



NCC Pediatrics Continuity Clinic Curriculum: Injury Prevention

Pre-Meeting Preparation:

- “Unintentional injuries in Pediatrics” (*PIR, 2011*)
- “Office-Based Counseling for Unintentional Injury Prevention” (*AAP Clinical Rep*)
- “LATCH 2014”- Update to car seat recommendations
- Explore [WISQARS](#) database and look-up “fatal injury” and “non-fatal” injury statistics/maps on your home state/region. Select 1 or 2 different age-groups, and be prepared to discuss your findings. (*PGY3s may choose their assignment location*).

Conference Agenda:

- Review Injury Prevention Quiz
- Complete Injury Prevention *Mega-Case*
- **Round-Table Discussion:**
 - Review resident [WISQARS](#) data for fatal and non-fatal injury reports OR log-on during clinic and generate statistics/maps for Montgomery County and DC.
 - Discuss cases of unintentional injury that you’ve seen in clinic or on the ward. *How did you the counsel parents? What injury prevention topics do you always address?*

Post-Conference: Board Review Q&A

Extra-Credit:

- [CDC website, National Center for Injury Prevention and Control:](#)
Good resource for patient/parent handouts, as well the WISQARS database
- [AAP \(Committee on Injury, Violence, and Poison Prevention\)](#)
Policy statements on every imaginable safety-related topic. Find ones that interest you!
- **Child Passenger Safety:**
 - [AAP Policy Statement](#) (*Pediatrics, 2011*)
 - [Car Seat Information for Families](#) (*2015 update*)
- [“US Infant Mortality Trends Attributable to Accidental Suffocation and Strangulation in Bed from 1984 Through 2004: Are Rates Increasing?”](#) (2009)

Unintentional Injuries in Pediatrics

Karen Judy, MD*

Author Disclosure
Dr Judy has disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

Objectives After completing this article, readers should be able to:

1. Describe the role that unintentional injuries play in the morbidity and mortality of children.
2. List the risk factors that predispose children and adolescents to the risk of death from a motor vehicle crash.
3. Detail strategies to counsel parents effectively about bicycle safety.
4. Describe the safety measures that need to be taken to reduce the risk of drowning in children.
5. Discuss preventive measures with parents that can reduce the likelihood of scald burns occurring in the home.
6. Recite the national poison control number.
7. Detail strategies to avoid accidental firearm injuries in the home.

Introduction

Unintentional injuries are the leading cause of morbidity and mortality among children in the United States. The definition of an injury is “tissue damage secondary to acute exposure (inadvertent or deliberate) to physical agents (eg, thermal, kinetic, chemical, or electrical energy, or water) or chemicals (eg, poisoning).” Unintentional injuries are not accidents because they are understandable, predictable, and preventable occurrences.

In the United States, injuries kill more children between the ages of 1 and 19 years than all other causes combined (Table 1). Data from the Centers for Disease Control and Prevention (CDC) Childhood Injury Report indicate that 20 children die every day from preventable injuries. (1) The problem is even more profound in developing countries, where more than 95% of deaths occur from injury, accounting for nearly 1 million deaths annually. Injuries also result in significant childhood morbidity. It is estimated that 1 in 4 children sustains an unintentional injury that requires medical care each year. Injuries produce acute morbidity, short- and long-term disability, and high medical costs; United States medical costs for these injuries approach \$17 billion per year.

The CDC, World Health Organization, and United Nations Children’s Emergency Fund (UNICEF) have completed “A World Report on Childhood Injury Prevention” and initiated a new campaign, “Protect the Ones You Love,” to raise parents’ awareness about the leading causes of child injury and detail methods of prevention. As part of the initiative, the CDC’s Injury Center offers resources to help parents keep their children safe from injuries, including fact sheets, podcasts, media outreach, and event planning guides. All materials are available free of charge at www.cdc.gov/safechild.

Risk Factors

Young children and teenagers are at greatest risk from suffering acute unintentional injuries. Males have twice the risk of injury as females, primarily due to greater exposure to activities that result in injury and patterns of risk-taking and rougher play. Native Americans and Alaskan natives have the highest rate of unintentional injury in the United States. Further, more than 40% of Native American children are from low-income families and are more likely to have difficulty obtaining medical care. They are less likely to practice safe behaviors and to receive lifesaving preventive services. Substance abuse, especially

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Table 1. Leading Causes of Unintentional Injury Death Among Children Age 0–10 Years, 2000–2005

