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Child Maltreatment Prevention – Finding Common Ground with Unintentional Injury Prevention

Rohit Shenoi
Baylor College of Medicine, rshenoi@bcm.edu

Christopher Greeley
University of Texas Health Science Center at Houston, christopher.s.greeley@demo.bepress.com

Angelo P. Giardino
Texas Children's Health Plan, apgiardi@texaschildrens.org

Introduction

Injuries are a common cause of mortality and morbidity in infants, children and young adults. Young children are particularly vulnerable to injury and require continued supervision and protection by their caretakers. Occasionally the injuries to children occur by the actions of their caretakers. In preverbal children, it may be difficult to ascertain if an injury is result of volitional actions of a caretaker or they are the results of true accidents that occur without outside human activity. Appreciating the source of the injury is a critical step in its prevention. Broadly, injuries can be separated by being at the hands of a responsible adult; volitional (or "intentional"), or the result of accidental circumstances ("unintentional").

The circumstances surrounding intentional and unintentional injuries often have commonalities, but prevention efforts for each injury type have conventionally failed to appreciate this overlap. Despite similarities in interventions, community-based programs and surveillance data, prevention efforts are often "siloed." This separation is often reinforced by funding streams, the perspectives of different disciplines, turf wars (criminal justice, mental health, public health), and the pitting of environmental (unintentional) against behavioral (intentional) orientations. While intentionality associated with an injury is often unclear (as in injuries from drunk driving or "shaken baby syndrome"), we argue that prevention efforts for each type of injury have more in common than previously believed. We believe that the public health model, which has been utilized very effectively in reducing unintentional childhood injuries, could provide equally efficacious results when applied to child maltreatment related injuries.

A public health approach[1] to injury prevention involves the surveillance of a specific injury, identification of its risk factors and protective factors, evaluation of interventions that reduce the injury burden, and dissemination and widespread adoption of best practices that are effective in decreasing the burden of injury. This approach based on population health principles should be hinged on the human ecological model in the prevention of *all* types of injuries in children – unintentional and intentional. In the human ecological model, there is a progressive, mutual accommodation between an active, growing human being and the changing properties of the immediate settings in which the developing person lives, as this process is affected by relations between these settings and by the larger contexts in which the settings are embedded. [2] During the past two decades, it has become more apparent to the public health community that intentional injury is at its core a public health problem amenable to interdisciplinary public health surveillance, analysis,

and intervention similar to that which is used to reduce unintentional injuries.[3,4,5]

Background

Over the past 50 years, unintentional injuries have contributed to considerable morbidity and mortality. In last few decades, great progress has been made in the identification of risk factors for unintentional injuries, and many effective and cost-effective interventions have been found. The most common causes of unintentional death of children in the United States (US) in 2009 were suffocation, in children less than 1year old; unintentional drowning; ages1 to 4 years; and motor vehicle crashes, birth to age 18.[6] Using a population health (public health) approach to these injuries, have resulted in reductions in motor vehicle crashes, submersion injuries and fire-related deaths with a related decrease in other causes of unintentional injuries. The cost-effectiveness of some of these interventions are often quite striking.[7] For example, for every dollar spent on smoke alarms, societal cost savings total $65; for child restraints and bicycle helmets, the savings are $29 for every dollar spent, and for poison control services, $7.

Child maltreatment (child abuse and neglect) affects 1 in 58 US children today.[8] The most common form of child maltreatment is neglect, accounting for approximately two-thirds of all maltreatment. Broadly, a child is neglected when one of his or her basic needs (clothing, food, hygiene, safety shelter, or supervision) are lacking because of a caretaker's negligence. Child physical abuse accounts for 15% of all child maltreatment, with child sexual abuse accounting for just under 10% of maltreatment. Maltreatment results in both immediate and long-term morbidity for the victim. The Adverse Childhood Experience studies (ACEs) demonstrate that child maltreatment is also a risk factor for poor health in the child victims' later adult lives and is associated with many of the leading causes of death among adults such as heart disease, cancer, chronic lung disease, liver disease, alcoholism, drug abuse, and depression; and other forms of violence, such as intimate partner and family violence.[9] The societal costs associated with all child maltreatment are staggering (Appendix 1), with an estimated annual national cost of $80 billion for the United States. Essentially, for every dollar invested in child maltreatment prevention programs, society can expect to reap at least $3.46 in later cost savings.[10] Individual strategies may have a benefit-to-cost ratio as high as $20.[11]

The human ecological models for human development posited by both Bronfenbrenner and Belsky provide a useful framework for understanding the interactions among the child, family, community and

society and the physical environment over time, with an eye towards promoting health and preventing injury.[12,13] In the human ecological model, there is a progressive, mutual accommodation between an active, growing human being and the changing properties of the immediate settings in which the developing person lives, as this process is affected by relations between these settings and by the larger contexts in which the settings are embedded.[2] To introduce the public health approach to child maltreatment prevention, we will contrast the epidemiology of unintentional injuries and injuries that result from child maltreatment, discuss barriers to instituting this approach, list evidence-based interventions in child maltreatment prevention that have been successful, and finally discuss the successful implementation of this model in child maltreatment injury prevention.

Epidemiology of child maltreatment injuries and unintentional injuries

A) Current status of child maltreatment and unintentional childhood injuries

Based on currently available data, Table 1 compares the burden of fatal and nonfatal cases of child maltreatment and unintentional injuries in US children under the age of 18 years during 2008.[14,15] Non-fatal intentional injuries (i.e. maltreatment cases) were 11 times lower than the number of unintentional injuries, and we hypothesize that the number of child maltreatment cases may be higher than represented here because of underreporting. However, fatal cases of child maltreatment were only 22% lower than the overall number of fatal unintentional childhood injuries. This discrepancy would suggest that child maltreatment injuries tend to be more severe and have a greater risk to be fatal. This was also described by DiScala and colleagues when they compared injuries resulting from child maltreatment and unintentional causes, using 10 years of data from the National Pediatric Trauma Registry.[16] When comparing childhood injuries from maltreatment and unintentional causes, victims of maltreatment were younger (mean age: 12.8 vs 25.5 months), more likely to have a pre-injury medical history (53% vs 14.1%) and to have sustained injuries such as retinal hemorrhages, intracranial injury and injuries to the abdomen and thorax (27.8% vs 0.06). The mechanism of injury in victims of child maltreatment are usually battering and shaking. Finally, child maltreatment victims use more medical services and have worse survival and functional outcomes as compared to their counterparts. Fatalities in child maltreatment most commonly occur in infants and toddlers; whereas

there is a bimodal distribution in unintentional injury deaths in children. African-Americans are the most common racial group in maltreatment deaths, whereas Native Americans and African-Americans are the most common groups in unintentional injury deaths. Table 1 compares the burden of intentional and unintentional injuries among children in the United States in 2008.

