

# Unintentional Injuries in Children and Youth



Children are our most valuable resources. They should be nurtured to reach their highest potentials. How would you feel if I told you that every year hundreds of thousands of children die due to preventable causes? Obviously, you would want to know how you can save these lives. Today, we will talk about the epidemic of unintentional injuries, an often overlooked public health problem.



**“If a disease were killing our children at the rate unintentional injuries are, the public would be outraged and demand that this killer be stopped.”**

**C. Everett Koop, MD, ScD  
Former US Surgeon General  
Chairman, The National  
SAFE KIDS Campaign**





## Accidents vs. Unintentional Injuries

- Accidents = implies that they are due to chance.
- Unintentional injuries = characterizes the event as predictable and preventable if safety measures are implemented.

In public health, we define accidents and injuries as two different entities. Accidents imply that these situations are due to chance. Unintentional injuries, however, characterize the event as predictable and preventable if the proper safety measures are in place. For example, if a child falls off his bike and hits his head on the pavement, causing a traumatic brain injury, most people would say it was an “accident.” But in the realm of injury prevention, this would be called an “unintentional injury” as it could have been prevented by a bicycle helmet. There is a subtle distinction between these two terms.



# Why are unintentional injuries important?



The slide features a vertical column of four small, square images on the left side. From top to bottom: a surgeon wearing a white mask and cap; two men in white lab coats, one pointing at a screen; a woman with dark hair smiling; and two people looking at a document. Below these images is the AMA logo, which consists of the letters 'AMA' in a bold, sans-serif font followed by a stylized caduceus symbol. The entire content is set against a white background with a purple border at the bottom.

So why are unintentional injuries important to consider?



# 10 Leading Causes of Death by Age Group, 2002

Rank	Age Groups										Total
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
1	Congenital Anomalies 5,823	Unintentional Injury 1,541	Unintentional Injury 1,176	Unintentional Injury 1,542	Unintentional Injury 15,412	Unintentional Injury 12,566	Unintentional Injury 15,710	Malignant Neoplasms 46,837	Malignant Neoplasms 93,391	Heart Disease 576,301	Heart Disease 696,947
2	Short Gestation 4,837	Congenital Anomalies 830	Malignant Neoplasms 537	Malignant Neoplasms 535	Homicide 5,219	Suicide 5,046	Malignant Neoplasms 16,085	Heart Disease 37,570	Heart Disease 64,234	Malignant Neoplasms 391,001	Malignant Neoplasms 557,271
3	SIDS 2,285	Homicide 423	Congenital Anomalies 199	Suicide 280	Suicide 4,010	Homicide 4,489	Heart Disease 13,688	Unintentional Injury 14,675	Chronic Low Respiratory Disease 11,280	Cerebro-vascular 143,283	Cerebro-vascular 162,872
4	Maternal Pregnancy Comp. 1,708	Malignant Neoplasms 402	Homicide 140	Congenital Anomalies 218	Malignant Neoplasms 1,730	Malignant Neoplasms 3,872	Suicide 6,851	Liver Disease 7,216	Diabetes Mellitus 10,022	Chronic Low Respiratory Disease 108,313	Chronic Low Respiratory Disease 124,816
5	Placenta Cord Membranes 1,028	Heart Disease 165	Heart Disease 92	Homicide 216	Heart Disease 1,022	Heart Disease 3,165	HIV 5,707	Suicide 6,308	Cerebro-vascular 9,897	Influenza & Pneumonia 58,826	Unintentional Injury 109,742
6	Unintentional Injury 946	Influenza & Pneumonia 110	Benign Neoplasms 44	Heart Disease 183	Congenital Anomalies 492	HIV 1,839	Homicide 3,239	Cerebro-vascular 6,055	Unintentional Injury 8,345	Alzheimer's Disease 58,289	Diabetes Mellitus 73,249
7	Respiratory Distress 943	Septicemia 79	Septicemia 42	Chronic Low Respiratory Disease 95	Chronic Low Respiratory Disease 192	Diabetes Mellitus 892	Liver Disease 3,154	Diabetes Mellitus 5,466	Liver Disease 6,097	Diabetes Mellitus 54,715	Influenza & Pneumonia 65,881
8	Bacterial Sepsis 749	Chronic Low Respiratory Disease 65	Chronic Low Respiratory Disease 41	Cerebro-vascular 58	HIV 178	Cerebro-vascular 567	Cerebro-vascular 2,425	HIV 4,474	Suicide 3,618	Nephritis 34,316	Alzheimer's Disease 58,866
9	Circulatory System Disease 687	Perinatal Period 65	Influenza & Pneumonia 38	Influenza & Pneumonia 53	Cerebro-vascular 171	Congenital Anomalies 475	Diabetes Mellitus 2,164	Chronic Low Respiratory Disease 3,475	Nephritis 3,455	Unintentional Injury 33,641	Nephritis 40,574
10	Intrauterine Hypoxia 583	Benign Neoplasms 60	Cerebro-vascular 33	Septicemia 53	Diabetes Mellitus 171	Liver Disease 374	Chronic Low Respiratory Disease 1,008	Viral Hepatitis 2,331	Septicemia 3,360	Septicemia 26,670	Septicemia 33,865