Rank	Age Group in Years				
	Younger than 1 (n=5,883)	1 to 4 (n=10,203)	5 to 9 (n=7,144)	10 to 14 (n=9,088)	15 to 10 (n=40,734)
1	Suffocation 66%	Drowning 27%	MVT occupant 22%	MVT occupant 26%	MVT occupant 41%
2	MVT occupant 8%	Pedestrian 15%	MVT unspecified 15%	MVT unspecified 15%	MVT unspecified 28%
3	Drowning 7%	Fires/Burns 14%	Pedestrian 13%	Pedestrian 12%	Poisoning 7%
4	MVT unspecified 5%	MVT occupant 13%	Fires/Burns 13%	Drowning 10%	MVT other 6%
5	Other injuries 5%	MVT unspecified 9%	Drowning 13%	MVT other 9%	Pedestrian 5%

MVT= motor vehicle traffic
 From Borse, NN, Gilchrist J, Dellinger AM, Rudd RA, Ballesteros MF, Sleet DA. *CDC Child Injury Report Patterns of Unintentional Injuries Among 0–19 Year Olds in the United States, 2000–2006*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2008

alcohol abuse, is a risk factor in motor vehicle crashes and is associated with injury mortality.

Prevention Activities

Attempts to decrease injury rates in children include active and passive measures. Active measures require the host (child or parent) to be involved every time protection is needed. For example, seat belt use requires compliance during each and every car trip. These measures are least likely to be adopted by the persons most at risk. Such efforts often require a change in cultural norms and are the only option in some areas of protection (eg, bicycle helmets). Passive measures have been more successful because the host does not have to change human behavior for the measure to be effective. For example, air bags automatically protect automobile passengers.

Health-care professionals can make an impact on injury prevention by providing counseling at health care visits (Table 2). The American Academy of Pediatrics (AAP) web site www.healthychildren.org is an excellent resource for parents. The Injury Prevention Program (TIPP) of the AAP offers helpful material for pediatricians to use for office-based injury prevention anticipatory guidance. Parents need to be reminded that close supervision is the best way to prevent unintentional injuries in children.

Counseling is most effective at the time of an encounter for assessment of an injury and in the context of community action. The most effective prevention programs are woven into the fabric of communities as they develop and grow. Sweden followed this pattern as they industrialized after World War II, making injury prevention a part of urban planning, road construction, transportation, health systems, and education. The result is that Sweden has the lowest rates of child injury deaths in

the world. Community action was well demonstrated by the community effort of pediatricians to pass bicycle helmet regulation in Seattle in the 1990s. Partnerships with community or school-based organizations such as Students Against Destructive Decisions (SADD) can maximize the impact of physicians' participation in injury prevention. Pediatricians must advocate for legislation and regulation to keep children safe.

Motor Vehicle Injuries

Motor vehicle crashes are the leading cause of injury death and disability in all age groups (Figure). In 2005, 20 children younger than 19 years of age were killed each day from motor vehicle crashes, and more than 200,000 were injured in that year, based on information from the CDC web-based Injury Statistics (WISQARS™) data at <http://www.cdc.gov/injury/wisqars/>. More than one third of children who were fatally injured were passengers in cars driven by drunk drivers. Fortunately, the mortality rate has been falling over the past several years, most likely due to more stringent child restraint laws. Currently, all 50 states have child restraint laws that vary by age, weight, and restraint system. Child safety seats reduce the risk of death by 50% to 70%, and positioning the child in the back seat is associated with a 40% reduction in risk of serious injury. Of note, child restraint use depends on the adult's restraint use; 40% of children who travel with an unbelted driver are themselves unrestrained.

Children younger than 2 years of age are safest riding rear-facing in a car seat. Recent evidence indicates that children generally are safer when riding backwards and may benefit from riding backwards for longer than 1 year. At 40 lb, children can be moved to a booster seat until they are at least 80 lb and 57 in tall. After that, children should remain restrained by a seatbelt in the

Table 2. Injury Prevention Tips

Motor Vehicle Crash

- Back seat (middle) placement of child
- Rear-facing car seat until age 2 y
- Forward-facing car seat until at least 40 lb
- Booster seat until at least 80 lb and 57 in
- Always check manufacturer's specifications on car seat
- Proper use of seat belts

Drowning

- Enclose pools completely with at least 4-ft fence and self-closing gate
- Wear life jackets on boats and when playing near water
- Do not leave children unattended in baths
- Supervise closely (adult within one arm's reach of a child in or near water)
- Teach swimming and water safety