Table 1. Comparison of the burden of intentional and unintentional injuries among children ages 0 to 17 years in the United States for 2008[a]

	CHILD MALTREATMENT	**UNINTENTIONAL INJURIES (74, 429,709)**
Number of Cases	695, 000 (9.2 per 1,000) 78% Neglect, 18% Physical abuse, 9% Sexual abuse, 8% Emotional abuse	7,669,452 (103.5 per 1,000)
Number of Fatalities	1,560 (2.1 per 100,000)	6,928 (9.31 per 100,000)
Types:	@Multiple forms abuse: 40.8% Neglect only: 32.6% Physical Abuse: 22.9% Other: 1.7% Medical Neglect: 1.5% Psychological Abuse: 0.3% Sexual Abuse: 0.2%	Transportation: 3,384 (4.55 per 100,000) Suffocation: 1,325 (1.78 per 100,000) Drowning: 889 (1.19 per 100,000) Fire related: 765 (1.02 per 100,000)
Age Group:	< 1 year: 17.9 per 100,000 1 year: 5.2 per 100,000 2 years: 4.3 per 100,000 3 years: 2.3 per 100,000 4-7 years: 1.1 per 100,000 8-11 years: 0.35 per 100,000 12-15 years: 0.37 per 100,000 16-17 years: 0.34 per 100,000	< 1 year: 1,315 (31.82 per 100,000) 1 year: 519 (12.66 per 100,000) 2 years: 392 (9.79 per 100,000) 3 years: 326 (8.17 per 100,000) 4-7 years: 765 (4.74 per 100,000) 8-11 years: 625 (3.91 per 100,000) 12-1 5 years: 1,159 (6.87 per 100,000) 16-17 years: 1,827 (20.58 per 100,00)
Gender	Males: 2.5 per 100,000 Females: 1.7 per 100,000	Males: 4,364 (11.46 per 100,000) Females: 2,564 (7.05 per 100,000)
Race and Ethnicity	African-Americans: 3.9 per 100,000 American Indian: 1.9 per 100,000 Hispanics: 1.9 per 100,000 Non-Hispanic Whites: 1.7 per 100,000 Asian: 0.6 per 100,000	African Americans: 1,379 (11.45 per 100,000) American Indian: 159 (14.84 per 100,000) Hispanics: 1,120 (6.87 per 100,000) White: 5,235 (9.10 per 100,000) Asian: 155 (4.11 per 100,000)

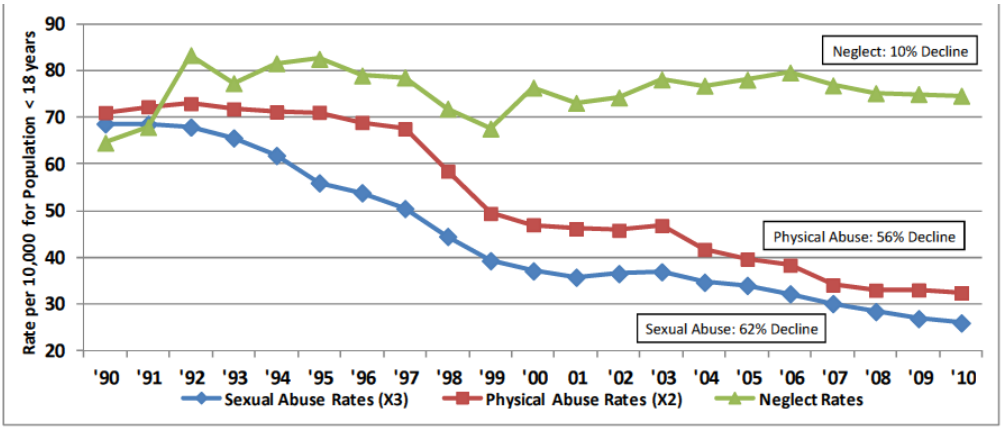
[a]Data adapted from WISQARS and Children's Bureau.[14, 15]

B) Current trends in child maltreatment and unintentional injuries

In 2010, US state and local child protective services (CPS) received an estimated 3.3 million reports of child (43.8 per 1,000) abuse or neglect and of these, approximately 695,000 children were found to have been abused (9.2 per 1,000).[15] CPS reports of child maltreatment may underestimate the true occurrence. Non-CPS studies estimate that 1 in 5 U.S. children experience some form of child maltreatment in their lifetimes and that rates range from 15 to 43 per 1,000 children.[17,18,19]

Unintentional injuries are the leading cause of death in the United States for persons aged 1–19 years and the fifth leading cause of death for newborns and infants aged <1 year. During the period 2000-2009, the overall annual unintentional injury death rate decreased 29%, from 15.5 to 11.0 per 100,000 people, accounting for 9,143 deaths nationally in 2009. The rate decreased among all age groups except newborns and infants aged <1 year; in this age group, rates increased from 23.1 to 27.7 per 100,000, primarily as a result of an increase in reported suffocations. The poisoning death rate among teens aged 15–19 years nearly doubled, from 1.7 to 3.3 per 100,000, in part because of an increase in prescription drug overdoses (e.g., opioid pain relievers). Childhood motor vehicle traffic–related death rates declined 41%; however, these deaths remain the leading cause of unintentional injury death.[20] Figure 1 demonstrates the annual unintentional injury death rates in US children from 2000-2009.

