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Violence Info Methodology

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1. Introduction

Scientific information on interpersonal violence – which includes child maltreatment, youth violence, intimate partner violence, elder abuse, sexual violence, multiple types of violence victimization and homicide – is scattered across a myriad of websites, statistical databases, technical reports, and often difficult-to-access academic journals. Often, these information sources only address one violence type, such as intimate partner violence. Furthermore, many existing databases have restricted coverage of interventions or prevalence of violence in one country or region of the world. The available information is also often difficult for non-academics to make sense of, and rarely is it presented in a concise, readable or visual format.

The Violence Prevention Information System (Violence Info) aims to improve access to scientific information about all types of interpersonal violence, including findings on prevalence rates, risk factors, consequences, and prevention and response strategies, through creating a data repository and displaying the information in a user-friendly format on a website. The Violence Info website is a one-stop shop for global violence prevention information, and will help to:

- Provide a more accurate understanding of the magnitude, severity and consequences of violence for individuals and society;
- Make the case for stepping up support and investment in violence prevention;
- Identify risk factors and causes of violence to inform prevention efforts;
- Increase the accessibility of evidence for intervention effectiveness;
- Measure indicators for the violence-related targets in the Sustainable Development Goals [1]; and,
- Guide policy makers' efforts to prevent violence.

Aim: To create and maintain a data repository and website which collates published scientific data from around the world on the main types of interpersonal violence.

The data repository: contains information from studies of violence extracted from academic journal articles, including study sample characteristics, design and measures. It also contains global, regional and national homicide rates from the World Health Organization (WHO) Global Health Estimates. Repository data tables are downloadable from the website.

The data visualization (Violence Info) website: supports the interpretation and reporting of information in the data repository through:

- Interactive visuals for each of the types (e.g. child maltreatment) and aspects (e.g. consequences) of interpersonal violence.
- An interactive studies section that allows the user to explore the studies and their findings in more depth.
- Country-reported information on violence prevention including measures such as policies, laws, prevention programmes and victim services.

2. Scope and organization

2.1 Summary

Violence Info summarizes scientific information from available studies that meet the inclusion criteria (see below). It is not designed to create new estimates, and any summary statistics are provided to assist the user in interpreting the reported findings.

The Violence Info website is organized along two dimensions:

1. Type of interpersonal violence, i.e. child maltreatment, youth violence, intimate partner violence, elder abuse and crosscutting categories such as sexual violence, violence against children, violence against women and homicide (see Section 2.2).
2. The aspects of the public health approach to violence, i.e. prevalence, consequences, risk factors, prevention and response strategies (see Section 2.3).

Tabs along the top left of the website allow the user to select a violence type. Each violence type page presents a definition of the violence type and a summary global prevalence figure[1]. Information on the prevalence, consequences, risk factors, and effectiveness of prevention and response strategies is extracted from published scientific studies and presented in different visualizations. All visualizations can be downloaded, shared, or embedded in other websites. There is also a help tool for each visualization to facilitate interpretation of the data and understanding of the statistics used. Each violence type page also provides examples of interventions with some evidence for effectiveness. They have been chosen for illustrative purposes and their inclusion in Violence Info does not mean that WHO endorses them. Key survey instruments used to gather information on the violence type are also summarized.

The studies section collates data from the different violence types and allows the user to explore the studies and their findings in depth, with options to filter the visualizations by a number of criteria. The user can also download the data repository tables in this section. These are available in Excel format with one file each for prevalence, consequences, risk factors, prevention strategies and response strategies. These files collate information from all violence types and contain all extracted data, providing the user with more study detail than available on the website visualizations[2].

The countries section allows the user to explore country-level data, including homicide estimates by year, sex and age; links to the studies section with the data filtered to the specific country; and information on measures the country reports to be taking to address violence (e.g. policies, laws, prevention programmes and victim services).

2.2 Main types of interpersonal violence

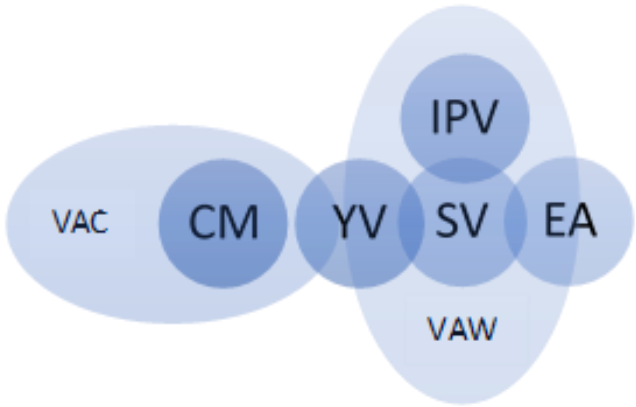
Interpersonal violence is the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in, or has a high likelihood of resulting in, injury, death, psychological harm, maldevelopment or

[1] Taken from WHO reports and/or factsheets.

[2] As homicide data only contains data on prevalence, and is not extracted from single studies, this violence type is not included in the studies section, and the data tables can instead be downloaded from the main homicide page (see Section 3.7).

deprivation [2]. This section defines each type of interpersonal violence featured in Violence Info. It should be noted that there is overlap between several violence types (Figure 1). Violence against children and violence against women are overarching categories encompassing some of the other main types (see section 2.2.7). Sexual violence is both a subtype of the other types of violence, and a type of violence in its own right, crosscutting youth violence, intimate partner violence and elder abuse (see section 2.2.5). It excludes child sexual abuse, the dynamics of which are often very different to that of adult sexual violence and therefore abuse of this nature is not combined with other forms of sexual violence.

Figure 1: Overlap between violence types



CM=child maltreatment; YV=youth violence; IPV=intimate partner violence; SV=sexual violence; EA=elder abuse; VAC=violence against children; VAW=violence against women

2.2.1 Child maltreatment

Child maltreatment is the abuse and neglect that occurs to children under 18 years of age. It includes all types of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power [2].

Subtypes of child maltreatment

The following subtypes of child maltreatment were used to categorize the study data included in Violence Info. Many studies use only a global measure of child maltreatment, which includes any or multiple subtypes. Therefore, in the studies section, 'any child maltreatment' also features as a subtype.

- **Physical abuse:** intentional use of physical force against a child that results in, or has a high likelihood of resulting in, harm for the child's health, survival, development or dignity. This includes hitting, beating, kicking, shaking, biting, strangling, scalding, burning, poisoning and suffocating [2].
- **Sexual abuse:** 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, or else that violates the laws or social taboos of society [2]. Where known, sexual abuse is subdivided into contact, non-contact and penetrative sexual abuse.

- **Psychological abuse:** the failure of a caregiver to provide an appropriate and supportive environment, including acts that have an adverse effect on the emotional health and development of a child. Such acts can include restricting a child's movements, denigration, ridicule, threats and intimidation, discrimination, rejection and other non-physical forms of hostile treatment [2]. It can also be referred to as emotional, mental or verbal abuse.
- **Neglect:** the failure of a caregiver to provide for the development of the child – where the caregiver is in a position to do so – in one or more of the following areas: health, education, emotional development, nutrition, shelter and safe living conditions [2]. Neglect is distinguishable from circumstances of poverty in that neglect can only occur in cases where reasonable resources are available to the caregiver. Where known, neglect is subdivided into physical and psychological forms of neglect.

2.2.2 Youth violence

Youth violence refers to violence that occurs among individuals aged 10-29 years who are unrelated and who may or may not know each other, and generally takes place outside of the home. It includes a range of acts from bullying and physical fighting, to more severe sexual and physical assault. Some violent acts, such as assault, can lead to serious injury or death. Others, such as bullying, slapping or hitting, may result more in emotional than physical harm [3].

Only studies that provided data for the specified age range for youth violence, either exclusively or as a designated subgroup within a more age-heterogeneous sample were included in youth violence.

Subtypes of youth violence

The following subtypes of youth violence were used to categorize the data:

- **Bullying:** is characterized by the repeated exposure of one person to physical and/or emotional aggression including teasing, name-calling, mockery, threats, harassment, taunting, hazing, social exclusion or rumours [4]. It can also take the form of cyber-bullying; defined as any aggressive, intentional act carried out by a group or individual, using electronic forms of contact, against a victim who cannot easily defend themselves [5].
- **Physical fighting:** an assaultive behaviour, with or without the use of weapons, which can lead to serious injury. It is distinguishable from physical bullying, as it typically involves two individuals of about the same strength, both motivated to engage in a fight, as opposed to one individual physically assaulting another without significant retaliation.
- **Sexual violence:** any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting[3] [6].

[3] The sexual violence subtype in youth violence is distinguishable from the sexual abuse subtype in child maltreatment, even though the age ranges between the two violence types overlap. Sexual violence in youth violence specifically relates to violence among peers, by either an intimate partner or an acquaintance. Sexual abuse in child maltreatment relates to abuse by a person in a position of trust, such as a caregiver or a stranger.

