  8. (survey adj2 population).mp.
  9. (nation adj2 survey).mp.
  10. 7 or 8 or 9
  11. (Australia or Greece or Poland or Austria or Iceland or Portugal or Belgium or Ireland or “Slovak Republic” or Canada or Italy or Slovenia or Chile or Israel or Spain or “Czech Republic” or Japan or Sweden or Denmark or Korea or Switzerland or Estonia or Luxembourg or “United Kingdom” or UK or Finland or Netherlands or “United States” or USA or France or “New Zealand” or Germany or Norway).mp.
  12. 6 and 10 and 11
  13. Limit to all children 0–18
- To perform a similar search for low- and middle-income countries, the following terms were used in place of “11.” above:
- “developing country” “developing countries” “developing nation” “developing nations” “developing population” “developing populations” “developing world” “less developed country” “less developed countries” “less developed nation” “less developed nations” “less developed population” “less developed populations” “less developed world” “lesser developed country” “lesser developed countries” “lesser developed nation” “lesser developed nations” “lesser developed population” “lesser developed populations” “lesser developed world” “under developed country” “under developed countries” “under developed nation” “under developed nations” “under developed population” “under developed populations” “under developed world” “underdeveloped country” “underdeveloped countries” “underdeveloped nation” “underdeveloped nations” “underdeveloped population” “underdeveloped populations” “underdeveloped world” “middle income country” “middle income countries” “middle income nation” “middle income nations” “middle income population” “middle income populations” “low income country” “low income countries” “low income nation” “low income nations” “low income population” “low income populations” “lower income country” “lower income countries” “lower income nation” “lower income nations” “lower income population” “lower income populations” “underserved country” “underserved countries” “underserved nation” “underserved nations” “underserved population” “underserved populations” “underserved world” “under served country” “under served countries” “under served nation” “under served nations” “under served population” “under served populations” “under served world” “deprived country” “deprived countries” “deprived nation” “deprived nations” “deprived population” “deprived populations” “deprived world” “poor country” “poor countries” “poor nation” “poor nations” “poor population” “poor populations” “poor world” “poorer country” “poorer countries” “poorer nation” “poorer nations” “poorer population” “poorer populations” “poorer world” “developing economy” “developing economies” “less developed economy” “less developed economies” “lesser developed economy” “lesser developed economies”

“under developed economy”  
 “under developed economies”  
 “underdeveloped economy”  
 “underdeveloped economies”  
 “middle income economy” “middle  
 income economies” “low income  
 economy” “low income economies”  
 “lower income economy” “lower  
 income economies” “low gdp”  
 “low gnp” “lower gdp” “lower  
 gnp” lmic lmic “third world”  
 “lami country” “lami countries”  
 “transitional country” “transitional  
 countries” Africa Asia Caribbean  
 “West Indies” “South America”  
 “Latin America” “Central America”  
 Afghanistan Albania Algeria  
 Angola Antigua Barbuda Argentina  
 Armenia Armenian Aruba  
 Azerbaijan Bahrain Bangladesh  
 Barbados Benin Byelarus  
 Byelorussian Belarus Belorussian  
 Belorussia Belize Bhutan Bolivia  
 Bosnia Herzegovina Hercegovina  
 Botswana Brazil Bulgaria “Burkina  
 Faso” “Burkina Fasso” “Upper  
 Volta” Burundi Urundi Cambodia  
 “Khmer Republic” Kampuchea  
 Cameroon Camerons Cameron  
 Camerons “Cape Verde” “Central  
 African Republic” Chad Chile  
 China Colombia Comoros “Comoro  
 Islands” “Comores” Mayotte  
 Congo Zaire “Costa Rica” “Cote  
 d’Ivoire” “Ivory Coast” Croatia  
 Cuba Cyprus Czechoslovakia  
 “Czech Republic” Slovakia “Slovak  
 Republic” Djibouti “French  
 Somaliland” Dominica “Dominican  
 Republic” “East Timor” “East  
 Timor” “Timor Leste” Ecuador  
 Egypt “United Arab Republic” “El  
 Salvador” Eritrea Estonia Ethiopia  
 Fiji Gabon “Gabonese Republic”  
 Gambia Gaza “Georgia Republic”  
 “Georgian Republic” Ghana “Gold  
 Coast” Greece Grenada Guatemala  
 Guinea Guam Guiana Guyana  
 Haiti Honduras Hungary India  
 Maldives Indonesia Iran Iraq  
 Jamaica Jordan Kazakhstan Kazakh  
 Kenya Kiribati Korea Kosovo  
 Kyrgyzstan Kirghizia “Kyrgyz  
 Republic” Kirghiz Kirgizstan “Lao