Figure 1. Rates of different types of child maltreatment in US children 1990-2010[a]

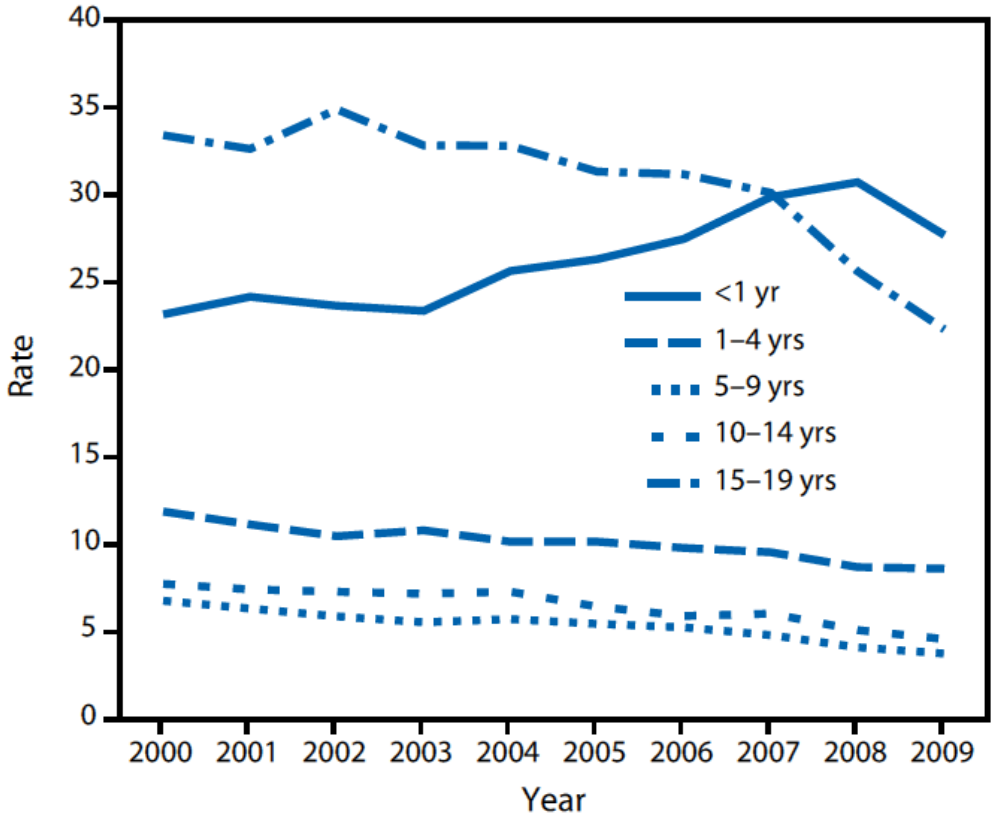


Note: Trend estimates represent total change from 1992 to 2010. Annual rates for physical abuse and sexual abuse have been multiplied by 2 and 3 respectively in Figure 1 so that trend comparisons can be highlighted.

[a]Data adapted from Crimes against Children Research Center.[21]

There is also a mixed picture for intentional injuries as well. The overall incidence of different types of child maltreatment has been declining over the past few decades as shown in Figure 2. Between 1990 and 2010, CPS-reported rates of sexual violence declined 62%, physical abuse declined 56%, and neglect declined 10%.[21] Explanations for this drop may be that the tolerance of child maltreatment has sharply decreased[22] and that professionals are growing increasingly alert to the possibility of child maltreatment and to act when they have concerns.[23] However, increased responsiveness to child maltreatment may have increased the number of reported cases and possibly more interventions such as out of home care. [24,25] Despite the overall apparent decrease in child maltreatment reported to state agencies, the rate of children hospitalized with serious physical abuse injuries has actually increased over the past decade.[26] The reason for this discrepancy remains unclear.

Figure 2. Unintentional Injury Deaths among Persons Aged 0-19 Years -- United States, 2000-2009[a]



* Per 100,000 population.

[a]Data adapted from Morbidity & Mortality Weekly Report.[27]

Child injuries and the principles for their prevention

Injuries are the leading cause of death among children over the age of 1 year.[28] An injury occurs when the body is exposed to energy greater than its ability to absorb it. The severity of an injury depends on the amount of energy, the distribution of energy in time and space and the body part affected. Children have developmental characteristics that predispose them to certain types of injuries. Because of a smaller body mass, the energy imparted from blunt trauma results in a greater force per unit body area. This energy is transmitted to a body that has less fat, less connective tissue and close proximity of multiple organs which leads to a high frequency of multiple injuries. The skeleton is incompletely calcified and is more pliable. For this reason, internal organ damage is often noted without overlying bony damage.[29] The head constitutes a greater proportion of children's body length and consequently they are more prone to head injuries. A larger ratio of body surface area to volume and thinner skin make them more susceptible to environmental injuries such as heat or cold exposure or burns. A poisonous substance is more likely to be toxic because of their smaller mass. Their physical abilities are not matched by their cognitive abilities and they are unable to judge the risks associated with various activities.[30] Measures to prevent injuries can be implemented along the continuum of care. Preventing an injury before it happens by eliminating the hazard is termed primary prevention. In secondary prevention, the severity or hazard potential of the injury is reduced. Once the injury has occurred, principles of tertiary prevention are utilized to successfully manage and treat the injury in order to improve outcome.

Common mechanisms of injury in children include blunt trauma from falls, being struck by objects or persons, motor vehicle crashes, bicycle and pedestrian injuries, suffocation, submersion and environment-related injuries. Penetrating injuries are less common and may occur from projectiles and sharp objects. The mechanisms of injury are modified by a complex interplay of economic, environmental, criminal, and behavioral factors.[31] While the vectors responsible for intentional and non-intentional injuries are often similar, their severity may vary. As noted above, the severity of injuries is likely to be more in inflicted injuries. This is because perpetrators are more likely to conceal the injuries, offer misleading information about the causative mechanism or downplay the severity of the injuries. They may also delay in seeking medical care for the victims.

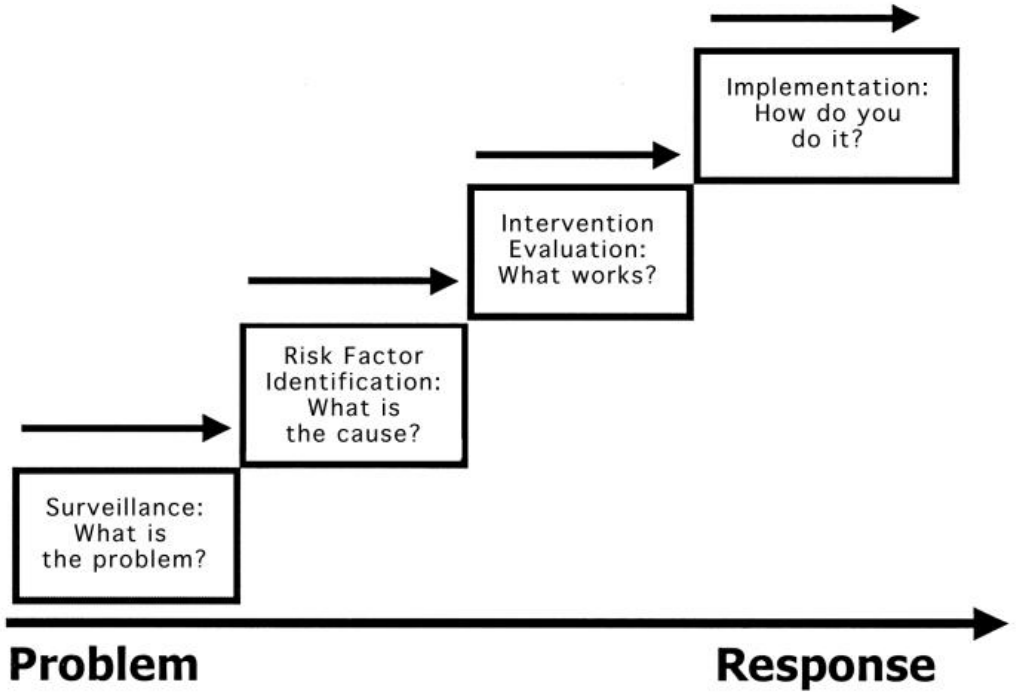
Injury prevention requires a multifaceted approach. Interventions should encompass the six E's: Education (to change knowledge, attitudes