Fire and Burns

- Install smoke detectors on every level of the home and near sleeping areas
- Test smoke detectors monthly, replace batteries yearly
- Establish a family fire escape plan
- Keep lighters, matches out of reach
- No smoking in bed!
- Reduce water heater temperature to 120°F
- Do not drink hot fluids near children
- Never leave the stove unattended
- Keep appliance cords, pot handles, grills, and fireplaces out of reach
- Cover outlets with protective devices

Poisoning

- Keep all potential poisons in original containers and out of reach
- Keep all medication out of reach
- Place child-resistant caps on medications
- Dispose of medications immediately and safely
- Install carbon monoxide detectors on every level of home
- Keep poison control number near the phone: 1-800-222-1222

Threats to Breathing

- Back to Sleep
- Remove comforters, pillows, bumpers, and stuffed animals from crib
- Avoid nuts, carrots, popcorn, and hotdog pieces
- Keep coins, batteries, small toys, magnets, and toy parts away from children <4 y old
- Cut blind cords short and tie them out of reach
- Ensure cribs and mattresses meet safety precautions

Falls

- No baby walkers with wheels
- Supervise children closely
- Use safety straps in high chairs, shopping carts, and for diaper changes
- Keep car seats and "bouncy chairs" on the floor

Recreation

- Ensure helmets are fitted and worn properly
- Keep children <10 y off the road
- Remove drawstrings, scarves, and ropes from clothing when children are on playground
- Supervise children closely
- Ensure playground equipment has deep soft surface underneath

backseat away from the airbag until they are at least 13 years of age. Correct installation of car seats cannot be overemphasized. Studies show that most car seats are not installed correctly and allow for too much movement (>1 in side to side and forward), thereby not providing appropriate protection. A valuable resource is www.seatcheck.org, a site where parents can enter their zip code and find out the location of the nearest certified car seat technician, who will help them install their car seat correctly for free.

Motor vehicle collisions are the leading cause of death for teenagers. In 2005, 12 teens died every day from such collisions. Teens are most at risk because they are newly licensed and distracted by other passengers. In addition, they underestimate dangerous situations, often speed, use alcohol, and have lower seat belt use. The intent of the *graduated* driver's license program is to allow new drivers to practice driving under low-risk conditions, with the goal of improving teen driving skills and safety. Increasing the legal age of drinking alcohol has lowered the rate of motor vehicle deaths in adolescents. Parents must reinforce the dangers of drinking and driving and address infractions seriously. A safe ride agreement encourages the teen to call the parent for a ride rather than drive while impaired or ride with another impaired driver. In this agreement, the parent must contract to provide a ride home and refrain from judgment. Pediatricians should encourage families to develop a parent-teen driving contract that specifies restrictions for the teen drivers, determines when restrictions will be lifted, and outlines the consequences for violating restrictions. An example of such a

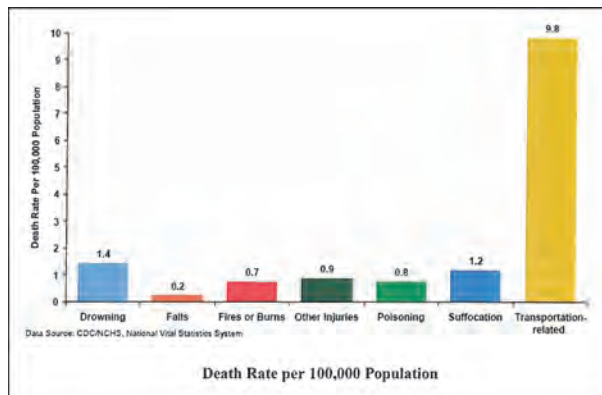


Figure. Unintentional injury death rates among children 0 to 19 years, by cause, United States, 2000–2005. Data source: Centers for Disease Control and Prevention, National Vital Statistics System. www.cdc.gov/nchs

driving contract can be found at <http://www.teen-driving.com/drivingcontract2.htm>.

Young children are at risk for pedestrian injuries because they are not aware of traffic threats. Children should not be allowed to cross streets independently until they are at least 10 years of age. Bicycles are another source of injury in young children. Bicycle helmets reduce pediatric head injuries by 85%, and it is estimated that 75% of all bicycle-related fatalities among children could be prevented with a bicycle helmet. All states should mandate bicycle helmets for children because such laws have proven to be effective in increasing helmet use and decreasing head injury rates. The annual cost of bicycle-related injuries and death (for all ages) in the United States is \$8 billion. Every dollar spent on bike helmets saves Americans \$30 in indirect medical costs and other costs. Helmets should be Snell or American National Standards Institute (ANSI)-approved to be appropriately protective during an impact. Helmets also must be fitted properly to provide optimum safety. For information on how to fit a bicycle helmet correctly, visit <http://bhsi.org/fit.htm>. Separate bicycle lanes are another protective measure.