Source: National Vital Statistics System, National Center for Health Statistics, CDC.  
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC.

This is a chart of the ten leading causes of death by age group in 2002 from the National Center for Health Statistics at the Centers for Disease Control and Prevention (CDC). As you can see, unintentional injuries are the leading cause of death for children and youth ages 1-18. In addition, unintentional injuries are the leading cause of death in adults 18-44. Thus, unintentional injuries causes a large burden of morbidity and mortality. In addition, a metric that is used in public health is Years of Potential Life Lost (YPLL). If a child dies at the age of 5 due to a drowning accident, but is expected to live until the age of 65, then one can conclude that the drowning was associated with a loss of 60 years of potential life lost. Now, imagine calculating YPLL for all children that die due to unintentional injuries in one year. There would be a LOT of years of potential life lost. This illustrates the importance of tackling this public health problem among children.



## Some Sobering Statistics

- Fifth leading cause of death overall
- Unintentional injuries are the leading cause of death in ages 1-18 (Hovert 2005)

In addition, if you aren't already convinced about the problem, unintentional injuries are the 5<sup>th</sup> leading cause of death overall in the US, and again, they are the leading cause of death in ages 1-18.



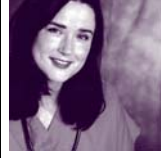
## The Costs of Childhood and Youth Unintentional Injury

- \$14 billion in lifetime medical spending
- \$1 billion in other resource costs
- \$66 billion in present and future work issues
- Medicaid and government sources paid for 39% of all days spent in the hospital by children.
  - An argument for putting more funds into this important public health topic.

Source: Miller et al.



Not only do unintentional injuries cause a lot of morbidity and mortality among children and youth, but it costs society a lot of money. Unintentional injuries cost \$14 billion in lifetime medical spending, \$1 billion in other resource costs, and \$66 billion in present and future work issues. In addition, Medicaid and other government sources pay for 39% of all days spent in the hospital by children as a result of unintentional injuries. This can serve as an argument for appropriating more funds into unintentional injury prevention and education.




**"If some infectious disease came along that affected children [in the proportion that injuries do], there would be a huge public outcry and we would be told to spare no expense to find a cure and to be quick about it."**

-Statement by Surgeon General C. Everett Koop before the Subcommittee on Children, Family, Drugs, and Alcoholism, U.S. Senate, February 9, 1989


Former Surgeon General Everett Koop testified, "If some infectious disease came along that affected children [in the proportion that injuries do], there would be a huge public outcry and we would be told to spare no expense to find a cure and to be quick about it." The public health community and the public must answer this problem of unintentional injuries among children and youth.

# Types of Unintentional Injuries




**AMA**

**Fires**




**Motor Vehicle Accidents (MVAs)**




**Drownings**

**Poisonings**



**Playground Injuries**



**Burns**

There are several types of unintentional injuries. To name a few, fires, motor vehicle accidents, drownings, poisonings, playground injuries, and burns.



## Motor Vehicle Accidents

- Leading cause of death among children and youth
- A daily average of 4 deaths and 602 injuries among children 14 or younger (NHTSA 2004a)
- Of those killed in MVAs during 2003, more than ½ were unrestrained (NHTSA 2004a)
- 1 out of 4 occupant deaths among kids 0-14 involve a drunk driver.
  - More than 2/3 ride with the drunk driver (Shults 2004)
- Survey of 17,500+ children found 15% incorrectly harnessed (Taft 1999)

Motor Vehicle Accidents are the leading cause of death among children and youth between 1-18 yrs of age with a daily average of 4 deaths and 602 injuries among children 14 or younger. Of those killed in MVAs during 2003, more than ½ were unrestrained. In 1 out of 4 occupant deaths among kids 0-14, a drinking driver is involved – either being the driver of the car the child is in or a driver under the influence in the other car. However, more than 2/3 of children actually ride in the vehicle of the drinking driver. In addition to the injuries caused by driving under the influence, a survey of 17,500+ children, found 15% of children were incorrectly harnessed. Thus, better education of parents in this area can protect more lives.