and practices), Engineering (automatic protection through the design of products), Environment modification (automatic protection by changing the physical environment), Enactment of laws (encourage changes in individual's behavior through legislation), Enforcement of laws, and Economics (providing financial incentives and disincentives to reinforce safe behavior).[32] Interventions to improve injury prevention will be more likely to succeed if multiple E's are addressed at the same time. While public service announcements are a common public health prevention strategy, behavioral changes occurring through education alone are ineffective. Therefore passive interventions that do not require any conscious effort are more effective than interventions that rely on active intervention. In summary, a multifaceted, systematic injury prevention approach is required that can change the community and home environments physically (safe play areas and elimination of community and home hazards) and socially (education and supervised extracurricular activities with mentors).[31]

William Haddon Jr. developed the 12-cell "Haddon Matrix"[33,34] to improve the understanding of the factors that contribute to injury and to propose methods to attenuate their effects or to prevent them. The Haddon matrix is broken down into the sequence of events leading to the final effects of injury. This often occurs in three phases: the time before the injury-causing event, the injury event itself and the post-injury period. The Matrix also frames the proposed injury contributing factors and prevention methods for each of the four interacting constituents involved in the injury milieu: the host, agent/vehicle, physical environment and social environment. The matrix allows for the targeting of priorities and strategies for injury prevention in terms of their costs and effects at different stages. It also enables the identification of existing research and future research that needs to be undertaken. Lastly, it helps to determine the allocation of resources in the past and in the future and the effectiveness of such allocation.

Once the interacting factors for a selected type of injury have been identified, one can then attempt to reduce the burden of its impact. A public health approach[1] is the best method to address this. Figure 3 depicts the four steps that are involved. They are: 1) Surveillance to define the extent of the problem, 2) Identify the risk factors and protective factors, 3) Develop and evaluate interventions to address the problem and 4) Implementation and widespread adoption of best practices based on the lessons learned. The following examples highlight the key perspectives involved using motor vehicle and bicycle safety as examples.

Figure 3. The four steps involved a public health approach to injury prevention[a]



[a]Data adapted from Centers for Disease and Prevention.[1]

Motor Vehicle Safety: Motor vehicle crashes are a leading cause of death among children.[35] The improvement in child morbidity and mortality due to motor vehicle crashes has occurred gradually. The focus on child passenger safety began about two decades ago, after investigations were conducted to determine the cause of death in children killed by deploying passenger airbags.[36] This information led the Centers for Disease Control and Prevention and the National Highway Traffic Safety Association to issue recommendations for the appropriate use of car seats to prevent further airbag–related fatalities. Since then, the number of fatalities and serious injuries in children due to motor vehicle related causes has decreased through a combination of increased attention to age-appropriate child passenger restraint use and rear seating position,[37,38,39,40,41,42,43] improved child restraint laws and enforcement of these laws,[44,45] and graduated drivers licensing for teenage drivers.[46] In the 10 years from 2001 to 2010, the number of children younger than 16 years who died in motor vehicle crashes in the United States has declined by 45%.[46] Table 2 describes the Haddon's Matrix as applied to the prevention of injuries due to motor vehicle crashes.

Table 2. The Haddon's Matrix as applied to the prevention of injuries due to motor vehicle crashes[a]

	Human	Vehicle	Environment Physical & Socio-economic
Pre-event	Age, Gender Supervision Alcohol, Drugs Impulsivity Speed	Defects Brakes Tires Avoidance systems Lighting	Visibility, Pavement Signals, Construction Poverty Ignorance of risk Enforcement of laws
Event	Seat-belt use Helmet use Tolerance	Airbag Automatic belts Crash-worthiness	Guardrails Medians Breakaway points
Post-event	Age Physical condition Access to health care	Post-crash Fire, Fuel leaks Poor access to EMS	Type of EMS system First responder Bystander care

[a]Data adapted from World Report on Child Injury Prevention. Modified from: Table 2.2. Haddon Matrix applied to risk factors for road traffic crash injuries among children.[47]

Bicycle Helmets: Bicycling is a popular recreational activity among children. However, bicycle-related injuries are common and can frequently lead to hospitalization. Bicycle helmets are effective in reducing cranial and facial injuries.[48] Their use can reduce head and brain injuries by 85% and 88% respectively.[49] However, despite the evidence of their benefits in preventing serious injury, bicycle helmets are not widely used. Barriers to use include cost, discomfort, lack of belief in the necessity, and an unpopular image of helmets among young cyclists. Legislation has been implemented in some countries to increase the use of bicycle helmets. In a systematic review, bicycle helmet legislation was found to both increase bicycle helmet use and reduce bicycle related mortality and head injuries. No evidence was found to either support or counter the possibility that legislation may lead to negative societal and health impacts such as reductions in cycling participation.[50] Education can also help reduce bicycle injuries. Combined with community education and efforts to reduce the cost of helmets, such programs have been shown to result in helmet use by more than 50% of cyclists, with a corresponding reduction in head injuries requiring emergency or hospital care.[51]

Application to Child Maltreatment: Table 3[52-76] outlines the application of the Haddon's matrix to child maltreatment prevention. According to the US Preventive Services Task Force, the current evidence is insufficient to assess the balance of benefits and harms of primary care interventions to prevent child maltreatment as applicable to children who do not have signs or symptoms of maltreatment.[30] We have listed interventions that that have been used in the prevention and treatment of victims of child maltreatment (physical abuse, neglect, sexual abuse, emotional abuse) based on a review of the literature. (The authors have used a Delphi process to assign the interventions to their respective cells within the Haddon's matrix grid.)