Drowning

The formal definition of drowning is a process resulting in primary respiratory impairment from submersion in a liquid medium. In 2005, drowning killed more than 1,100 children in the United States. Four times as many children receive emergency department care for nonfatal drowning injuries for every child that dies. Nonfatal drowning has the highest average lifetime health and economic impact, with affected children often neurolog-

ically devastated and requiring prolonged medical and rehabilitative care. Factors that determine the clinical outcome of the victims include age, submersion time, water temperature, water tonicity, degree of water contamination, symptoms after a near-drowning event, associated injuries (especially cervical spine and head), presence of coingestants, underlying medical conditions, type and timing of rescue and resuscitation efforts, and response to initial resuscitation.

Drowning is the #1 cause of childhood death in Asia. The overall rate of drowning for African American children is 1.7 times higher than that for white children in the United States. A bimodal distribution of deaths is observed, with an initial peak in the toddler age group and a second peak in male adolescents. Children younger than 1 year of age often drown in bathtubs, buckets, and toilets. Children 1 to 4 years of age are more likely to drown in swimming pools where they have been unsupervised temporarily (usually for <5 min). Typical incidents involve a toddler left unattended temporarily or under the supervision of an older sibling. In the adolescent and young adult age groups (ages 15 to 24 y), most incidents occur in natural bodies of water. Approximately 90% of drownings occur within 10 yards of safety. Pediatricians should be educated about “touch supervision” in which a parent should be within an arm’s length of a swimming child.

Preventive measures for drowning at home include draining water from bathtubs and buckets and securing toilet seats. Swimming pools must be enclosed on all four sides by a fence (minimum 4 ft high) with a self-closing latch gate. Such fencing can reduce the incidence of drowning by 50% to 80%. Use of life vests seems to be an obvious preventive intervention for all age groups when they are around water, including toddlers playing around pools or open water, boaters, and even poor swimmers. Improving swimming ability with swim lessons makes sense but has not been proven effective; other conditions (eg, cold water, water currents, loss of consciousness, hypothermia) may preclude the effectiveness of swimming skills. Although swimming “buys time” to rescue, a life vest buys more time. It is clear that increasing life vest use among adolescents and adults is critical. Legislation requiring children to wear life vests when in small boats exists. Raising the age requirement for life vests to older than 6 to 14 years of age would be appropriate, given the age groups at risk.

Adolescents, a particularly high-risk group for drowning, must be informed about water safety and the dangers of intoxication while in and around the water. Changing culture to advertise the dangers of, instead of promoting,

the mixing of alcohol and water-related activities should be a goal, similar to that undertaken for drinking and driving. Driving under the influence (DUI) laws exist for boaters in all 50 states, but they have been poorly enforced. Recently, several states have linked boating violations with motor vehicle DUI violations.

Burns

About 120,000 children are treated in United States emergency departments each year for burn-related injuries. Most pediatric burns occur at home and are largely preventable. Most children 4 years of age and younger who are hospitalized for burn-related injuries suffer from scald burns (65%) or contact burns (20%). Most scald burns in children, especially children ages 6 months to 2 years, are caused by hot foods or liquids spilled in the kitchen where food is prepared and served. A key preventive measure is to set water heater temperatures no higher than 120°F. Within 3 seconds, a child's skin can be burned severely enough to require surgery when scalded with water at a temperature greater than 120°F.

After 6 years of age, the incidence of burn injuries tapers off, but it increases again as adolescents enter the work force and sustain activity- and work-related injuries, such as from motor vehicle crashes and repairs. In all age groups, accidental injuries most often are the result of carelessness and inattention to basic safety measures. The number of deaths due to fires and burns has declined since the "The Flammable Fabrics Act of 1971," which regulates the sale of flammable children's clothing, especially sleepwear. Overall, the most important factors in the reduction of burn-related deaths have been the use of smoke detectors and regulations on hot water heater temperature. In the United States, most people killed in house fires die from smoke inhalation rather than from burns.

Poisoning

Annually, more than 1 million children younger than 6 years of age experience toxic exposures, making poisoning a major and persistent cause of injury-related morbidity among children in the United States. Almost 90% of poisonings occur at home, and although more than 50% of poison exposures involve children younger than the age of 6 years, most fatal poisonings occur among adults. On average, United States poison control centers (PCCs) receive one call concerning a suspected or actual human poison exposure every 12.7 sec. Fortunately, the number of pediatric poisoning deaths has declined substantially over the past 30 years. This decline can be attributed to numerous factors, including child-resistant

packaging, heightened parental awareness of product toxic effects, intervention by poison information centers, and specially trained health professionals.