2.2.3 Intimate partner violence

Intimate partner violence refers to any behaviour within an intimate relationship that causes harm to those in the relationship. When abuse occurs repeatedly in the same relationship, the phenomenon is often referred to as 'battering'. Intimate partner violence occurs mainly from adolescence and early adulthood onwards, most often in the context of marriage or cohabitation [6][4].

Subtypes of intimate partner violence

The following subtypes of intimate partner violence were used to categorize the data. Many studies use only a global measure of intimate partner violence, which includes any or multiple subtypes. Therefore, in the studies section, 'any intimate partner violence' also features as a subtype.

- **Physical violence:** acts of physical aggression, such as slapping, hitting, kicking and beating [6].
- **Psychological abuse:** the infliction of mental anguish, such as intimidation, constant belittling and humiliation. Also includes controlling behaviours, such as isolating a person from their family and friends, monitoring their movements, and restricting their access to information or assistance [6].
- **Sexual violence**: any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion by a current or previous intimate partner [6].
- **Financial abuse**: controlling finances, withholding money or credit cards, exploiting assets, deliberately running up debts, forcing or preventing someone from working [6].

2.2.4 Elder abuse

Elder abuse is a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person (aged 60 years or older) [7].

Subtypes of elder abuse

The following subtypes of elder abuse were used to categorize the data. Many studies use only a global measure of elder abuse, which includes any or multiple subtypes. Therefore, in the studies section, 'any elder abuse' also features as a subtype.

- **Physical abuse:** the infliction of pain or injury, physical coercion, or physical or drug-induced restraint [6].
- **Sexual abuse:** any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion, by a caregiver or any other individual [6].
- **Psychological abuse:** the infliction of mental anguish (including serious loss of dignity and respect) [6].
- **Financial abuse:** the illegal or improper exploitation or use of funds or resources of the older person [6].
- **Neglect**: the refusal or failure to fulfil a caregiving obligation. This may or may not involve an intentional attempt to inflict physical or emotional distress on the older

[4] Dating violence amongst youths is included in IPV rather than youth violence.

person. This also includes abandonment, deserting a dependent person with the intent to abandon them, or leaving them unattended for a duration that is likely to endanger their health or welfare [6].

2.2.5 Sexual violence

Sexual violence is any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting. It includes rape, defined as the physically forced or otherwise coerced penetration of the vulva or anus with a penis, other body part or object[5] [6].

Subtypes of sexual violence

The following subtypes of sexual violence were used to categorize the data. Many studies use only a global measure of sexual violence, which includes any or multiple subtypes. Therefore, in the studies section, 'any sexual violence' also features as a subtype.

- **Contact**: includes intentional touching either directly or through clothing of the genitalia, anus, groin, breast, inner thigh, or buttocks, but excludes penetration of any of these [8].
- **Non-contact**: includes no physical contact of a sexual nature including: acts that expose an individual to sexual activity (e.g. pornography, voyeurism); unwanted filming, taking or disseminating photographs of a sexual nature of another person; sexual harassment; or threats of sexual violence [8].
- **Penetrative**: penetration, however slight, between the mouth, penis, vulva or anus of the individual, including penetration of the anal or genital opening by a hand, finger or other object [8].

2.2.6 Homicide

Homicide is the killing of a person by another with intent to cause death or serious injury, by any means. Homicide thus only refers to those acts in which the perpetrator intended to cause death or serious injury by his or her actions. Homicide excludes deaths related to conflicts, deaths caused when the perpetrator was reckless or negligent, and killings considered justifiable according to penal law, such as those by law enforcement agents in the line of duty or in self-defence. In its global health estimates, WHO uses relevant International Classification of Disease (ICD) codes to define homicide (ICD-10 codes X85-Y09[6] and Y871[7] [9]).

2.2.7 Violence against children and violence against women

Two overarching categories - violence against children and violence against women - are generated from relevant data in the above types of violence.

[5] Although this definition encompasses child sexual abuse, in this section Violence Info only includes sexual violence perpetrated against adults aged 18 years and older or sexual violence among peers under 18 years.
[6] Assault – includes homicides and injuries inflicted by another person with intent to injure or kill by any means. Excludes injuries due to legal intervention or operations of war.
[7] Sequelae (late effects) of assault.

Violence against children

Violence against children is defined as the intentional use of physical force or power, threatened or actual, against a child, by an individual or a group, that either results in or has a high likelihood of resulting in actual or potential harm to the child's health, survival, development or dignity [6]. The essential difference between child maltreatment and the broader concept of violence against children is that the former is defined as occurring in the context of a relationship of trust whereas this is not a requirement for the latter. The perpetrators of child maltreatment may be, for instance, parents, other caregivers or teachers, while the perpetrators of violence against children may also include peers and strangers. Thus the concept of violence against children subsumes that of child maltreatment. All studies in the Violence Info repository with samples of individuals under the age of 18 years[8] contribute to the studies section for violence against children. All child maltreatment studies were included in the violence against children section regardless of sample age at time of study (e.g. retrospective study with adults) as by definition child maltreatment occurs to individuals under the age of 18 years.

Violence against women

Violence against women is defined as any act of violence that results in, or is likely to result in, physical, sexual or mental harm or suffering to women, including threats of such acts, coercion, or arbitrary deprivation of liberty, whether in public or private life [10]. All studies in the Violence Info data repository with samples of females aged 18 years or above[8] contribute to the studies section for violence against women.

2.3 Aspects of violence

The public health approach to violence prevention has four steps:

1. Defining the problem through the systematic collection of data on the magnitude, characteristics and consequences of violence;
2. Identifying the causes and correlates of violence, and the factors that increase or decrease the risk for violence;
3. Establishing what works to prevent and respond to violence by designing, implementing and evaluating interventions; and
4. Scaling up interventions of proven or promising effectiveness [6].

Violence Info covers all four steps of the public health approach, with each of the main violence pages displaying visualizations for prevalence, consequences, risk factors, and prevention and response strategies.

2.3.1 Prevalence

Prevalence is an epidemiological measure of how common a condition or behaviour is in a population at a particular point in time. The prevalence of any type of violence is calculated by dividing the number of persons having been a victim of violence at a particular point in time by the total number of people sampled. Prevalence is then expressed as a percentage, calculated by multiplying the ratio by 100.

[8] Studies that included a range of ages before and after 18 years were excluded from this category.

Visualizations

For each violence page, two prevalence visualizations are presented. The first is a summary global prevalence figure taken from WHO reports and/or factsheets. These are not calculated from the studies in the data repository. The second visualization is an interactive world map of the prevalence of each subtype of violence. Diamonds on the map represent the median prevalence value for all studies from each country/area or WHO region. The size of the diamond is proportionate to the size of the median prevalence (larger = higher prevalence). A hover box for each diamond provides the user with the median prevalence value, the country/area or WHO region, the number of people sampled, and the number of studies. The median prevalence values shown on the maps do not represent national or regional estimates, but rather data extracted from the included studies.

Prevalence period

Studies vary in what prevalence periods they measure violence (e.g. past 6 months, past year, lifetime). The prevalence periods displayed on the maps are determined by which period has the greatest number of studies in the data repository. Prevalence period in the studies section can be filtered to display prevalence for past year or lifetime for each violence type[9].

Regional distribution of WHO Member States and Associate Members/areas

All countries which are Members of the United Nations may become members of WHO by accepting its Constitution. Other countries may be admitted as members when their application has been approved by a simple majority vote of the World Health Assembly. Territories or areas which are not responsible for the conduct of their international relations may be admitted as Associate Members upon application made on their behalf by the Member or other authority responsible for their international relations [11]. Members of WHO are grouped according to regional distribution: the African Region, the Region of the Americas, the South-East Asia Region, the European Region, the Eastern Mediterranean Region and the Western Pacific Region. Appendix 1 provides a list of the countries/areas included in each WHO region.

Countries/areas within the six WHO regions are further categorized according to the World Bank analytical income of economies based on the 2015 Atlas gross national income per capita estimates [12]: low income (US$ 1 025 or lower), lower-middle income (US$ 1 026–4 035), upper-middle income (US$ 4 036–12 475), or high income (US$ 12 476 or more).

2.3.2 Consequences and risk factors

Consequences

Consequences of each type of violence are visualized under four main groupings: health problems, social and behavioural problems, impaired cognitive and academic performance, and economic problems. Physical health consequences were categorized using the International Classification of Diseases (ICD-10) [9] and mental health consequences using the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) [13]. Appendix 2 provides a list of all consequences included in each category.

[9] Past year and lifetime prevalence periods are filter options in the studies section. Other prevalence periods (e.g. past 6 months) are displayed in the studies section only when the 'all prevalence periods' filter is selected.

Risk factors

Risk factors are organized according to the ecological framework of violence. This framework is based on evidence that no single factor can explain why some people or groups are at higher risk of interpersonal violence and others more protected from it. Interpersonal violence is viewed as the outcome of interaction among many factors at four levels – the individual, the relationship, the community and the societal (Box 1 [14]). Violence Info further sub-divides the individual level, displaying individual characteristics of both the victim and the perpetrator that increase the likelihood of violence. Appendix 3 provides a list of all risk factors included at each level.