Table 3. Application of Haddon's Matrix to Child Maltreatment Prevention[a]

	Host **Injured Individual**	**Agent or Vehicle** **- Physical force** **- Injury objects (home/elsewhere)** **- Perpetrator**	**Physical (Home) and Social Environment**
Pre-event (before injury of child) **PRIMARY PREVENTION**	• Train child to recognize and avoid potentially sexually abusive situations [52] • Teach safety skills and self control • Parent coping skills such as measures to help baby cry less (ex. swaddling) • "Purple crying" [53] • Home visitation • Prenatal classes • Parent-Child interaction therapy (PCIT)[54] • Enhanced Pediatric Clinic Care (SEEK model) [55] • Prevent exposure to intimate partner violence (Evidence lacking [56])	• Education about developmental norms • Gun safety education • Screen for parental depression, intimate partner violence, alcohol and drug abuse, (ex. OAS and CAMP screens, Parent Conflict scales) at all encounters • Help agent (home visitor, natural mentor or community networking) to assist in addressing broader family issues, such as relationship conflict, parental depression, anger and stress. • Parent skills training such as Triple P - Positive Parenting Program (Levels 2,3, 4, 5) [57,58] • Back ground checks on potential applicants for jobs as child care workers at home/nursery • Abusive head trauma education programs [59] • Anticipatory guidance by primary care providers: - teach parenting, child development and recalibrating parental expectations for crying child • Parent-Child interaction therapy (PCIT) [54,60] • Cognitive therapy [61] • Disciple strategies	**SOCIETAL**[62] **Implementing legal reform and human rights** • Translating the Convention on the Rights of the Child into national laws • Right to an adequate standard of living • Right to social security • Right to education • Right to equality and freedom from discrimination • Strengthening police and judicial systems • Promoting social, economic and cultural rights **Introducing beneficial social and economic policies** • Providing early childhood education and care • Ensuring universal primary and secondary education • Taking measures to reduce unemployment and mitigate its adverse consequences • Investing in good social protection systems **Changing cultural and social norms** • Changing cultural and social norms that support violence against children and adults (ex. bullying) • Norms for appropriate discipline based on developmental stage of the child **Reducing economic inequalities** • Tackling poverty • Reducing income and gender inequalities **Environmental risk factor reduction** • Reduce availability of alcohol • Monitor levels of lead and remove environmental toxins • Setting up shelters and crisis centers **RELATIONSHIP** • Home visitation programs (Nurse- Family Partnership[63-68], Early Start [69] • Parenting Training (Triple P - Positive Parenting Program [57, 58] (Level 1) • Strengthening Families **INDIVIDUAL** • Reduce unintended pregnancies • Increase access to prenatal and postnatal care • Registration of sex offenders and on-line directory • Background checks for those seeking employment in child care areas • Internet safety and social networking safety ("sexting", child pornography)

			• Job training, economic assistance • Drop off centers • Train child to recognize and avoid potentially abusive situations [52]
Event (abuse) **SECONDARY PREVENTION**	• Seek help outside the place of ongoing violence from multiple parties • Encourage victim outcry	• "Time Out" and anger management for perpetrators	• Access to Crisis Hotlines and 911 • Safety plan for child to escape from abuse • Buddy system • Shelters and centers for battered women and their children • Training health care professionals to identify and refer adult survivors of child maltreatment • Consider the possibility of child abuse in all client/patient encounters
Post-event (after abuse event through rehabilitation) **TERTIARY PREVENTION**	• Better systems of care by EMS and in-hospital (ED, inpatient and rehab) • Cognitive Behavioral therapy for sexually abused children with post-traumatic stress [70, 71] • Out-of-home care (Foster,Kinship)[72] • Resilient peer treatment [73] • Post-shelter counselling for women exposed to intimate partner violence [74] • Parent-child psychotherapy where mother is victim of IPV [75] • In-home care for families after physical abuse or neglect project "*SafeCare*" [76]	• Post-event counseling for perpetrators • Swift prosecution of perpetrators • Restraining orders against abusive partners	• Develop more robust Child Protection teams to avoid sibling injuries (improve infrastructure) • Ensure EMT training in child abuse and access to child protection consultation • Post-event counseling to families (non perpetrators) • Access to trauma/tertiary care facilities with ongoing medical care • Availability of respite care • Out of home care of victims [72] • Special schooling or training • Access to victim's compensation funds • Registration of sexual offenders • Surgical castration and chemical treatments for child molesters • Zero tolerance for child maltreatment by employers

[a]Data adapted from Centers for Disease Control and Prevention.[77]

Reasons for a public health approach to child maltreatment injury prevention

There are several reasons for adopting a public health approach to child maltreatment prevention. These are summarized below:

1. There is compelling research that early neglect has a profound, long-term, negative impact on the life of a child. When neglect and poor caregiver interaction occur during early childhood development, the child is unable to develop a true sense of self and the capacity for regulation

and engagement with the environment.[78,79] Preventing child maltreatment can lead to improved health and prevent disease later in adulthood.
2. Child maltreatment is a widespread phenomenon and Child Protective Services investigates only a fraction of the children who experience child abuse and neglect.
3. It is not practical or cost-effective to offer individualized social services to all families. The average costs per child associated with maltreatment are $100,000; including both medical and non-medical expenses.[80] Foster et al demonstrated that it cost $11.74 per child to train practitioners to deliver the Triple P program.[81]
4. Accurate risk assessment of children at high risk for child maltreatment is difficult and often inaccurate.[5]
5. Public health efforts have been successfully used for unintentional injury prevention such as child passenger safety, bike safety, or back-to – sleep campaigns and the same concepts could be translated to child maltreatment prevention.
6. Public health services are experienced in addressing complex health issues (such as smoking cessation) that require sustained multipronged strategies that have to be adapted over time.
7. Public health campaigns are multidisciplinary and cross-cutting, engaging professionals and the general public which can be used in child maltreatment prevention.
8. Public health agencies have access to young children through immunization programs, the Women, Infants and Children (WIC) program, Head Start, and maternal and child health initiatives and the same could be conduits for child maltreatment prevention.