## Teen Drivers

- 2 out of 5 deaths among US teens from MVA (CDC 2004)
- Teens represent 10% of population, but make up 14% of all motor vehicle related deaths (IIHS 2004)
- Estimated cost of police-reported crashes (fatal and non-fatal) for drivers aged 15-20 = \$40.8 billion
- Compared with other age groups, teens have the lowest rate of seat belt use.
  - 2003 – 18% of high school students reported they rarely or never wear seat belts when riding with someone else.

Let's turn our focus to the teenage population. In 2004, the CDC reported that 2 out of 5 deaths among US teens resulted from MVAs and the cost of these crashes for 15-20 year olds is \$40.8 billion. Teenagers represent a small segment of the population (10%) but have a disproportionate burden, making up 14% of all motor vehicle related deaths. Here again, injury prevention can save a great number of lives since teenagers report having the lowest rate of seat belt use and almost 20% report rarely or never wearing seat belts.



## Bicycle Safety

- Children 0-14 y.o. accounted for 21% of pedal cyclists killed in MVA in 2003 (NHTSA 2003)
- Bicycle helmets are 85 to 88% effective with regards to head injuries and fatalities from bicycle crashes (Thompson)

Bicycle safety practices have increasingly been implemented in communities. NHTSA reported that 0-14 y.o. accounted for 21% of all pedal cyclists killed in MVAs in 2003. Many traumatic brain injuries result from bicycle accidents, many of which lead to deaths. Bicycle helmets are 85 to 88% effective in regards to TBI and fatalities from bicycle crashes. Many states require children to wear helmets. It may be prudent to investigate if your state does.



## Water Safety

- Drowning is still the 2<sup>nd</sup> leading cause of injury related death for kids 1-14 (CDC 2003)
  - Most drownings occur in residences (Brenner et al, 2001)
- For every child that drowns, 3 ER visits occur for non-fatal submersion injuries
  - >40% require hospitalization (CDC 2003)
- Consequences:
  - Memory problems
  - Learning disabilities
  - Permanent loss of basic functioning

Drownings are still the 2<sup>nd</sup> leading cause of injury-related deaths for kids 1-14 according to the CDC, and most of these drownings occur at residences with pools without fences to keep curious children out. In addition, for every child that drowns, 3 ER visits occur for non-fatal submersion injuries. More than 40% of these ER visits require hospitalization. Consequences of water-related injuries include memory problems, learning disabilities, and permanent loss of basic functioning (i.e. a vegetative state).



## Playground Injuries

- >200,000 children 14 and younger treated
- 45% are severe injuries (Tinsworth, 2001)
  - Fractures and dislocations
  - Internal injuries
  - Concussions

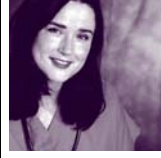
Playground injuries are another type of unintentional injury. More than 200,000 children 14 years and younger are treated for injuries from the playground. 45% are severe injuries that include fractures, dislocations, internal injuries, and concussions.



## Poisonings

- Ingestion of cosmetics, personal care products, cleaning substances, pain relievers, foreign bodies, and plants (Litovitz, 2001)
- 52.7% of all poisonings occurred among children <6 y.o. (Litovitz, 2001)

Children are naturally curious. And many children like to get into cabinets and open up interesting containers and drink or eat whatever is inside, including cleaning substances, pain relievers, cosmetics, and more. Poisonings are also an unintentional injury found mostly in children. Almost 53% of all poisonings occurred in children under the age of 6.



## Haddon Phase-Factor Matrix: A Public Health Framework

	Host Factors	Agent Factors	Physical Environment	Socio-cultural Environment
Pre-Event				
Event				
Post-Event				

Now that we have talked about the importance of unintentional injuries and the types of unintentional injuries in children, how do we approach the problem? The Haddon Phase-Factor Matrix is a tool that provides public health practitioners a framework to identify possible interventions. The phases are listed to the left: Pre-event, Event, and Post-Event. The Factors are listed at the top: Host factors – the individual affected, Agent factors – the carrier of the event, the physical environment, and the socio-cultural environment.