Box 1: The ecological framework

Individual-level risk factors include personal history and biological characteristics of the individual that increase the likelihood of being a victim or a perpetrator of violence (e.g. sex, age, disability, education, alcohol/substance abuse).

Relationship-level risk factors refer to the proximal social relationships that influence the risk of violent victimization or perpetration (e.g. relations with violent peers, dysfunctional family relationships).

Community-level risk factors refer to the characteristics of community contexts in which social relationships are embedded, such as schools, workplaces and neighbourhoods, associated with being victims or perpetrators of violence (e.g. concentrated poverty, high unemployment).

Society-level risk factors include factors that create a climate conducive to violence, those that reduce inhibitions against violence, and those that create and sustain gaps between different segments of society (e.g. legal and social norms that support violence, economic and gender inequalities).

Visualizations

The visualizations display the four consequences or risk factors within each grouping or level that have the highest median effect size. The height of the triangle is proportionate to the size of the median effect size (higher = larger effect). A hover box for each triangle provides the user with further information, including the consequence or risk factor sub-categories, number of people sampled and number of studies. The presence of an 'other' triangle in the visualization indicates that there are more categories in that grouping/level, and hovering over this triangle provides the user with a list of the other categories, which can be accessed in the studies section. Consequence or risk factor categories, which have a median value based on just one study, are not shown as a separate triangle but are grouped in the 'other' triangle and can be accessed in the studies section.

2.3.3 Prevention and response strategies

Prevention

Prevention strategies aim to stop violence from occurring in the first place by reducing risk factors and enhancing protective factors associated with violence [15]. Universal prevention strategies target groups or the general population without regard to individual risk, while selective prevention strategies target individuals who are a member of a subgroup considered at heightened risk of violence [16]. Appendix 4 provides a list of prevention strategies.

Response

Response strategies aim to reduce the immediate and long-term consequences for victims of violence and offer treatment for perpetrators of violence to prevent its re-occurrence. A list of response strategies are provided in Appendix 5.

Intervention categorization

Interventions are categorized in the Violence Info repository according to the strategy under which they best fall. Strategy groupings and names are based on previous WHO work on violence prevention for each violence type [2, 17, 18]. An important distinction must be drawn between a strategy and a specific intervention. Although specific interventions may have been demonstrated to be effective, this in no way implies that all other interventions categorized under the same strategy are also effective [18]. Evaluation studies of the effectiveness of prevention and response interventions use a wide range of measures of change. For instance, while the primary aim of every intervention included in Violence Info is to prevent violence, proxy measures of improved outcomes related to violence may be used, for example, measuring changes in knowledge, attitudes and beliefs, with the assumption that a positive change in these variables will work to reduce risk of violence. A list of the types of outcome measures of effectiveness used across the studies in Violence Info are provided in Box 2.

Visualizations

The visualizations list all prevention or response strategies included in Violence Info as an interactive box. A hover box for each box provides the user with further information for that strategy, including the range of effect sizes across studies, the total sample size and the number of studies. Clicking a specific strategy will redirect to the studies section to display data from all studies included in the selected strategy.

Although violence types are generally not unitary concepts and can take different forms such as physical, sexual and psychological violence, outcome evaluations generally do not examine effectiveness in relation to these different types of violence. The visualizations on the Violence Info website therefore do not account for subtypes of violence within each violence type and it is possible that interventions considered effective may only be so for certain subtypes of violence [19]. In the few cases where outcome evaluations are available for targeted subtypes of violence, this is recorded (and thus identifiable) in the data repository.

Box 2: Outcome measures of effectiveness of prevention and response interventions

Prevention and response

- Changes in knowledge, attitudes and beliefs*
- Improvement in child wellbeing
- Improvement in parent-child interaction
- Improvement in parenting skills and behaviours
- Improvement in parental/caregiver wellbeing
- Reduction in child behavioural problems
- Reduction in family problems
- Reduction in the perpetration of violence
- Reduction in violence victimization
- Increased safety awareness
- Increased social support

Prevention

- Increased identification of violence
- Improvement in home environment conditions

Response

- Improvement in academic outcomes
- Improved independence
- Reduction in inappropriate behaviour
- Improvement in quality of life
- Increased use of resources
- Improvement in mental health
- Reduction in repeat perpetration of violence
- Reduction in repeat violence victimization

** This is a weak measure as changes in knowledge, attitudes and beliefs do not necessarily lead to changes in violent behaviour. In this respect, even successful programmes in this area cannot be assumed effective at preventing violence without further research demonstrating corresponding reductions in violent behaviour.*

2.4 Age categorizations

To facilitate filtering studies by age, where possible, study samples were assigned an age group. However, this was complicated by inconsistencies across studies in the way sample age was reported (e.g. ranges, means, school grades, etc.) and variations in age ranges across studies. Thus, when using the filters it is important to note that the age group assigned to each study was based on the age group that matched the majority (or all) of the study sample, and studies identified may therefore include some that fall outside the selected age filter. Further, different age categorizations (and labels) are used for each violence type (Appendix 6).

2.5 Studies

The studies section allows the user to explore individual studies and their findings in more depth. The user can select between the main aspects of violence (e.g. prevalence) from the

tabs along the top to generate visualizations of the data. Tools at the top allow the user to search for a particular study author, filter the data according to a number of variables, download the data repository for that aspect of violence, or get help interpreting the visualizations. The filters include:

- Sex;
- Age group (specific to each violence type, see section 2.4);
- Country income level;
- Country/area and WHO region;
- Publication year;
- Summary estimate type (i.e. median, mean, weighted mean);
- Prevalence period (for prevalence only); and,
- Violence subtype (for consequences, risk factors, prevention and response only).

To accelerate the generation of the visualizations and for ease of interpretation, only studies with large samples (≥1,000 for prevalence; ≥400 for risk factors/consequences; ≥200 for prevention and response) are shown as the default setting. The user can deselect this filter to include all sample sizes. Beneath the visualizations, a table of references of included studies is provided.

There are several layers to the data visualization, facilitating the user's exploration of the data in finer detail. The first layer displays visualizations for each type of violence separately, including visualizations for violence against children and violence against women. At this level, the user can identify and compare the number of studies for each type of violence for the selected aspect.

By choosing a specific type of violence the user can move to additional layers containing more detailed information:

- **Prevalence:**
  - The second layer shows separate visualizations for each subtype of violence, and the third layer shows a specific subtype of violence by sex. Summary estimates are provided on each of these two layers.
  - The visualizations display each study estimate as a diamond along a scale ranging from 0-100%. Where summary estimates are provided these are indicated by a line through the median value (default setting) on the line. A hover box for each diamond provides the user with further information for that study, including the violence subtype, prevalence figure, prevalence period, sample size, author, and study year and country/area.

- **Consequences and risk factors**:
  - The second layer shows separate visualizations for each consequence type (i.e. health problems; social and behavioural problems; impaired cognitive and academic performance; economic problems) or risk factor level (i.e. individual, relationship, community, societal). No summary estimates are provided here as these groupings are too broad to synthesize all included categories. The third layer subdivides each

of these higher-level groupings into separate visualizations for each consequence and risk factor sub-category. Summary estimates are provided at this layer.

- The visualizations display each study estimate along a scale ranging from 0 to an odds ratio of 10 times more likely[10]. Values >10 are grouped together and shown separately from this line to aid visualizations. For weighted means only, only values <41 are included in the summary estimate (values above this cut-off are classified as outliers, see section 3.6.3). Where summary estimates are provided these are indicated by a line through the median value (default setting) on the line. A hover box for each diamond provides the user with further information for that study, including the consequence or risk factor category, effect size, sample size, author, and study year and country/area. On the third layer of consequences and risk factors, the hover box will display (where relevant) the sub-category (e.g. depressive symptoms and disorders) rather than the category (e.g. mental and neurological disorders) which is displayed as the title above the visualization.

- **Prevention and response**
  - The second layer shows separate visualizations for each intervention strategy, and the third layer shows a specific strategy by WHO Region. Summary estimates are provided on each of these two layers.
  - The visualizations display each study estimate along a scale ranging from more effective (<1), to less effective/possibly harmful (>1). Where summary estimates are provided these are indicated by a line through the weighted mean value (default setting) on the line. A hover box for each diamond provides the user with further information for that study, including the strategy, effect size, sample size, author, and study year and country/area.

2.6 Countries

The countries section includes data for WHO Member States (n=194) and Associate Members (see Appendix 1) [11]. The landing page provides the user with an overview of the data available for each of the types of violence for each country/area. Specific countries/areas can be rapidly located by using the WHO region filter or the search box.