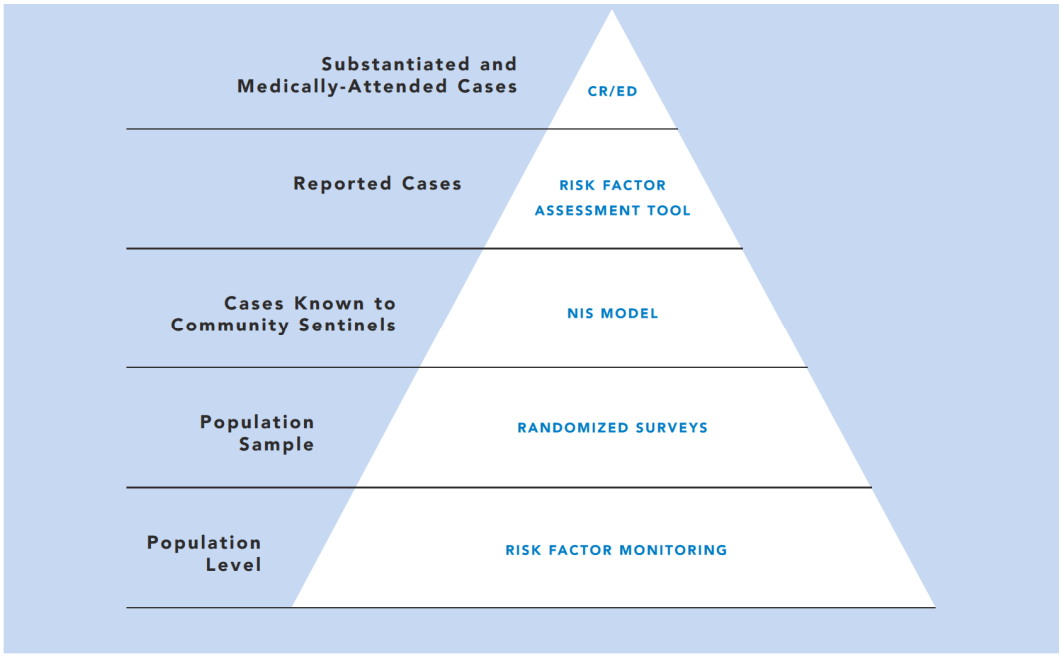
Instituting a public health approach to child maltreatment prevention: Challenges

Having made a case of instituting a public health approach to child maltreatment prevention, we would like to present the operational difficulties in doing so.

A) Surveillance:

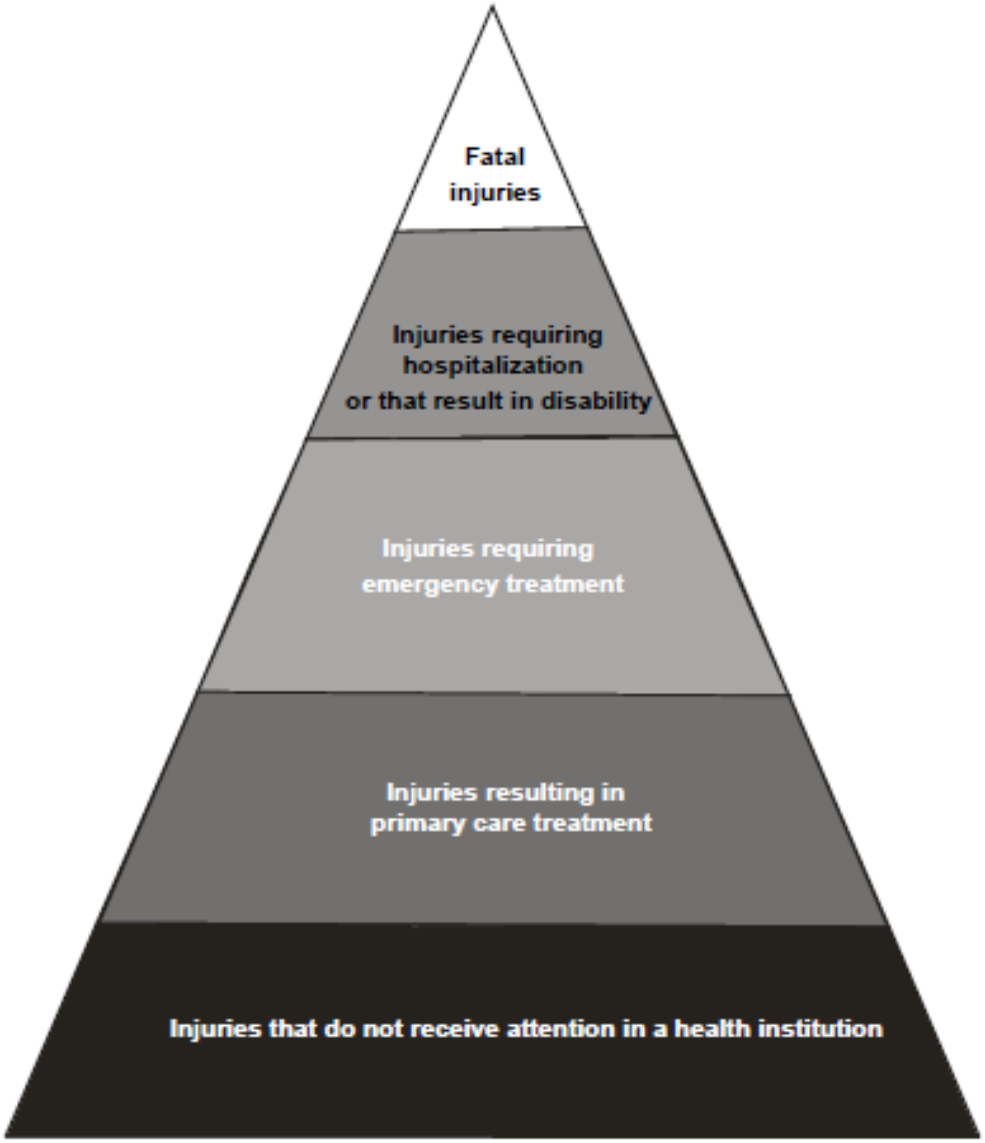
Surveillance can gauge the magnitude of the problem, identify risk and protective factors, track and monitor changes in incidence and prevalence, monitor effectiveness of prevention and intervention activities, and identify areas where change could have the greatest impact. The burden of injuries is best depicted by using an injury pyramid. The injury pyramids for child maltreatment (Figure 4) and unintentional injuries (Figure 5) are presented.

Figure 4. Injury pyramid for child maltreatment [a]



[a] Reprint with permission from Prevent Child Abuse North Carolina and the North Carolina Institute of Medicine.[82]

Figure 5. The Injury pyramid for unintentional injuries[a]



Illustrates a way of considering differing severity levels of injury.