The compounds most likely to be involved in pediatric poisonings are cosmetics and personal care products, cleaning substances, analgesics, cough and cold preparations, and plants. Fortunately, most of these exposures do not result in toxic symptoms or cause only minor toxic symptoms in young children. Most ingestions can be managed at home after careful consultation with the regional PCC. However, physicians and parents should be aware of compounds that pose high risk to children. Syrup of ipecac is no longer recommended for the home management of pediatric poisonings because there is no evidence that it improves outcomes and it may delay the administration or reduce the effectiveness of other treatments, such as activated charcoal or other oral antidotes. Parents should be instructed to call the PCC immediately if they suspect a child has ingested a toxic substance. The regional PCC telephone number is 1-800-222-1222 anywhere in the United States.

Pharmaceutical products responsible for significant morbidity and mortality in young children have included iron supplements, tricyclic antidepressants, cardiovascular medications (calcium channel blockers, β -blockers), oral hypoglycemic agents, narcotic analgesics, and anti-malarials (chloroquine). During the past 10 years, pediatric poisoning fatalities have remained at 2% to 3% of all poisoning fatalities. This plateau in the number of pediatric poisoning fatalities may be due to inefficient use of resources. Many parents do not call the PCC for information when their child has experienced a potentially toxic ingestion. Primary care clinicians and emergency departments must continue to emphasize the importance of contacting the PCC immediately upon suspicion of toxic ingestion by a child.

Gun Violence

In the United States, more than 33% of households admit to having firearms, and almost 70% of parents admit that their guns are unlocked. Most accidental shootings result from having a gun in the home. For every instance in which a gun in the home is used in self-defense, there are four accidental shootings. Not only are children strong enough to fire most guns on the market, but they are also very curious and likely to want to play with novelty items, including the guns they find hidden at home. One study found that 75% of children who found a handgun played with it, and 50% of these children pulled the trigger. (2) All of these children had been educated previously about gun safety, including

instructions never to touch a gun and to find an adult if a gun is discovered. However, in one telephone survey of households, nearly 90% (regardless of gun ownership or age of child) responded that they believed that if their child found a gun, he or she would “know better” than to touch it. (3)

Removing guns from homes is the only action that can ensure decreased rates of accidental firearm deaths in the home. Parents need to be counseled, beginning at the newborn visit, about the hazards of having a gun in their home. Parents of older children should ask other parents about guns in the home before setting up playtime. If parents choose to keep a firearm in the home, the unloaded gun and ammunition must be kept in separate locked cabinets. Project Child Safe (www.projectchildsafe.org) is a program that provides gun safety kits at no cost to gun owners.

Suffocation

The #1 cause of mortality for children younger than 1 year of age is suffocation. Food, coins, and toys are the primary causes of choking-related injury and death. Certain characteristics, including shape, size, and consistency of certain toys and foods, increase the potential to cause choking among children. All babies and toddlers should avoid small objects and foods because of the threat of choking. Batteries, buttons, jewelry, coins, and small toys should be eliminated from the child’s environment. The most dangerous foods include peanuts, popcorn, hot dogs, whole grapes, raisins, bites of meat and apple, carrots, and candy. Young children are at increased risk of choking because their molars have not erupted, so they are unable to grind food adequately in preparation for swallowing.

Behavioral factors also may affect a child’s risk for choking. High activity levels while eating, such as walking or running, talking, laughing, and eating quickly, may increase a child’s risk of choking. Other agents that can cause suffocation are dangling cords, which may strangle a child (eg, cords on blinds, electrical cords), and dry cleaning bags. Parents, teachers, child care workers, and other child caregivers must be educated to supervise and create a safer environment for children. The United States Consumer Product Safety Commission (CPSC) has well-established surveillance systems and an array of legislation and regulations to protect children against choking and injury on toys and other consumer products. The CPSC works to ensure that toys have appropriate choking-hazard warnings and provides recall information for products that pose choking risks to children.

Falls

The leading cause of nonfatal injuries in children is falls from heights off the ground (Table 3). Most of these injuries occur at home during the warmer months of the year. Infants most often fall from furniture, toddlers from windows, and older children from playground equipment. The greater the height of the fall, the more severe the injury. Mortality rates increase at falls greater than 15 ft. Children younger than 3 years of age are less likely to have serious injuries from falls because they are smaller and have more fat and cartilage to dissipate energy. Most children suffer head, musculoskeletal, or thoracic injuries from falls.