On each country page, several types of data are presented. An interactive visualization displays the types of violence for which data is available for the selected country. Selecting a particular violence type on the visualization will redirect the user to the studies section showing all studies in prevalence, consequences, risk factors, and prevention and response strategies for the selected country/area. The country page also presents a fact card containing information on national population, gross national income per capita, GINI coefficient, and alcohol consumption per capita. Three visualizations display country homicide rates per 100 000 population, by year, sex and age. These data come from the WHO Global Health Estimates [20]. Data are also provided on what countries reported about the existence of national actions plans, social and educational policies, specific laws, prevention programmes, and services for victims. This information is taken from the *WHO Global status report on violence prevention 2014* [3].

[10] An odds ratio of 1 = no association.

3. Systematic searches and data extraction methods

3.1 Summary

Development of the Violence Info website was conducted in two phases:

Phase 1: The first phase sought to systematically search and collate evidence from meta-analyses and systematic reviews (SRs) on each violence type and aspect. Single study (SSs) data extracted from SRs, rather than the original SSs, were used in this phase to populate the data repository. The exception to this strategy was homicide, which used data from the WHO Global Health Estimates (see Section 3.7).

Phase 2: The second phase focused on filling gaps in data available in Violence Info (identified following completion of Phase 1), through systematically searching and synthesizing evidence from SSs and/or large national surveys (for prevalence). For instance, identifying and including studies from geographical areas, violence types or aspects not covered in depth by the SRs. In the first instance, we aimed to have one type of interpersonal violence well covered – child maltreatment.

Phase 3: The third phase involved identifying and filling specific gaps across violence types and aspects. This phase comprised a rapid review methodology and experts in each violence field were contacted to suggest studies to fill significant gaps identified by WHO experts.

3.2 Systematic search strategy

Phase 1: Combined searches covering each violence type and aspect (see Appendix 7) were conducted in the following electronic databases:

- Medline[11]
- PsycINFO[11]
- CINAHL
- Criminal Justice Abstracts[11]
- ERIC[11]
- Cochrane Database of Systematic Reviews[11]
- SciELO
- ASSIA
- EMBASE
- JOLIS+[12]
- Global Health Library[121]

[11] Databases searched collectively using the Discover (EBSCO) database.
[12] See Appendix 8 for exceptions to search strategy for these databases.

Searches were conducted in all languages[13] and covered the period between 1 January 1990 and 30 September 2015. Searches were conducted by one researcher, with results exported into a combined Endnote file and duplicates removed.

Phase 2: A systematic search strategy for child maltreatment (Appendix 9) was developed and run in the following electronic databases:

- Medline[10]
- PsychINFO[10]
- CINAHL[10]
- Criminal Justice Abstracts[10]
- ERIC[10]

Searches were conducted in all languages[12] and covered the period between 1 September 2014 and 30 September 2015. Searches were conducted by one researcher, with results exported into a combined Endnote file and duplicates removed.

Systematic search strategies were also developed for the other violence types. Results from these searches will be added to Violence Info as they become available (funding dependent)

Phase 3: Experts in the field of each violence type were contacted to suggest studies to fill identified gaps in the data. This will continue to be an ongoing phase of Violence Info with experts and users being able to suggest appropriate studies.

3.3 Study selection process

Phase 1: Eligible studies were identified in two steps.

Step 1: Application of inclusion/exclusion criteria to titles and abstracts

- All references retrieved were subjected to an initial include/exclude process based on information contained in the titles and abstracts only. Two reviewers screened titles and abstracts to identify studies for potential inclusion (one reviewer made include/exclude decisions on all abstracts; the second cross-checked all those that had been excluded to confirm these decisions). Systematic reviews/meta-analyses[14] were excluded at this stage if they did not relate to one of the main violence types[15]. Papers that referred to violence victimization or perpetration generally (e.g. community violence) were checked to determine if they included any data relevant to the main violence types covered by Violence Info. During this initial title and abstract screen, reviewers coded each paper based on violence type(s). This process was broad, identifying papers that could potentially feed into Violence Info and excluding those

[13] Studies identified in languages other than English were retained in the search and inclusion process. However, due to time and resource constraints, these studies have not been included in the data repository.

[14] Reviews of reviews were also included and used to locate potential additional SRs, which had not been identified during the systematic search.

[15] SRs covering multiple types of violence were also included in phase 1, however due to variations in definitions of multiple types of violence (e.g. repeat incidents of the same type of violence vs multiple types of violence suffered during the same developmental period) this violence type has not been included on the Violence Info website. Data related to multiple violence types has been retained in the data repository however.

that were clearly not relevant. Full versions of relevant articles were then retrieved and independently assessed during Step 2.

Step 2: Application of inclusion/exclusion criteria to full text

- A second include/exclude process was carried out by two reviewers based on the full article. The inclusion criteria were:
    - The paper is a systematic review or meta-analysis;
    - The article contains single study data suitable for extraction;
    - The data fit at least one of the aspects of violence (e.g. consequences);
    - (For prevalence) the data are based on general population samples and not selected samples (e.g. homeless); and,
    - The review includes a measure of actual violence, with the exception of intervention studies where measures of risk factors as a proxy for violence (e.g. attitudes/knowledge) can be included if the reduction of violence is an explicit aim of the intervention.

Appendix 10 provides a flow chart of the data screening and extraction process for Phase 1, and the number of reviews, single studies and effect sizes for each violence type that are included in the data repository.

Phase 2: Phase 2 used the same screening criteria as Phase 1 for Steps 1 and 2, with the exception that the article did not necessarily have to be a systematic review or meta-analysis. Further, as Phase 2 focused on identifying single studies to strengthen prevalence estimates and fill gaps in data, a supplementary search strategy for identifying relevant SSs was included in this phase. Backward citation searching was performed on SRs identified in Phase 2 that reported prevalence summary figures to locate and extract single study prevalence figures and important study details (e.g. country/area, sample size). Appendix 11 provides a flow chart of the data screening and extraction process of child maltreatment studies, which were the focus for Phase 2.

Phase 3: Phase 3 used the same screening criteria as Phase 1, with the exception that the article did not necessarily have to be a systematic review or meta-analysis. Appendix 12 provides a flow chart of the data screening and extraction process for Phase 3.

3.4 Quality assessment

Two reviewers independently assessed the quality of the SRs/SSs using relevant quality assessment tools (see below). Disagreements were resolved by consensus and if no consensus could be reached, then a third reviewer made the final decision. Cohen's kappa for overall inter-reviewer agreement on study quality categorization was calculated, resulting in a Cohen's kappa of 0.77. According to guidelines [21], this represents 'substantial agreement' (range: 0.61-0.80) between reviewers and is the second highest category of agreement (highest: 'almost perfect agreement', range: 0.81-0.99).

Systematic reviews

All included SRs were quality assessed using A Measurement Tool to Assess Systematic Reviews (AMSTAR [22]). Each individual AMSTAR item receives a score of "1" when criteria are met (i.e. "yes" response) and the sum of all "yes" responses provides the total score out of a possible 11. AMSTAR does not provide guidance on how to categorize the total score for the overall assessment of the SRs quality. Therefore, thresholds were set at levels used in Mikton and Butchart [23] (a review of reviews on child maltreatment prevention), as follows:

- Low quality (0-4);
- Moderate quality (5-8); and,
- High quality (9-11).

It is important to note that the AMSTAR tool is an assessment of methodological quality and risk of bias of the SR. It does not assess the quality of the body of evidence (i.e. the SSs) included in the review. As the purpose of Phase 1 of Violence Info was to provide an overview of SS data extracted from SRs, it was not possible to access enough single study information to perform our own quality assessment at single study level. Thus, AMSTAR was used as a proxy indicator of the quality of the single studies included in each review, with the assumption that higher quality reviews would have performed their own assessment of bias and accounted for such. Where available, any quality assessment performed by the SR was also included in the data extraction form.

Prevalence single studies

All included prevalence SSs were quality assessed using the Risk of Bias Tool [24]. Each item is classified as high or low risk, for the purposes of Violence Info and in order to score studies similar to the method used with AMSTAR, low risk was given a value of 1 and high risk a value of 0. The sum of all items provides a total score out of 10. This tool does not provide guidance on how to categorize the total score for the overall assessment, thus we split the categories so that they reflected as far as possible the AMSTAR method:

- Low quality (0-3);
- Moderate quality (4-7); and,
- High quality (8-10).

Consequence and risk factor single studies

All included SSs on consequences and risk factors were quality assessed using the Cambridge Quality Checklist [25]. The tool consists of three checklists: checklist for correlates (scored out of 5); checklist for risk factors (scored out of 3); and checklist for causal risk factors (scored out of 7). No guidance is provided on how to compute a global score or categorization of the total score, thus scores on each subscale were summed to compute a total score and were categorized to reflect as far as possible the AMSTAR method:

- Low quality (2-6);
- Moderate quality (7-10); and,
- High quality (11-15).