[a]Data adapted from Centers for Disease Control and Prevention.[83]

a) Injury definition: There is no uniform set of definitions for child maltreatment, neglect, physical abuse, sexual abuse, or psychological abuse that is used consistently by local, state, and federal agencies. This

has led to difficulties in measuring the burden of injuries and comparing them between jurisdictions and regions. Recently standardized definitions for child maltreatment and abusive head trauma have been proposed, which are a characterization of associated terms and recommended data elements.[84] This is an attempt to avoid the inclusion of other conditions with overlapping symptoms and signs.

Another problem is the overlapping nature of symptoms and signs of maltreatment-related injuries with non-intentional causes.[85] Moreover, the diagnosis of maltreatment is more challenging because most victims are young and the medical histories are incomplete or inaccurate. Victims are more likely to be missed until they are very ill, leading to increased morbidity.

b) Reporting of injuries: The United States uses a child-safety approach in reporting injuries as opposed to a child- and family-welfare approach that is used in the United Kingdom and most western European nations. In the mandatory reporting system in the US, there are separate referrals for child protection and welfare, variations in who is mandated to report suspected cases of child maltreatment, the utilization of risk-assessment methods to predict future risk for child maltreatment, and the utilization of services that target the prevention of recurrence (secondary prevention).[9]

There are pitfalls in the current model of mandatory reporting of child maltreatment in the US. In considering the advantages of recognition of child maltreatment, the ensuing therapeutic interventions should outweigh the disadvantages of reporting abuse to CPS. Few interventions in child maltreatment have been found to be effective. Consequently people are not sure if reporting to CPS, the investigation by CPS, and finally the interventions, do in fact improve the lives of victims. The reasons for this are:

1. A high threshold of suspicion for child maltreatment is needed to report to CPS. Those where child maltreatment is likely or very likely form a small proportion of those in whom it is suspected (about 4%).
2. When mandatory reporting exists, the proportion of investigations by CPS is low. Apart from a few false positives such as bone and bleeding disorders many allegations cannot be substantiated because of lack of evidence, non-cooperation by family, lack of commitment to comply with services and constraints due to CPS staffing.
3. When maltreatment is confirmed, some victims or families may not receive services or protective action

At every step in this process, professionals have to make decisions based on their relationship with the child and family, the time needed and whether their colleagues support them.

In summary, there are several reasons for inadequate child maltreatment surveillance. These include: a low index of suspicion for child maltreatment among professionals (though recent trends suggest otherwise), failure to report maltreatment, bias towards reporting abuse in minorities and socio-economically disadvantaged persons, a variable response to child maltreatment across different communities and professionals and the inability of child protective services to respond to child maltreatment allegations due to insufficient staff and resources.[86]

Routine screening for child maltreatment has been evaluated and currently the data do not support routine screening.[87] Emergency departments have used screening methods or protocols to detect potential victims of child maltreatment who will need more thorough assessment. These methods are based on the age and type of injury, a plausible mechanism, and consistency of history. It is important to be aware that maltreatment is a cause of injury in about 1% of injured children who visit the emergency department. Put in another way, although about 10% of children that physicians see are exposed to maltreatment in the past year, few will present with injuries. Scoring systems based on a combination of specific injuries and age[88] have been developed but have not been tested in a clinical setting.[85]

B) Availability of evidence-based information on child maltreatment prevention strategies:

Until recently, there has been a paucity of high-level evidence-based strategies in child maltreatment prevention. There are several possible reasons. They include inadequate access to current research and delayed dissemination of information in child maltreatment. Very few studies have been conducted in policy analysis, possibly stemming from the lack of agreement on appropriate analytic tools (decision analysis, cost-benefit analysis, cost effectiveness analysis, qualitative research). Furthermore, policy makers may have an inadequate understanding of the scientific rigor behind effective interventions against child maltreatment and lack the ability to effectively evaluate the impact of these interventions.

C) Provision of services to the victim:

In child maltreatment prevention, the strategies usually consist of universal child and family welfare, targeted maltreatment prevention, and policies aimed at identification of children exposed to maltreatment with interventions to prevent recurrence. Suspected maltreatment requires to be investigated before further action can be taken for victims and perpetrators. This leads to delay in services and interventions. Recidivism

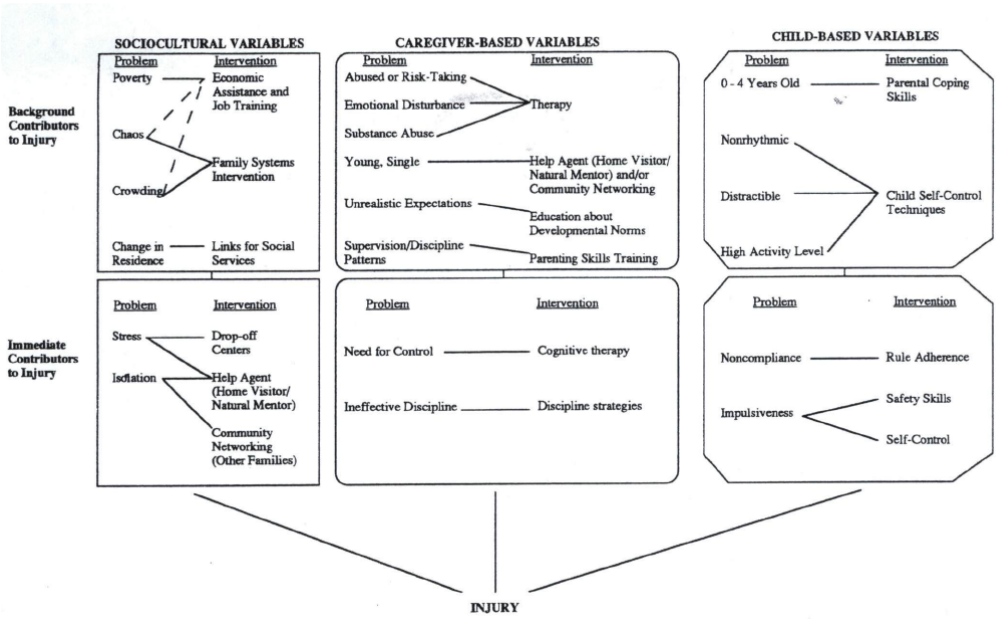
is common. Victims of physical abuse and neglect come disproportionately from economically disadvantaged areas and are less likely to have safe, stable and nurturing relationships in the family and community. Consequently, recovery takes longer. This leads to further competition for limited services. There is a paucity of proven and effective interventions that are generalizable to other regions. Many of the interventions are behavior related and are less likely to be successful. These "active" interventions require conscious effort on the part of the victim and perpetrator to succeed. The effective interventions that do exist require a commitment of considerable personnel and financial resources.