PDR” Laos Latvia Lebanon Lesotho  
 Basutoland Liberia Libya Lithuania  
 Macedonia Madagascar “Malagasy  
 Republic” Malaysia Malaya Malay  
 Sabah Sarawak Malawi Nyasaland  
 Mali Malta “Marshall Islands”  
 Mauritania Mauritius “Agalega  
 Islands” Mexico Micronesia  
 “Middle East” Moldova Moldova  
 Moldovian Mongolia Montenegro  
 Morocco Ifni Mozambique  
 Myanmar Myanma Burma Namibia  
 Nepal “Netherlands Antilles” “New  
 Caledonia” Nicaragua Niger Nigeria  
 “Northern Mariana Islands” Oman  
 Muscat Pakistan Palau Palestine  
 Panama Paraguay Peru Philippines  
 Philipines Phillipines Phillippines  
 Poland Portugal “Puerto Rico”  
 Romania Rumania Roumania  
 Russia Russian Rwanda Ruanda  
 “Saint Kitts” “St Kitts” Nevis “Saint  
 Lucia” “St Lucia” “Saint Vincent”  
 “St Vincent” Grenadines Samoa  
 “Samoan Islands” “Navigator  
 Island” “Navigator Islands” “Sao  
 Tome” “Saudi Arabia” Senegal  
 Serbia Montenegro Seychelles  
 “Sierra Leone” Slovenia “Sri  
 Lanka” Ceylon “Solomon Islands”  
 Somalia Sudan Suriname Surinam  
 Swaziland Syria Tajikistan  
 Tadzshikistan Tadjikistan Tadzshik  
 Tanzania Thailand Togo “Togolese  
 Republic” Tonga Trinidad Tobago  
 Tunisia Turkey Turkmenistan  
 Turkmen Uganda Ukraine Uruguay  
 USSR “Soviet Union” “Union  
 of Soviet Socialist Republics”  
 Uzbekistan Uzbek Vanuatu “New  
 Hebrides” Venezuela Vietnam  
 “Viet Nam” “West Bank” Yemen  
 Yugoslavia Zambia Zimbabwe  
 Rhodesia “Western Sahara” Kuwait  
 “United Arab Emirates” Qatar  
 Nauru Tuvalu Bahamas “South  
 Africa”

In all, 1313 abstracts were identified  
 for high-income or low- and middle-  
 income country data, with 421  
 generated from the LMIC search  
 and the remainder from the HIC  
 search. After removing duplicates  
 across databases, a total of 907

unduplicated references remained  
 for a search of literature published  
 through January 2014; we conducted  
 additional searches using the  
 Internet to identify published reports  
 of multicountry studies and by using  
 MedLine to identify reports published  
 after January 2014. The date last  
 searched was August 14, 2015.  
 We added a total of 21 references,  
 bringing the total screened to 929.  
 Of these, 54 underwent full review,  
 and 16 reports were excluded due to:  
 no reporting of past-year exposure  
 to violence (6), no reporting of  
 victimization (1), use of subjective  
 definitions of violence (2), and use of  
 nonprobabilistic sampling methods  
 (5) and qualitative data (2). We used  
 the 38 reports to conduct the data  
 triangulation for the synthesis of  
 survey data to generate prevalence  
 of exposure to past-year violence  
 against children. These 38 reports  
 used probabilistic sampling, in the  
 majority of instances from an entire  
 country, but occasionally from a  
 subregion, province, or rarely, city.  
 As described in the body of the  
 paper, the triangulation approach  
 included a critical synthesis of data  
 to develop minimum estimates by  
 using population-weighted averages  
 of Regional exposures to past-year  
 violence.<sup>49-51</sup> Triangulation was  
 appropriate for synthesizing research  
 across a variety of methodologies,  
 given that our primary purpose was  
 to inform public health action.<sup>49</sup> We  
 abstracted prevalence estimates  
 for emotional, physical, and/or  
 sexual violence, bullying, fighting, or  
 exposure to “any violence,” as defined  
 by various surveys (see Supplemental  
 Table 6). Two investigators  
 independently duplicated the  
 abstraction of prevalence data  
 from published manuscripts and  
 reports into a customized Microsoft  
 Excel database. Investigators  
 jointly reviewed a small number of  
 discrepancies (4) against original  
 papers to resolve minor differences.