## Applying the Haddon Matrix: Motor Vehicle Accident



	Host Factors	Agent Factors	Physical Environment	Socio-Cultural Environment
<b>Pre – Event</b>	Driver age, experience, alcohol	Speed of travel, conditions of tires and brakes	Weather, roadway type, type of signs, signals	Norms about drinking and driving, graduated licensing
<b>Event</b>	Seatbelt use, seating position in vehicle	Vehicle size, airbags, bumper types	Guardrails, road medians, shoulders	Laws for occupant restraint use, level of law enforcement
<b>Post – Event</b>	Age of Victim, general health status	Fuel system protection	EMS response type and timing, rehab programs	Funding for trauma care systems, standards for EMS



Source: Staniland N. "Injury Prevention and Control: Understanding the Issues and Making a Difference." International Journal of Trauma Nursing, April – June 2001, pp. 67-69.

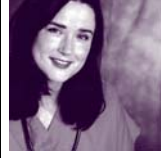
Let's see the Haddon Matrix at work. Let us examine a Motor Vehicle Accident. We can list the host or individual factors interact to create a MVA before, during and after the event. For example, a driver's age, experience, and alcohol status are factors that can lead to a MVA. During the event, factors like seatbelt use can affect the host's injury severity and survival. After the event, the host's age and general health status can contribute to how readily the host can recover from the event, the MVA. And we can continue to apply this to agent factors (in this case, the car), the physical environment and the socio-cultural environment.



## Phases of Injury Prevention

1. Reducing the number of events with the potential to cause injury.
2. Reducing the number of injuries that occur.
3. Reducing the severity of injury and optimizing outcomes.

Thus, the Haddon Phase-Factor Matrix helps us to identify factors that may be amenable for change to prevent injury in three ways: reducing the number of events with the potential to cause injury, reducing the number of injuries that occur, and reducing the severity of injury and optimizing outcomes.



## What's happening now in the field of unintentional injuries?

So what's happening now in the field of unintentional injuries?



## Federal Government Activities

- A Boost for Children Ages 4 to 8
  - CDC funded state health depts in CO, KY, NY will implement community based programs for increasing booster seat usage
- Kids in the Back
  - CDC/HSPH intervention in low-income Hispanic community to increase number of children 12 and younger who ride properly in the back seat

There are several ongoing federal government activities. We will briefly touch on a few programs. The CDC has funded the Colorado, Kentucky, and New York state health departments to implement community-based programs for increasing booster seat usage. The Kids in the Back intervention, funded by the CDC and the Harvard School of Public Health, focuses on increasing the number of children 12 and younger who ride properly in the back seat among low-income Hispanic communities.



## Federal Government Activities

- CDC/NIH study to examine effect of parents' actions on their teenager's driving behavior and MVAs.
- Three Tragic Seconds: A childhood drowning prevention program
  - CDC, Children's Hospital of Orange County, CA and National SAFE KIDS Campaign
  - Multimedia educational program to teach parents about drowning prevention.

In addition, the CDC and NIH have jointly funded a study to examine the effect of parents' actions on their teenager's driving behavior and MVAs. The CDC with other partners also sponsors a drowning prevention program named "Three Tragic Seconds." This is a multimedia educational program that teaches families how to best prevent unintentional drownings.



## Federal Government Activities

- NHTSA – “Back to School Safely” Web site for children
  - [http://www.nhtsa.dot.gov/people/outreach/kidsPage/bussafety/bckschool\\_safely/index.html](http://www.nhtsa.dot.gov/people/outreach/kidsPage/bussafety/bckschool_safely/index.html)

Lastly, the National Highway and Traffic Safety Administration has targeted children with a website called “Back to School Safely.” Thus, there are many ongoing federal research and programmatic activities that focus on unintentional injury prevention in the US.



## **What existing policies and programs does the AMA have related to unintentional injuries?**

What existing policies and program does the AMA have related to Unintentional Injuries?



# AMA Policies Related to Unintentional Injuries

## • H-10.982 Injury Prevention

- Our AMA (1) **supports the CDC's efforts** to (a) conduct research, (b) develop a national program of surveillance and focused interventions to prevent injuries, and (c) evaluate the effectiveness of interventions, implementation strategies, and injury prevention programs;
- (2) **supports a Public Health Service public information campaign** to inform the public and its policymakers of the injury problem and the potential for effective intervention;
- (3) **supports the development of a National Center for Injury Control at the CDC;** and
- (4) encourages state and local medical societies to support, in conjunction with state and local health departments, **efforts to make injury control a priority**, and advise the leadership of the United States Congress of this unqualified support; and the AMA remains open to working with all interested parties in efforts to deal with and lessen the effects of violence in our society. (Res. 410, A-92; Reaffirmed by BOT Rep. 19 - I-94; Reaffirmed by BOT Rep. 34, A-95; Modified and Reaffirmed by BOT Rep. 52, I-95; Reaffirmed: CSA Rep. 8, A-05)

The AMA has several policies, including the one shown on this slide. The Injury Prevention policy supports the CDC's efforts in the realm of injury prevention, supports a Public Health Service public information campaign, supports the development of a National Center for Injury Control at the CDC, and encourages state and local medical societies to support, in conjunction with state and local health departments, efforts to make injury control a priority.