In contrast, unintentional injuries are not concealed from health care providers, so diagnosis is straightforward and services can be set up easily. Repeat injuries are less likely to occur. Safety interventions have been well studied and have proven to be effective. Many interventions require minimal cost (helmets, safety seats, fire alarms, etc). Passive methods of injury control are also highly effective (engineering of roadways, child proofing of bottle caps, seat belt use, fencing for pools). There is also a higher confidence in the effectiveness of interventions to reduce unintentional injury. Even in serious injuries, an early diagnosis facilitates optimum care early in the post-event phase due to an effective EMS and trauma system. Though some types of unintentional injuries are more common in lower socio-economic groups, the families and community of the affected child are more likely to rally around them.

D) Implementation and adoption of a comprehensive child maltreatment prevention program:

The current system of separation of mandatory child maltreatment investigation by CPS from child and community welfare impedes the formation of a comprehensive program at reducing child maltreatment. There are many stake-holders from private, public and faith-based agencies that have a common goal to reduce child maltreatment. However, they lack a multi-disciplinary, coordinated system which includes enhanced surveillance; utilization of effective, evidence-based, cost-effective interventions, a stable funding stream and a community grass-roots effort. Peterson and Brown proposed a working model for the prevention of child maltreatment related injuries that incorporate a human ecology model (Figure 6).[3] It is intended for use at a population level consistent with the public health approach.

Figure 6. Working model of the etiological factors for child injury and proposed interventions for dealing with them[a]



[a]Data adapted from Pyschological Bulletin.[3]

Example of a successful public health approach to child maltreatment prevention

Child maltreatment prevention should incorporate community-based or societal strategies rather than focusing on changing individual and family dynamics. Efforts should be made to promote positive health and well-being of the population as a whole by offering a continuum of services that span the individual, family, community and societal levels.[89] As one example, North Carolina has successfully utilized a public health approach to reduce child maltreatment.[90] The health department assumed a leadership role to raise awareness about child maltreatment prevention as a public health issue, and to support and enhance child maltreatment efforts in public health agencies. It leveraged resources to increase uptake of evidence-based practice and developed cross-sector partnerships and collaborations. The stake-holders included personnel in law and criminal justice, law enforcement, child protection, legislature and judiciary, child - welfare system, public health, private agencies and non-profit agencies.

Another population-based approach to child protection uses the Triple P program.[56,91] The Triple P (positive parenting program) seeks to prevent severe behavioral, emotional, and developmental problems in

children and adolescents by enhancing the knowledge, skills, and confidence of parents. The program has five different levels of intervention of increasing strength for parents of children up to the adolescent years. It creates a family-friendly environment that supports parents in the task of raising their children, with a range of programs tailored to the differing needs of parents.[92] It has been utilized with success across culturally and ethnically diverse populations around the world.[93,94,95] This parenting program has been effective in reducing problem behavior in children and improving parents' well-being and parenting skills.[96] The program has decreased the rate of substantiated child abuse, reduced foster care placements, and decreased hospital visits from child abuse injuries.[58] Currently, the Triple P demonstration project in South Carolina is the only child abuse prevention strategy that has had a demonstrated effect at a population level (county).

The constellation of partners work as an alliance in the following capacities: community planning, funding, training and technical assistance, evaluation, quality assurance, and coordination. They have used the following pool of evidence-based intervention programs such as: Nurse Family Partnership (Evidence-Based Home Visitation Program)[63]; Strengthening Families,[89] and Incredible Years (Evidence-Based Curriculum for Parents, Teachers and Children)[97] and determined intermediate range measurable outcomes such as medical home for children, healthy pregnancies for mothers, parents' ability to demonstrate child development knowledge and effective parenting skills, parents' ability to provide care that promoted attachment, increased education and employment support for parents, family planning services for parents, treatment for mental illness and depression, parents ability to receive appropriate treatment and services for domestic violence and substance abuse, ability of parents to receive and provide social support. At a population level, their goal is to improve school readiness and reduction of child maltreatment and juvenile delinquency.

Conclusion

In summary, there are compelling reasons for a public health approach to child maltreatment prevention. It provides a theoretical and conceptual framework to maximize the reach of interventions to a large cross-section of the population, to ensure their overall wellbeing and thereby reduce the incidence of child maltreatment.[5] A public health approach would envision a large stakeholder group, likely led by the state or county health department assuming a leadership role in child maltreatment prevention.

This approach would lead to improvements in the surveillance system, publicized social norms and policies, utilized evidence based practice, enhancing existing systems and increased and/or shifted funding for primary prevention. This program can be a model for other states or counties to enhance their own child maltreatment prevention efforts, with the state health department playing a key role.

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Appendix 1: Estimated Cost of Child Abuse and Neglect, April 2012[a]

Direct Costs	Estimated Costs (to 2012 dollars)
Acute Medical Treatment: based on the cost of treating trauma or joint disorders for children experiencing serious harm	$2,907,592,094
Mental Health Care System : the direct costs of mental health services based on estimates derived from the Fourth National study of Child Abuse and Neglect for each type of child	$1,153,978,175
Child Welfare System: estimates including federal, state and local – based on adjustment for inflation	$29,237,770,193
Law Enforcement: cost of police services for intervention for each type of child	$34,279,048
TOTAL DIRECT COSTS	$33,333,619,510

Indirect Costs	Estimated Costs (to 2012 dollars)
Special Education: Approximately 1 in 5 maltreated child of school age has a learning disorder.	$826,174,734
Early Intervention: 36% of children birth to five years in the child welfare system require early intervention services	$247,804,537
Emergency/Transitional Housing : children who experience abuse are disproportionately more likely than their	$1,606,866,538

peers to experience homelessness as adults.	
Mental Health and Health Care: estimated annual cost of physical and mental health care	$270,864,199
Juvenile Delinquency: effect of child maltreatment reports a correlation between maltreatment and subsequent juvenile delinquency.	$3,416149,283
Adult Criminal Justice Costs: The National Institute of Justice states 13% of violent crime can be attributed to early child maltreatment	$32,724,767,699
Lost Worker Productivity: Developmental consequences of child maltreatment find that abused and neglected children are more likely than non-maltreated children to be unemployed or under employed.	$7,834,164,589
TOTAL INDIRECT COSTS	$46,926,971,578

TOTAL DIRECT AND INDIRECT COST OF CHILD ABUSE AND NEGLECT: $80,260,411, 087

[a]Data adapted from Prevent Child Abuse America.[98]