**SUPPLEMENTAL TABLE 6** Standard Definitions of Types of Exposure to Violence Against Children

Type of Violence	Definition
Emotional	Shouted, yelled, or called dumb, lazy, or other derogatory names in past month, threatened to kick out of house or did kick out of house, threatened to hit or spank (MICS “psychological”). Threatened with abandonment/ridiculed or put down/made to feel unloved or unwanted/told by a caregiver or relative they wish you were dead or had never been born (VACS)
Psychological (emotional), severe	Cursed child; called child names such as stupid, ugly, or useless; threatened to abandon child; locked child out of house or threatened with knife or gun; or threatened to invoke evil spirits against child (WorldSafe)
Physical excluding spanking	Punched/kicked/beaten/whipped; choked/smothered/attempted drowning/burned or scalded intentionally/threatened with a weapon in past 12 mo by relative or authority figure (excludes spanking) (VACS); or involved in a physical fight past month (GSHS/HBSC)
Physical, moderate	Shook/slapped/hit with bare hand on bottom or hit with an object in past month (MICS and WorldSafe)
Physical, severe	Hit/slapped on face/head/hit with belt or hard object/beaten up/hit repeatedly as hard as possible (MICS); kicked, choked, smothered with hand or pillow, burned/scaled, branded, hit with an object, beat over and over again (WorldSafe)
Sexual	Pressured sex/physically forced sex/attempted unwanted sex/unwanted sexual touching (VACS)
Bullying Victimization	Peer(s) are reported to say or do nasty or unpleasant things or intentionally ridicule (can be physical or emotional or sexual in nature) (GSHS and HBSC)
Fighting	Students reported being involved in a fight in past 12 mo (GSHS, HBSC).
Any	Pressured sex/physically forced sex/attempted unwanted sex/unwanted sexual touching (sexual), punched/kicked/beaten/whipped, choked/smothered/attempted drowning/burned or scalded intentionally/threatened with a weapon in past 12 mo by relative or authority figure (physical); or threatened with abandonment/ridiculed or put down/made to feel unloved or unwanted/told by a caregiver or relative they wish you were dead or had never been born (emotional) (VACS); shook/slapped/hit with bare hand on bottom or hit with an object in past month (moderate physical); or hit/slapped on face/head/hit with belt or hard object/beaten up/hit repeatedly as hard as possible (severe physical); or shouted/yelled/called dumb or lazy or other derogatory names in past month, threatened to kick out of house or did kick out of house, threatened to hit or spank (emotional) (MICS); physical assault with or without a weapon by peer, adult, or gang member/bullying/physical dating violence/threatened physical assault/relational aggression/harassment; or completed rape/attempted rape/unwanted sexual touching; child maltreatment including physical abuse, emotional abuse, neglect, custodial interference or abduction; and direct property crime to child, including theft, vandalism, or robbery (NatSCEV)

For the base scenario, the highest of emotional, severe psychological, physical (excluding spanking), sexual, bullying, fighting, or “any violence” (1 or more of the above, only reported by VACS, NatSCEV). For the sensitivity analysis, the highest reported of any of the above as listed or of “any violence” (1 or more of the above, as reported by VACS, NatSCEV, or MICS).

### Data Coverage and Quality

In total, 96 countries had data that met the criteria for inclusion in the systematic review (see Methods section of the main paper). Only studies that were conducted by using exact versions or contextual adaptations of previously validated standardized instruments were included, and care was taken to use studies that asked for exposure to past-year violence by using questions that specifically asked for recall of instances of exposure to violent behaviors. An example of a question measuring the experience of violent behavior would be, “Have you ever been punched/kicked/slapped in the past 12 months?”

### Calculation of Region-specific Estimates of Violence Against Children

First, we grouped countries according to their regional

classification using the UN allocation of countries to these 6 major world regions: Africa, Asia, Europe, Latin America/Caribbean, Northern America, and Oceania. We then used census data from the US Census Bureau International Population Data site (<http://www.census.gov/population/international/data/idb/region.php?N=%20Results%20&T=4&A=separate&RT=0&Y=2015&R=-1&C=BH>) to compute the numbers of children ages 2 to 14 years and 15 to 17 years in each region in 2014 by subtracting the 0- and 1-year-old census estimates for each country from the 0- to 14-year-old population estimates; then, to calculate the total numbers of childrens ages' 15 to 17 years, we summed country-specific population figures for 15-year-old, 16-year-old, and 17-year-old children. Of note, even though representative population-based past-year prevalence data were available for Wales and Scotland, it

was not possible to include these in estimates for the European region due to unavailability of census-based population data in the International Population Database. Given the small size of the populations of these 2 countries and the fact that prevalences of violence were similar to the remaining 36 countries in the region that did have available population estimates, it is unlikely this omission led to bias in minimum estimates for the European region.