Falls from windows, roofs, and balconies occur more often in urban areas in low-income housing. These falls can be prevented with window guards that keep children in, yet allow for egress during a fire. Openings in windows or railings should be less than 4 in to impede a young child from falling. In 1976 in New York City, window guards decreased mortality from falls by 35% and decreased hospital admissions for falls by 96%. Double-hung windows should be opened from the top. Children should be restricted from playing on fire escapes, roofs, or balconies. Furniture should not be placed near windows or balconies, and grass or shrubbery should be planted at bases of buildings to soften a fall.

Many parents purchase walkers with the belief that they encourage mobility, promote walking, and keep their infants safe. In contrast, evidence shows that walkers can delay normal motor and mental development and are dangerous. Reported injuries from the use of the walkers are overwhelmingly caused by falls; falls down stairs are implicated in 75% to 96% of cases. The AAP recommends that walkers be banned. Parents should be discouraged from using walkers with wheels; stationary activity centers are a safer alternative to mobile walkers.

Parents must be educated to restrain their children in highchairs and on changing tables. Infant seats should be placed only on the floor. Falls from beds can be prevented by lowering the mattress in the crib when the toddler learns to stand in the crib. Bunk beds require guardrails that open less than 3.5 in to prevent egress, and children younger than 6 years of age should not sleep in a top bunk. Supervision cannot be overemphasized. Bathtubs are a common site of injuries from falls, especially in children younger than age 4. Such children most often suffer head and facial lacerations, even while adults are supervising. Safety measures include slip-resistant devices, shatterproof enclosures, and elimination of sharp edges.

Table 3. Leading Causes of Nonfatal Unintentional Injuries Among Children 0 to 19 Years, by Age Group, United States, 2001–2006

Rank	Age Group in Years				
	Younger Than 1 (n=1,430,364)	1 to 4 (n=12,243,896)	5 to 9 (n=11,070,041)	10 to 14 (n=14,124,306)	15 to 19 (n=16,206,250)
1	Falls 52%	Falls 43%	Falls 37%	Falls 28%	Struck by/Ag 21%
2	Struck by/Ag 14%	Struck by/Ag 19%	Struck by/Ag 23%	Struck by/Ag 25%	Falls 17%
3	Bites/Stings 6%	Bites/Stings 9%	Bites/Stings 8%	Overexertion 12%	MV occupant 17%
4	Fires/Burns 5%	Foreign Body 6%	Cut/Pierce 7%	Cut/Pierce 7%	Overexertion 14%
5	Foreign Body 4%	Cut/Pierce 4%	Pedal cyclist 6%	Pedal cyclist 6%	Cut/Pierce 8%
6	MV occupant 3%	Overexertion 4%	Overexertion 4%	Unknown/ Unspecified 5%	Other injuries 4%
7	Cut/Pierce 3%	Fires/Burns 3%	MV occupant 4%	Bites/Stings 4%	Unknown/ Unspecified 4%
8	Poisoning 3%	Poisoning 3%	Foreign Body 3%	MV occupant 4%	MV other 4%
9	Overexertion 3%	Unknown/ Unspecified 2%	MV other 3%	MV other 4%	Bites/Stings 4%
10	Suffocation 3%	MV occupant 2%	Unknown/ Unspecified 2%	Other injuries 1%	Pedal cyclist 2%

Struck by /Ag=struck by or against an object, MV=motor vehicle
Data from Centers for Disease Control and Prevention National Vital Statistics System. www.cdc.gov/nchs

Playgrounds are a frequent site of falls in school-age children. Emergency departments treat more than 200,000 children per year who sustain playground injuries. Upper extremity fractures are the most common injury. Injuries are related to the height of the fall, usually greater than 5 to 6 ft, as well as to the type of playground undersurface (sand is safer than grass). Measures to improve the safety of playgrounds include creating energy-absorbing surfaces below the structures, lowering the height of playground equipment, inspecting the units, securing ropes at open ends, maintaining guardrails, and supervising at all times.

In 2005, 20,700 children younger than 5 years of age were seen in emergency departments for falls from shopping carts, most of whom had head injuries. Measures to protect children in shopping carts include using seat belts, prohibiting riding in the cart basket, restricting standing or climbing on carts, ensuring that adults push

carts, and designing carts to keep children closer to the floor.

Recreational activities, including bicycling, inline skating, skateboarding, and riding scooters, are a common cause of injuries in children. In 1998, the AAP recommended full protective gear for inline skating (eg, helmet, wrist guards, knee pads, and elbow pads). This recommendation led to a decrease in skating injuries in 1999. Parents must be counseled to set an example by wearing protective gear themselves when participating in sports. They must lead by example. Children are not likely to wear protective gear unless their parents do.