Prevention and response single studies

All included prevention and response SSs were quality assessed using the Effective Public Health Practice Project [26]. Each section (which may consist of more than one item) is classified as strong, moderate or weak. A global rating is categorized as follows: strong – no weak ratings for any section; moderate – one weak rating; weak – two or more weak ratings. These global categorizations were used as the basis for categorization as follows:

- Low quality (weak rating);
- Moderate quality (moderate rating); and,
- High quality (strong rating).

3.5 Data extraction

To capture the information extracted from the studies, data extraction forms were developed on Microsoft Excel spreadsheets. The data extraction forms were developed, tested and refined after a number of consultations between topic area specialists, WHO representatives and the data extraction team concerning the data to be extracted and the categorization of violence sub-types and outcomes. To increase the accuracy of extraction, drop down lists were created for most items to enable standardized data input. All data extractors received training in the use of the extraction forms and detailed coding instructions were provided to each data extractor to aid accurate coding. Data were extracted by one researcher onto the standardized extraction sheet, and checked by a second researcher. Discrepancies were resolved by consensus and/or the guidance of a senior researcher. Checks were also made by a senior researcher to ensure coding schemes were consistent between different extractors. All data were then cleaned and combined into the finalized version by a third researcher.

3.5.1 Extracting data from multiple SRs containing the same SS

SSs were frequently reported in more than one SR. In the first instance data were extracted from all SRs containing the SS. Depending on the data reported and extracted from the SR, the SS duplicate rows were addressed using one of the following methods:

1. When SRs report an identical SS statistic (OR/d/%), the statistic is retained, all other extracted information from the SRs are combined, leaving the SS represented as one single row. Both SS ID codes are recorded.
2. When SRs report different SS statistic types (e.g. SR1 reports d value and SR2 reports OR), the preferred statistic for that aspect (e.g. OR for risk factors) of violence is retained, all other extracted information from the SRs are combined, leaving the SS represented as one single row. Both SS ID codes are recorded.
3. When SRs report the same SS statistic types (e.g. OR), but different values (e.g. OR=1.43 v. OR=2.12), and the reason for this difference is impossible to discern from the information given in the SRs (i.e. both SRs report same violence type/outcome), the lowest value is retained, to produce a conservative estimate. All other extracted information from the SRs are combined, leaving the SS represented as one single row. Both SS ID codes are recorded.
4. When SRs report the same SS statistic type, but different values, and the outcome (i.e. consequence) or violence type may be related but is different (e.g. sub-scale of a full-scale) both SS rows are retained in the database. All other extracted information from

the SRs are combined (where appropriate) and added to both rows. Both SS ID codes are recorded on both rows.

When a SS in Phase 2 had previously been extracted from an SR in Phase 1, data from the original Phase 2 SS were used/retained in preference to that extracted from the Phase 1 SR.

3.6 Collation of data in Violence Info

The default summary estimate for all aspects of violence is the median value. When computing summary statistics, conventional meta-analyses often weigh individual study point estimates based on some function of their sampling variances, to provide more weight to studies with more precise estimates. However, most of the studies being summarized on Violence Info are not comparable, sampling different population groups and using varying definitions of exposures and outcomes. There is, therefore, no a priori reason to expect that the studies with larger sample sizes are more accurately measuring the underlying parameter of interest. For this reason, a median value is displayed to summarize the central tendency of the studies' point estimates. However, the filter option in the studies section does allow the user to generate mean and weighted mean estimates for each aspect. Weighted mean values are calculated using study sample sizes[16] as the weight. While sample sizes are not considered the optimal weight for summary estimates, they do closely approximate the inverse variance and so are a suitable substitute [27].

In the case of odds ratios, all SS effect sizes were transformed to their log values prior to the calculation of the mean and weighted mean filter options in the studies section. The log transformation is needed to maintain symmetry in the analysis [28]. Ratio summary statistics (hazard ratios, odds ratios, risk ratios) all have the common feature that the lowest value they can take is 0, the value of 1 corresponds to no difference between groups, and the highest value that an odds ratio can ever take is infinity [29]. Thus this number scale is not symmetric. Once the summary log odds ratio has been calculated, this is converted back to the original metric, the odds ratio, for interpretability purposes.

3.6.1 Effect size transformation

As discussed previously, Violence Info presents summary effect sizes extracted from single studies. Studies reported a range of different types of effect estimates; typically, as an absolute measure (e.g. mean difference, standardized mean difference, risk difference), a ratio measure (e.g. odds ratio, risk ratio, hazard ratio), or correlation coefficient (e.g. *r* values). As only primary studies with a common outcome and effect size type (i.e. OR or *d*) can be pooled to calculate a summary effect, some study effect sizes had to be transformed from the original reported statistic to the selected statistic used for the synthesis of the relevant aspect in Violence Info (e.g. OR for risk factors).

[16] In some cases, data were not available for the precise sample size for subgroups. In this case as a proxy, the total sample size was divided by the number of subgroups (e.g. total divided by two for gender) to avoid overestimation of the effect size. Where no sample size data were available in the SR, attempts were made to trace the single study and extract this information so it did not have to be excluded from the synthesis.

When transformations are made between different measures, certain assumptions must be made about the nature of the underlying traits or effects. Even if these assumptions do not hold exactly, the decision to use these transformations is considered preferable than the alternative (to simply omit any studies using an alternative metric [28], which may lead to an incomplete and biased summary of the evidence [30]).

An online calculator [31] was used to transform original extracted data from the studies to the relevant effect size chosen for each aspect (e.g. OR for consequences) of Violence Info. Where studies did not provide the data in the format required for transformations, such as group means and standard deviations rather than *d* values, such *d* values were first calculated and then transformed to ORs. Due to their similar properties, Cohen's *d*, Glass's *Δ* and Hedge's *g* were included in the summary statistic (for prevention and response) together with no transformations made, and were converted to ORs (for consequences and risk factors) using the online calculator for Cohen's *d* transformations. Similarly, hazard ratios, risk ratios and odds ratios (adjusted and unadjusted) have similar properties, and have also been included in the summary statistic (for consequences and risk factors) together with no transformations made, and were converted to *d* (for prevention and response) using the online calculator for OR transformations. In all cases, exact calculations of ORs and *d* from group percentages[17] and means were preferred over including hazard ratios, risk ratios, Glass's *Δ* and Hedge's *g*, although this information was often not provided in SRs.

To maintain transparency and ensure the data are available in the original statistic for the user, the data repository contains the results of all studies in their original metrics and the transformed effect size, which is included in the summary estimate displayed on the website.

3.6.2 Direction of effect sizes

To generate meaningful summary estimates, a convention for the direction of the effect size must be decided on and applied consistently. To facilitate interpretability on the website, odds ratios for consequences and risk factors were set in the direction of >1 (i.e. more likely), and where necessary, odds where inverted to ensure the convention was followed [28]. For prevention and response effect sizes, all effect sizes were given algebraic signs such that positive values indicated better results for the treatment group over the control group, or better results at post-treatment than pre-treatment. Thus, negatively poled scales (the higher the worse) were multiplied by the factor (-1) to maintain this convention [28].

3.6.3 Outliers

Outliers have extreme values (either small or large) that can largely influence statistical analysis. Outliers often occur due to incorrectly measured data. As discussed above, some of the effect sizes extracted from single studies were converted to the chosen metric for each violence aspect, and in some cases, where assumptions were violated, this may have led to an overestimate of the converted effect. This was particularly problematic for consequences and risk factors, which were measured in odds ratios and on a scale to infinity. Thus outliers in consequences and risk factors were excluded from the synthesis. They have been retained

[17] Computation of the odds ratio cannot be done if there is 0 cases in one of the four cells. A standard method of dealing with this was used - adding 0.5 to every cell [29].

in the data repository and can also be viewed in the studies section on the separate visualization for odds ratios >10. The cut-off point for exclusion from the synthesis was ≥41.

3.7 Methodology for homicide estimates

WHO Global Health Estimates (GHE) provide global, regional and national homicide rates. These are based on analysis of latest available national information on levels of mortality and cause distributions as at the end of October 2016 together with latest available information from WHO programmes for causes of public health importance. Data, methods and cause categories are described in a Technical Paper [32] available on the WHO website. Population estimates are from the 2015 revision of the UN World Population Prospects [33].

In addition to the visualizations for homicide on the homicide and countries sections of the website, a downloadable spreadsheet includes point estimates for homicides by country, WHO region, and by age and sex, for the years 2000, 2005, 2010 and 2015. The regional classification refers to WHO regional groupings as of 2015, which corresponds to the most recent reference year for this GHE revision. Documentation, country-level and other regional-level summary tables are available on the WHO website [20]. Depending on the available data sources, the cause-specific estimates will have quite substantial uncertainty ranges. Explicit uncertainty ranges are not included in this spreadsheet, but will be available in early 2017 from the above-mentioned website, as part of the comprehensive GHE 2015 estimates dataset that includes cause-of-death estimates by age, sex, and year. Due to changes in data and some methods, these estimates are not comparable to previously released WHO estimates.