As described in the Methods section of the main paper, we were able to abstract age-disaggregated data for 110 of the 112 prevalence estimates identified. For the small number of surveys reporting violence outcomes for the entire 0- to 17-year-old age range ( $n = 2$ ), we did the following. For the independent survey measuring violent discipline in the home, as reported by mothers, we applied

**SUPPLEMENTAL TABLE 7** Surveys Used as Sources for Country-specific Estimates of Violence Against Children

Survey	Age Group, y	Type of Violence Collected	Sampling Population
MICS; 33 countries	2–14	Violent parental discipline	National 3-stage cluster sampling of households to interview a woman (caregiver) ages 15–49 y with at least 1 child ages 2–14 y <sup>12</sup>
NatSCEV	0–17	Maltreatment Bullying and assaults Sexual violence Direct property victimization Witnessing or indirect victimization	National telephone-based sampling using random selection of child, interviewing caregivers for children <10 y, and interviewing children ages 10–17 y, using 4 sources: address based sample linked to cell phones/residential lines; prescreened sample of households with children from recent RDD surveys; landline sample with children in household based on commercial lists; cell phone numbers drawn from targeted RDD sample frame <sup>47</sup>
WorldSafe; 6 countries, with 19 communities, median	0–17	Parental verbal punishment Parental physical punishment	Two-stage cluster sampling of households to enroll a female caregiver ages 15–49 y and at least 1 child ages 0–17 y (sample sizes of 400–1485) living in 19 communities in 6 countries <sup>15,24</sup>
Survey Adaptations of CTS; 3 countries (Finland, Canada, Italy)	0–12, 0–17, or 3–12	Violent parental discipline	National probabilistic mailed survey of parents/guardians of 0–12 y-olds (Finland); provincial RDD probability sample of mothers/female caregivers of children 0–17 y (Canada); provincial questionnaire sent to parents of children ages 3–12 y, with random selection of sample proportional to size of 3–12 y population <sup>35,37,43</sup>
VACS; 8 countries	13–17	Sexual Violence Physical Violence Emotional Violence Violence Perpetration Witnessing Violence	National 3-stage cluster sampling of households to enroll participants ages 13–24 y <sup>44</sup>
GSHS; 21 countries	Target age 13–15, range 11–17	Bullying Gang violence Sexual violence victimization Intimate Partner Violence Access to firearms Corporal punishment	National sampling of middle-school children attending eligible schools by using 2-stage cluster design <sup>20</sup>
HBSC; 37 countries	11–15	Bullying Physical fighting Violence perpetration/Exposure to weapons Threats	National sampling of children attending school, based on at least 95% of children in the 11-, 13-, 15-y age groups; use of stratified cluster probability sampling with school class as sampling unit <sup>32</sup>
National Survey of School Health	13–15	Bullying	National multistage probability sample of ninth grade students in public or private schools, based on 2010 national school census, and administered via smart phones <sup>48</sup>

RDD, random digit dialing.

reported prevalences to the 2- to 14-year-old age range.<sup>39</sup> Then, for the corresponding country-specific prevalence of past-year violence for the 15- to 17-year-old group, we applied data from HBSC.<sup>32</sup> Taking this approach caused the types of data used for each country's estimates to be similar to that available for the majority of countries included. Finally, for the 1 report that included an overall estimate for ages 0 to 17 of direct

exposure to any of multiple types of violence (eg, physical, emotional, sexual, or bullying) perpetrated in the home, school, or community, by authority figures, peers, partners, family members, or strangers, we applied this overall estimate to both the 2 to 14- and 15 to 17-year-old age groups.<sup>47</sup> In the event that a country had both national and subnational data available for a give age range, we used national estimates in our calculations.

The minimum prevalence of past-year violence against children for the 2014 population of 2- to 17-year olds was estimated for 2- to 14-year-olds and 15- to 17-year-olds in every major world region by dividing the sum of the age-specific estimates of total numbers of children exposed to violence in the previous year based on published country reports (separately for 2- to 14-year-olds and 15- to 17-year-olds) by the

sum of the corresponding age-specific estimates of the total child population at risk (for 2- to 14-year-olds and 15- to 17-year-olds) in the corresponding countries in 2014 based on international census data (US Census Bureau). The resulting population-weighted average provides an estimate of the regional prevalence separately for the 2- to 14-year-old and 15- to 17-year-old age groups. This age-based approach was used because of the variations in age ranges for much of the survey data; however, our main goal was to generate minimum

estimates of the global prevalence of violence against children for the 2- to 17-year-old population.

### **Calculating the Total Number of Children Exposed to Violence in 2014 in Each Region**

Once the regional prevalences for each age group were computed, we multiplied the age-specific prevalences (see previous section) by the total age-specific population for all countries in the region (both those with and those without data) to generate minimum estimates of the total numbers of 2- to 14-year-olds and 15- to 17-year-olds

exposed to past-year violence in each region. The sum of these 2 numbers provides the total number of children ages 2 to 17 years exposed in each region. The total number of children in the world exposed to violence in the previous year was calculated by summing these region-specific estimates (Table 4 in body of paper). Of note, the total number of children suffering violence as summed in analyses by Region (Table 4) differs from the total sum (data not shown) in analyses by UN Economic Region (Table 5) due to variations in imputed population prevalences of violence and in population weights.