Pediatricians must continue to work diligently to prevent childhood injuries by educating parents, working with legislators, and advocating within communities. Such efforts should be rewarded with lives saved and injuries prevented.



CLINICAL REPORT

Office-Based Counseling for Unintentional Injury Prevention

H. Garry Gardner, MD, and the Committee on Injury, Violence, and Poison Prevention

Guidance for the Clinician in Rendering Pediatric Care

ABSTRACT

Unintentional injuries are the leading cause of death for children older than 1 year. Pediatricians should include unintentional injury prevention as a major component of anticipatory guidance for infants, children, and adolescents. The content of injury-prevention counseling varies for infants, preschool-aged children, school-aged children, and adolescents. This report provides guidance on the content of unintentional injury-prevention counseling for each of those age groups.

INTRODUCTION

Unintentional injuries continue to be the leading cause of death in children older than 1 year. In 2003, unintentional injuries caused 34.6% of all deaths in 1- to 4-year-olds, 37.8% of all deaths in 5- to 9-year-olds, 37.5% of all deaths in 10- to 14-year-olds, and 49.7% of all deaths in 15- to 19-year-olds. Among all children from 1 to 19 years of age, 64.7% of unintentional injury deaths involved motor vehicles.¹

Pediatricians play a key role in educating parents about the risks of unintentional injuries and specific measures to minimize those risks, including environmental modification or the use of safety equipment. Anticipatory guidance is a major component of well-child care and injury visits, and parents value the advice and counseling they receive from their pediatricians. Anticipatory guidance for injury prevention should be an integral part of the medical care provided for all infants, children, and adolescents.

Counseling for the prevention of unintentional injuries needs to be appropriate for the child's age and locale. Initially, it is necessary for the counseling to be provided to the parent or caregiver as both the role model for the child's behavior and the person who is most capable of modifying the child's environment. As children mature, counseling should be directed increasingly toward children or adolescents as they become responsible for their own behavior. Physicians are encouraged to document injury-prevention counseling in the medical chart.

In 1983, the American Academy of Pediatrics introduced The Injury Prevention Program (TIPP). TIPP includes a safety-counseling schedule, age-appropriate safety surveys, and age-appropriate safety sheets for families to take home.² Physicians may use different parts of TIPP to supplement their anticipatory guidance.² The interventions outlined here and in TIPP have been shown to be effective in improving parental safety practices.³⁻⁹ A review of the literature on childhood injury-prevention counseling in primary care settings demonstrated that 18 of 20 studies have shown positive outcomes in increasing knowledge and behavior and in decreasing injury rates in children.¹⁰ A systematic review of 22 randomized,

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doi:10.1542/peds.2006-2899

All clinical reports from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

Key Words

injuries, prevention, anticipatory guidance, infants, children, adolescents

Abbreviations

TIPP—The Injury Prevention Program

ATV—all-terrain vehicle

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controlled trials of counseling and other interventions in a clinical setting demonstrated improvement in certain safety practices, specifically motor vehicle restraint use, smoke alarm ownership, and maintenance of safe hot-water temperature.¹¹

INFANTS

Advise parents about the following issues:

1. Traffic safety: The correct use of currently approved child safety restraints needs to be discussed. The infant car safety seat should be rear-facing in the back seat, never in the front seat if there is a passenger-side air bag. Infants should never be left unattended in an automobile. Parents need to be reminded of the importance of using their own seat belts.¹²
2. Burn prevention: Smoke alarms in the home should be installed and maintained.^{13,14} Hot-water temperature should be set at a maximum of 120°F to avoid scald burns. Parents should be advised not to carry their infant and hot liquids or foods at the same time. Milk and formula should not be heated in the microwave because it can heat unevenly, causing pockets of liquid hot enough to scald the infant's mouth. Electrical outlets should be covered with devices that will not pose a choking hazard.
3. Fall prevention: Window and stairway guards/gates are necessary to prevent falls from heights.¹⁵ Infant walkers should not be used.¹⁶ Infants should never be left alone on any furniture such as changing tables, beds, or sofas.
4. Choking prevention: Small parts or objects can pose a choking hazard to young children. Round or cylindrical and compressible objects and foods can pose life-threatening risks of airway obstruction. Balloons pose a similar risk for young children. To avoid risk of strangulation, parents should be advised to avoid clothes and toys with long strings and cords and to cut looped blind and drapery cords. Suffocation may occur from entrapment in unsafe crib environments and access to waterbeds or plastic bags. Parents should be aware of hazards in any home where an infant spends time.
5. Drowning prevention: Because very young infants drown most commonly in bathtubs and buckets while unsupervised, advise parents never to leave infants or young children in the bathtub or around other bodies of water without constant adult supervision, and advise them to empty and properly store buckets immediately after use.¹⁷⁻¹⁹ Parents should be reminded that infant bath seats or supporting rings are not a substitute for adult supervision.
6. Safe sleep environment: Infants should be placed for sleep in a supine position in a crib that conforms to