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Appendix 1: Member States, and areas by WHO region and World Bank income groups

African Region			
Low income	**Lower middle income**	**Upper middle income**	**High income**
Benin	Cabo Verde	Algeria	Seychelles
Burkina Faso	Cameroon	Angola	
Burundi	Congo	Botswana	
Central African Republic	Côte d'Ivoire	Equatorial Guinea	
Chad	Ghana	Gabon	
Comoros	Kenya	Mauritius	
Democratic	Lesotho	Namibia	
Republic of the Congo	Mauritania	South Africa	
Eritrea	Nigeria		
Ethiopia	Sao Tome and Principe		
Gambia	Swaziland		
Guinea	Zambia		
Guinea-Bissau			
Liberia			
Madagascar			
Malawi			
Mali			
Mozambique			
Niger			
Rwanda			
Senegal			
Sierra Leone			
South Sudan			
Togo			
Uganda			
United Republic of Tanzania			
Zimbabwe			

Region of the Americas			
Low income	**Lower middle income**	**Upper middle income**	**High income**
Haiti	Bolivia (Plurinational State of)	Argentina	Antigua and Barbuda
	El Salvador	Belize	Bahamas
	Guatemala	Brazil	Barbados
	Honduras	Colombia	Canada
	Nicaragua	Costa Rica	Chile
		Cuba	Puerto Rico (*Associate
		Dominica	WHO Member State)
		Dominican Republic	Saint Kitts and Nevis
		Ecuador	Trinidad and Tobago
		Grenada	United States of America
		Guyana	Uruguay
		Jamaica	
		Mexico	
		Panama	
		Paraguay	
		Peru	
		Saint Lucia	
		Saint Vincent and the Grenadines	
		Suriname	
		Venezuela (Bolivarian Republic of)	

Eastern Mediterranean Region			
Low income	**Lower middle income**	**Upper middle income**	**High income**
Afghanistan Somalia	Djibouti Egypt Morocco Pakistan Sudan Syrian Arab Republic Tunisia West Bank and Gaza Strip (*Non-member area) Yemen	Iran (Islamic Republic of) Iraq Jordan Lebanon Libya	Bahrain Kuwait Oman Qatar Saudi Arabia United Arab Emirates

European Region			
Low income	**Lower middle income**	**Upper middle income**	**High income**
	Armenia Kyrgyzstan Republic of Moldova Tajikistan Ukraine Uzbekistan	Albania Azerbaijan Belarus Bosnia and Herzegovina Bulgaria Georgia Kazakhstan Montenegro Romania Russian Federation Serbia The former Yugoslav Republic of Macedonia Turkey Turkmenistan	Andorra Austria Belgium Croatia Cyprus Czech Republic Denmark Estonia Finland France Germany Greece Hungary Iceland Ireland Israel Italy Latvia Lithuania Luxembourg Malta Monaco Netherlands Norway Poland Portugal San Marino Slovakia Slovenia Spain Sweden Switzerland United Kingdom of Great Britain and Northern Ireland

South-East Asia Region			
Low income	**Lower middle income**	**Upper middle income**	**High income**
Democratic People's Republic of Korea Nepal	Bangladesh Bhutan India Indonesia Myanmar Sri Lanka Timor-Leste	Maldives Thailand	

Western Pacific Region			
Low income	**Lower middle income**	**Upper middle income**	**High income**
	Cambodia Kiribati Lao People's Democratic Republic Micronesia (Federated States of) Mongolia Papua New Guinea Philippines Samoa Solomon Islands Tonga Vanuatu Viet Nam	China Fiji Malaysia Marshall Islands Nauru Palau Tuvalu	Australia Brunei Darussalam Japan New Zealand Republic of Korea Singapore

Appendix 2: Consequences categories and sub-categories

Category*	Sub-category*
Economic problems	Gambling Unemployment Unstable housing Welfare recipient
Health problems	Allergies Communicable disease Comorbidity Disability Excessive health service use Health risk behaviours Injury Low resilience Mental and neurological disorders Non-communicable disease Overweight and obesity Poor general health Poor health-related quality of life Sexual and reproductive health problems Underweight
Impaired cognitive and academic performance	Cognitive impairment Poor academic performance Poor language functioning Trouble in school
Social and behavioural problems	Adolescent pregnancy Attachment problems Divorce and relationship problems Externalizing behaviour problems Internalizing behaviour problems Internet addiction Low life satisfaction Low self-esteem Placement in nursing home Poor daily functioning Poor emotional functioning Poor self-control Poor social skills Pregnancy termination Prostitution Social isolation Subsequent maladaptive parenting practices Subsequent perpetration of crime or delinquency Subsequent perpetration of violence Subsequent violent victimization Unplanned pregnancy

*This is not an exhaustive list of consequences of violence; it only reflects the consequences for which there are data in the repository.

Appendix 3: Risk factors – ecological levels and categories

Violence type	Level	Sub level	Category*
Child maltreatment	Individual	Child	Child employment Chronic illness Disability Externalizing behaviour problems Female Higher birth order Impaired cognitive and academic performance Intellectual disability Internalizing behaviour problems LGBT (Lesbian, gay, bisexual and transgender) Living away from home Low education Low socioeconomic status No sex education Orphan Pre or neonatal problems Previous violence victimization Residential mobility Social problems Substance abuse Younger age
		Parent/caregiver	Adolescent pregnancy Criminal behaviour History of child maltreatment Low education Low self-esteem Male Mental and neurological disorder Other childhood adversities Poor health Poor impulse control Prior pregnancy termination Single parent Social isolation Step-parent Stress Substance abuse Unemployment Unplanned/unwanted pregnancy Use/approval of corporal punishment Younger parent
	Relationship		Large family size Parental death/separation Poor family relationships Poor parent-child relationship Poor parenting skills Stigmatization Violence in the family
	Community		High rates of violence Low social capital Rural residence

Youth violence	Individual	Victim	Delinquency Ethnic minority Externalizing behaviour problems Frequent use of the internet History of violence perpetration Intellectual disability Internalizing behaviour problems LGBT (Lesbian, gay, bisexual, and transgender) Low self-esteem Low socioeconomic status Male Mental and neurological disorder Overweight or obese Previous violence victimization Younger age
		Perpetrator	Delinquency Early sexual initiation Employment Ethnic minority Externalizing behaviour problems Frequent use of the internet Lack of empathy Low education Low socioeconomic status Male Mental and neurological disorder Moral disengagement Perinatal problems Previous perpetration of violence Previous violence victimization Problems in school Residential mobility Runaway from home Sexually active Substance abuse Younger age
	Relationship		Delinquent peers Large family size Low parental education Low parental supervision Parental substance abuse Poor family relationships Poor parental supervision Poor parent-child relationship Single parent Violence in the family Younger parent
	Community		Adverse school environment Availability of weapons High level of anti-social disorder High rates of crime High rates of violence Urban residence
	Societal		High level of inequality

Intimate partner violence	Individual	Victim	Gambling History of violence perpetration HIV positive Low education Low socioeconomic status Mental and neurological disorder Multiple sexual partners No maternity leave Non-traditional gender role norms Older age Physical health problems Previous violence victimization Social isolation Substance abuse Unemployment Unmarried Unwanted/unplanned pregnancy Witnessing IPV in childhood
		Perpetrator	Anger/hostility Attitudes supportive of sexual violence Engagement in transactional sex Gambling History of violence perpetration Lack of empathy Low education Low socioeconomic status Married/cohabiting Mental and neurological disorder Multiple sexual partners Older age Other childhood adversities Previous violence victimization Substance abuse Unwanted/unplanned pregnancy Younger age
	Relationship		Adherence to traditional gender role norms Both partners first marriage Dominance and control by one partner Educational disparity Less children Marital dissatisfaction Polygamy Pregnancy Substance abuse by both partners
	Community		Alcohol outlet density Concentrated poverty High level of anti-social disorder High rates of crime High rates of unemployment High rates of violence Immigrant concentration Low level of education Low social capital Residential stability

			Smaller population Urban residence
	Societal		Gender inequality Lack of trust in legal system Social norms supportive of violence Traditional gender role norms
Elder abuse	Individual	Victim	Behavioural problems Cognitive impairment Ethnic minority Female History of violence perpetration Life dissatisfaction Low education Low socioeconomic status Mental and neurological disorder Physical impairment Previous violence victimization Single/widowed Social isolation Substance abuse Younger age
		Perpetrator	Caregiving burden History of violence perpetration Low education Low self-esteem Male Mental and neurological disorder Substance abuse
	Relationship		Living with others Poor family relationships
Sexual violence	Individual	Victim	Homelessness Social isolation Substance abuse Witnessing IPV in childhood
		Perpetrator	Attitudes supportive of sexual violence Engagement in transactional sex History of violence perpetration Hostility towards women Hyper-masculinity Lack of empathy Low education Low life satisfaction Low socioeconomic status Married/cohabiting Mental and neurological disorder Multiple sexual partners Older age Other childhood adversities Previous violence victimization Substance abuse Traditional gender role norms
	Relationship		Adherence to traditional gender norms Dominance and control by one partner Marital conflict

	Community		Concentrated poverty Urban residence
	Societal		Social norms supportive of violence

*This is not an exhaustive list of risk factors of violence; it only reflects the risk factors for which there are data in the repository.