## AMA Policies Related to Unintentional Injuries

- **H-10.996 Playground Equipment Labeling**

- The AMA commends the Consumer Product Safety Commission for the intense and detailed attention given to the **study of playground injuries** and **offers its assistance in further educating the public to the relative hazard of injury** when paved surfaces are beneath such playground equipment as slides, swings, and climbers. (BOT Rep. T, I-80; Reaffirmed: CLRPD Rep. B, I-90; Reaffirmed: Sunset Report, I-00)

H-10.996 commends the Consumer Product Safety Commission for the study of playground injuries it conducted and offers the AMA's assistance in further education of the public on this topic.



## AMA Policies Related to Unintentional Injuries

- **H-10.987 Use of Helmets in Bicycle Safety**
  - Our AMA (1) **supports appropriate efforts to educate parents and children about bicycle safety, including the use of bicycle helmets**, and (2) supports working with the American Academy of Pediatrics and other appropriate organizations to **ensure widespread distribution of information and educational materials about bicycle safety**, including the use of bicycle helmets, to both medical and non-medical audiences. (Sub. Res. 72, I-89; Reaffirmed: Sunset Report, A-00)

The AMA also supports appropriate efforts to educate parents and children about bicycle safety, including the use of helmets, and supports working with other partners to ensure widespread distribution of information and educational materials about bicycle safety.



## AMA Activities

- Injury Prevention discussed on AMA's Web site: <http://www.ama-assn.org/ama/pub/category/2281.html>
- AMA Parent Package
  - Handouts for health professionals to share with parents and caregivers about making responsible choices in relation to unintentional injuries
- AMA's Office of Alcohol and Other Drug Abuse: Provides fact sheet on youth and alcohol, participates in nationwide campaigns
  - A Matter of Drinking: The National Effort to Reduce High-Risk Drinking Among College Students
  - Reducing Underage Drinking Through Coalitions: Youth and Adults United for Change

Lastly, the AMA has a Parent Package available online that include handouts for health professionals to share with parents and caregivers about making responsible choices in relation to unintentional injuries in their children.



## What Can You Do?

- Sponsor a bicycle helmet drive at your local hospital.
- Sponsor a safety fair at your local hospital or shopping mall.
- Lobby your state government for stricter seatbelt and helmet laws.
- Teach a safety class to young children.
  - Lessons include crossing streets, seatbelts, stop/drop/and roll, etc.
- Incorporate safety practices in your medical interviewing and suggest interventions.



## More Resources



CDC's NCIPC Division of Unintentional Injury Prevention

<http://www.cdc.gov/ncipc/duip/duip.htm>

The Prevention Institute

<http://www.preventioninstitute.org/home.html>



Unintentional Injuries in Childhood: Analysis and Recommendations

[http://www.futureofchildren.org/usr\\_doc/Unintentional\\_Injuries.pdf](http://www.futureofchildren.org/usr_doc/Unintentional_Injuries.pdf)

Estimating Costs of Unintentional Injuries, 2003

<http://www.nsc.org/lrs/statinfo/estcost.htm>



Indian Health Service's Injury Prevention Project

<http://www.ihs.gov/MedicalPrograms/InjuryPrevention/index.cfm>



RWJF Cost of Injuries is High

<http://www.rwjf.org/reports/grr/030188.htm>



## Summary

- Unintentional Injuries are the leading cause of death in children and youth ages 1-18.
- Unintentional Injuries are PREVENTABLE
- The Haddon Matrix is a tool to help look for interventions for injury prevention.
- The AMA must continue to recognize unintentional injuries as an important public health problem.

In conclusion, childhood unintentional injuries are the leading cause of mortality in children ages 1-8 and are entirely preventable. The Haddon Phase-Factor Matrix is a tool that can help identify possible interventions. The AMA must continue to prioritize childhood unintentional injuries.



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