Appendix 4: Prevention intervention strategies

- After-school activities
- Awareness raising/media campaign
- Caregiver support programs
- Challenging social norms
- Clinical enquiry and referral
- Communication/relationship skills training
- Community mobilisation
- Dating violence school programmes
- Home visiting
- Institutional prevention programmes
- Microfinance/gender equality training
- Multicomponent programmes
- Parenting programmes
- Peer mediation programmes
- Poverty de-concentration
- Psychological/mental health interventions
- Rape-awareness and knowledge school programmes
- Reducing alcohol use and access
- School sexual abuse awareness programmes
- School-based bullying prevention
- School-based life/social skills programmes
- Social support groups*

*This is not an exhaustive list of strategies to prevent violence; it only reflects the strategies for which there are data in the repository.

Appendix 5: Response intervention strategies

- Advocacy/empowerment interventions
- Couples therapy
- Developmental support for child victims
- Family and child therapy
- Family preservation home support programmes
- Home visiting
- Intimate partner violence perpetrator programmes
- Intimate partner violence shelters
- Multicomponent programmes
- Offending parents support group
- Parenting programmes
- Psychological therapy for adult survivors
- Psychological therapy for child victims
- Psychological therapy for survivors
- Sexual offender treatment programmes
- Therapeutic approaches for youth violence perpetrators*

*This is not an exhaustive list of strategies to respond to violence; it only reflects the strategies for which there are data in the repository.

Appendix 6: Age categorization

Table A1: Age filter label and age range, by the main violence types

Violence type	Label	Age range
Child maltreatment	Early childhood	0 – 3 years
	Middle childhood	4 – 10 years
	Adolescence	11 – 18 years
Youth violence*	School child	5 – 9 years
	Adolescent	10 – 19 years
	Young adult	20 – 29 years
Intimate partner violence	Adolescent	10 – 19 years
	Young adult	20 – 29 years
	Adult	30 – 59 years
	Old adult	60 – 79 years
	Very old adult	80+ years
Elder abuse	Old adult	60 – 79 years
	Very old adult	80+ years
Sexual violence	Adolescent	10 – 19 years
	Young adult	20 – 29 years
	Adult	30 – 59 years
	Old adult	60 - 79 years
	Very old adult	80+ years

* While youth violence is defined as between individuals aged 10-29 years, we have also included an age filter outside this age range, as youth violence prevention programmes often target younger school children.

Table A2: Age filter label and age range, by the overarching violence types

Violence type	Label	Age range
Violence against women	Adolescent	18 – 19 years
	Young adult	20 – 29 years
	Adult	30 – 59 years
	Old adult	60 – 79 years
	Very old adult	80+ years
Violence against children	All	0 – 17 years
	Early childhood	0 – 3 years
	Middle childhood	4 – 10 years
	Adolescence	11 – 18 years

Appendix 7: Phase 1: systematic review search strategy

#	Search term (s)	Results
1	Violen*	170 885
2	Aggress* (NOT cancer OR disease)	188 129
3	((Deviant OR Antisocial OR "Anti social") AND behavio#r) OR delinquen* OR "conduct problems" OR externali#ing	83 037
4	(Crime N5 victim*) OR offend* OR conviction OR recidivism	102 229
5	Homicide OR Murder OR femicide OR infanticide OR filicide	33 858
6	Mistreat* OR Neglect OR Maltreat*	60 685
7	(physical OR sexual OR mental OR emotional OR domestic OR elder OR child OR psychological OR partner OR spouse) N4 abuse	126 563
8	Sexual AND (assault OR harassment OR exploitation OR traffic* OR slavery)	24 002
9	Rape OR (unwanted sex*) OR "unwanted touching" OR "unwanted fondling"	20 534
10	"human traffic*" OR "harmful traditional practice*" OR "female genital mutilation" OR FGM OR "female genital cutting" OR slavery OR "forced prostitution" OR "forced marriage"	6 681
11	bully* OR bullie* OR fight* OR fought OR assault OR batter*	186 189
12	"harsh parent*" OR "corporal punishment" OR "physical discipline" OR paddling OR spank*	4 556
13	OR/1-12	805 844
14	"systematic review" OR "systematic literature review" OR meta-analys*	203 458
15	13 AND 14	6 264

Appendix 8: Exceptions to the search strategy

Jolis+

- No search history function; therefore lines of search all ran as one
- Filtered by year, scholarly and peer-review journal
- Added results beyond the Library Network Collection
- Recorded 1 857 results, but displayed/retrieved 200; unable to export; checked first 50 against current Endnote file; all were already present

Global Health Library

- Only single line search; therefore ran as "systematic review OR meta-analysis" AND (violence OR abuse OR neglect OR maltreatment)
- Initially retrieved 1 149; but 1 081 of these were pulled from Medline (i.e. already retrieved)
- Separated out results from
  - LILACS (AMRO/PAHO) = 63
  - WHOLIS (KMS) = 3
  - IMEMR (EMRO) = 1
  - WPRIM (WPRO) = 1

Appendix 9: Phase 2: child maltreatment search strategy

	Search ran September 2014 – September 2015 (06/03/2017)	
#	**Search term (s)**	**Results**
S1	MH ("Child Abuse, Sexual" or "Child Abuse")	2 716
S2	DE ("Child Abuse" or "Child Neglect" or "Child Abuse Reporting")	2 803
S3	S1 or S2	4 248
S4	MH ("Child" or "Minor" or "Infant")	86 709
S5	DE ("Infants")	493
S6	S4 or S5	87 004
S7	MH ("Violence" or "Physical Abuse")	3 568
S8	DE ("Violence" or "Family Violence" or "Violent Crime")	3 862
S9	MH ("Sex Offenses" or "Rape")	980
S10	DE ("Sex Offenses" or "Rape" or "Sexual Abuse")	2 357
S11	MH ("Crime Victims")	927
S12	DE ("Victims of Crime" or "Victims" or "Crime Victims" or "Victimization")	2 558
S13	S7 or S8 or S9 or S10 or S11 or S12	10 393
S14	S6 AND S13	1 128
S15	TI (child* N5 (violen* or victim* or assault* or maltreat* or offence* or offense* or abus*)) or AB (child* N5 (violen* or victim* or assault* or maltreat* or offence* or offense* or abus*))	5 408
S16	S3 or S14 or S15	7 444
S17	MH ("Prevalence" or "frequency" or "rate")	21 370
S18	TI (prevalence or frequency or rate or consequence* or outcome* or impact* or effect* or "risk factor" or causal* or predictor) or AB (prevalence or frequency or rate or consequence* or outcome* or impact* or effect* or "risk factor" or causal* or predictor)	795 971
S19	S17 or S18	799 416
S20	MH ("Primary Prevention" or "Counseling")	3 612
S21	DE ("Prevention" or "Counseling" or "Parent Counseling" or "Family Counseling")	6 805
S22	TI (prevent* or intervention or interventions or intervene* program* or legislat* or respon*) or AB (prevent* or intervention or interventions or intervene* or program* or legislat* or respon*)	455 330
S23	S20 or S21 or S22	457 922
S24	S16 and S19	4 195
S25	S16 and S23	3 148
S26	S24 or S25	5 299
	With limits (Journals and Reports only)	4 917

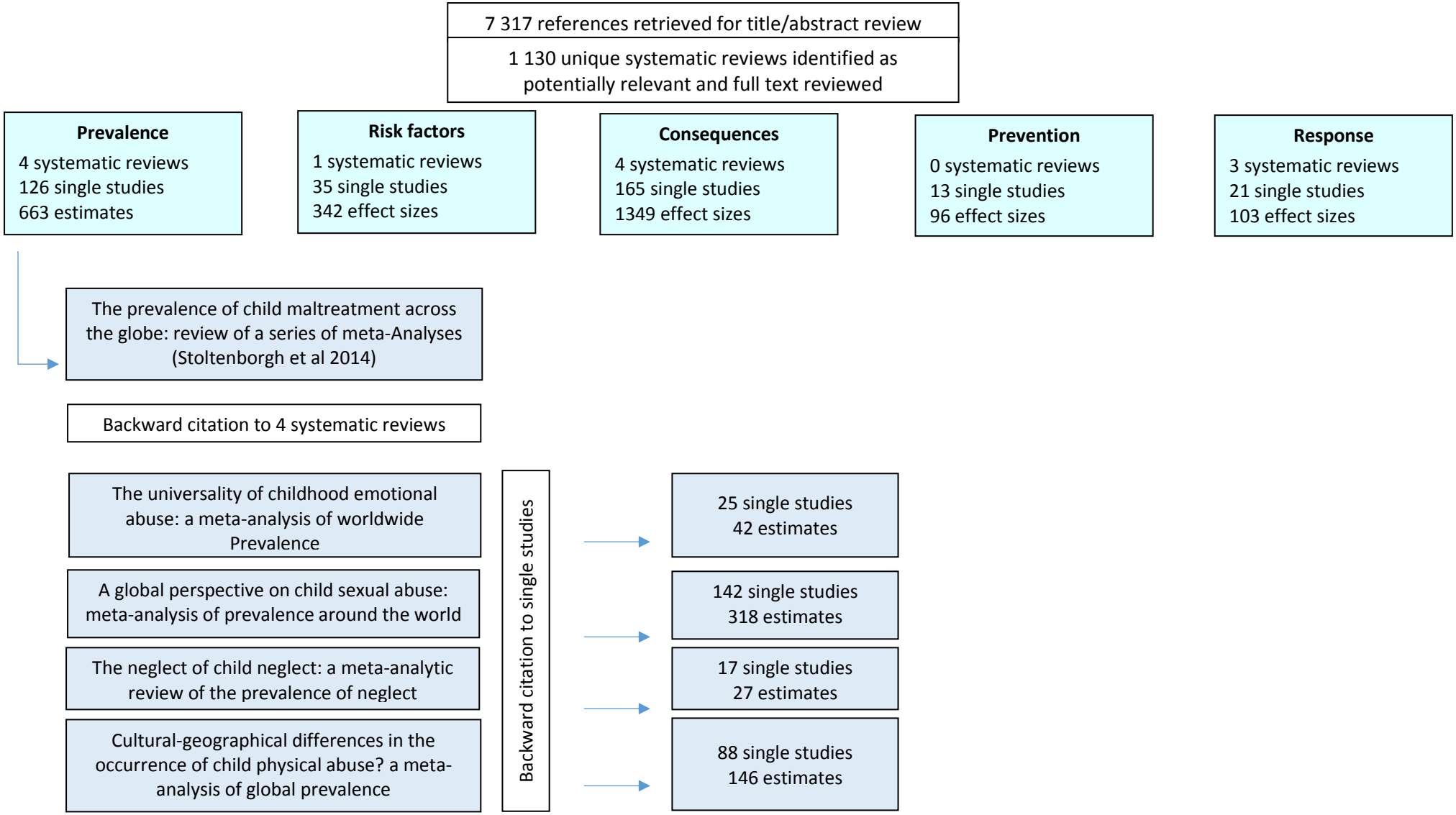
Appendix 10: Flow chart of paper screening and data extraction process for phase 1

7 317 references retrieved for title/abstract review

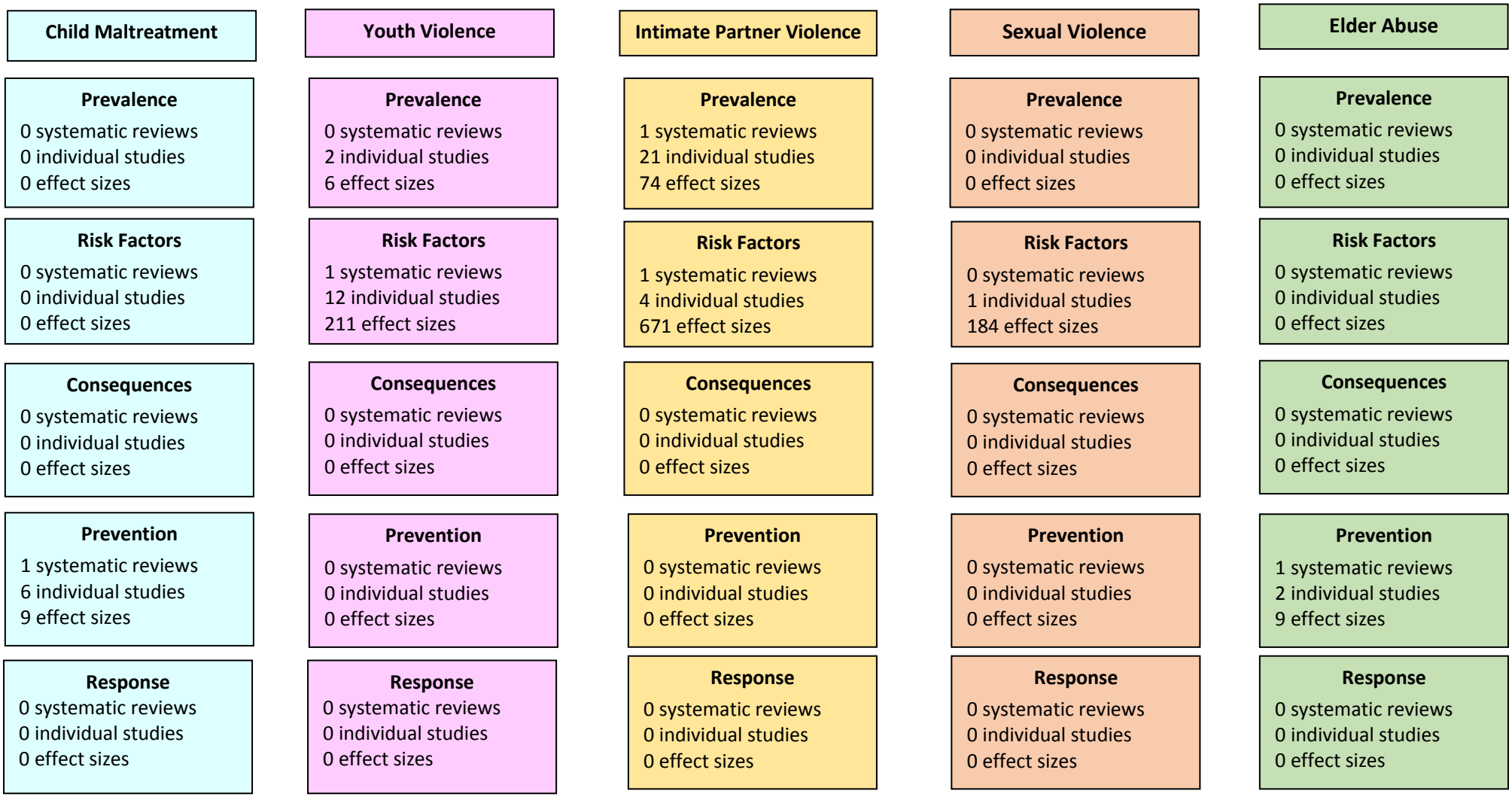
1 130 unique systematic reviews identified as potentially relevant and full text reviewed

Child maltreatment	Youth violence	Intimate partner violence	Sexual violence	Elder abuse
341 systematic reviews considered for inclusion	341 systematic reviews considered for inclusion	219 systematic reviews considered for inclusion	138 systematic reviews considered for inclusion	19 systematic reviews considered for inclusion
73 reviews included	40 reviews included	53 reviews included	19 reviews included	6 reviews included
Prevalence 9 systematic reviews 173 single studies 342 estimates	**Prevalence** 5 systematic reviews 134 single studies 266 estimates	**Prevalence** 9 systematic reviews 335 single studies 991 estimates	**Prevalence** 9 systematic reviews 129 single studies 200 estimates	**Prevalence** 4 systematic reviews 51 single studies 171 estimates
Consequences 35 systematic reviews 757 single studies 1524 effect sizes	**Consequences** 23 systematic reviews 254 single studies 399 effect sizes	**Consequences** 18 systematic reviews 214 single studies 338 effect sizes	**Consequences** 8 systematic reviews 21 single studies 23 effect sizes	**Consequences** 2 systematic reviews 14 single studies 66 effect sizes
Risk factors 7 systematic reviews 213 single studies 845 effect sizes	**Risk factors** 23 systematic reviews 348 single studies 663 effect sizes	**Risk factors** 20 systematic reviews 225 single studies 642 effect sizes	**Risk factors** 14 systematic reviews 169 single studies 678 effect sizes	**Risk factors** 3 systematic reviews 47 single studies 214 effect sizes
Prevention 9 systematic reviews 101 single studies 169 effect sizes	**Prevention** 13 systematic reviews 108 single studies 190 effect sizes	**Prevention** 7 systematic reviews 45 single studies 93 effect sizes	**Prevention** 3 systematic reviews 56 single studies 169 effect sizes	**Prevention** 0 systematic reviews 0 single studies 0 effect sizes
Response 15 systematic reviews 178 single studies 326 effect sizes	**Response** 4 systematic reviews 11 single studies 12 effect sizes	**Response** 8 systematic reviews 69 single studies 157 effect sizes	**Response** 5 systematic reviews 62 single studies 84 effect sizes	**Response** 0 systematic reviews 0 single studies 0 effect sizes

Appendix 11: Flow chart of paper screening and data extraction process for phase 2: child maltreatment



Appendix 12: Flow chart of paper screening and data extraction process for phase 3



World Health Organization