current safety standards. Infants should not be put to sleep on soft surfaces such as waterbeds or sofas. Avoid soft materials in the infant's sleep environment. If bumper pads are used, they should be removed when the infant begins to stand. Never leave the crib sides down when the infant is in the crib.²⁰

7. Cardiopulmonary resuscitation: It is important that parents become trained in infant and child cardiopulmonary resuscitation and learn how to access their local emergency medical services (eg, 911).

PRESCHOOL-AGED CHILDREN

Toddlers and young children are more able to explore their environment but do so with little regard to risk or consequences. Parents of preschool-aged children need to be counseled to take a proactive role in protecting their children.

1. Traffic safety: Toddlers may be placed in a forward-facing car safety seat when they reach 1 year and 20 pounds, but it is best for them to remain rear-facing until they reach the highest weight or height allowed in that position by the car safety seat. Preschool-aged children should always ride in the back seat. Parents need to be reminded again of the importance of using their own seat belts.¹² Young children should never be left unsupervised in or around cars. Driveways and streets are particularly dangerous places for children to play. Supervised pedestrian safety begins at this age. Preschool-aged children are not ready to cross the street alone. Children must be watched closely when near driveways and streets.²¹ Use of an approved bicycle helmet begins with riding a tricycle or bicycle with training wheels.
2. Burn prevention: Smoke alarm batteries should be checked regularly.²² Children should be kept away from hot oven doors, irons, wall heaters, and grills. Advise parents to keep hot food and coffee out of the reach of young children.¹⁴ Electrical outlets should be covered.
3. Fall prevention: Toddlers learning to walk and climb need to be protected from stairways, open windows, and heavy furniture that could topple over.¹⁵
4. Poison prevention: Medicines and household products should be kept out of the sight and reach of children and locked up whenever possible. These items should be purchased and kept in original child-proof containers or blister packs. Ipecac is no longer recommended and, if present in the home, should be discarded. Keep the poison control telephone number (1-800-222-1222) handy.²³
5. Drowning prevention: Backyard swimming pools or spas need to be completely fenced on 4 sides to separate them from the house and yard; the fence should

have a self-closing, self-latching gate.²⁴ The gate should open away from the pool and should be checked often to ensure that it is in good working order. Children younger than 5 years should swim only with close adult “touch” supervision.¹⁷⁻¹⁹

6. Firearm safety: Because of the dangers that in-home firearms, particularly handguns, pose to young children, parents should be advised to keep handguns out of places where children live and play. If parents choose to keep a firearm in the home, the unloaded gun and ammunition must be kept in separate locked cabinets.²⁵

SCHOOL-AGED CHILDREN

Advice to parents of elementary school-aged children begins to be more focused on the child’s behavior. Children begin to learn home safety rules by 3 to 4 years of age.²⁶ The child should then be included in this learning process, and the parents should be reminded again of their need to model safe behaviors.

1. Traffic safety: When children reach the top weight or height allowed for their car safety seat, they need to ride in booster seats. A booster seat should be used until the child properly fits in the adult seat belt with the shoulder belt lying across the chest, the lap belt low and snug across the upper thighs, and the legs bent at the knees when sitting against the vehicle seat back (usually around 4 feet 9 inches in height and between 8 and 12 years of age).¹² Remind children and parents that no one should ride in the bed of a pickup truck.²⁷ All-terrain vehicles (ATVs) should not be used by children younger than 16 years.^{28,29} Review safe pedestrian practices.²¹ Approved bicycle helmets should be worn on every bike ride.^{30,31}
2. Water safety: Children 5 years and older should be taught to swim and should be taught appropriate rules for water play. Children must never be allowed to swim alone. Coast Guard–approved personal flotation devices should be worn by all children engaged in any boating activity.¹⁷
3. Sports safety: Adults who supervise children participating in organized sports programs and recreational activities need to emphasize the importance of safety equipment for the particular sport as well as appropriate physical conditioning for that sport.³²⁻³⁵ The use of protective equipment for in-line skating and skateboarding needs emphasis.^{36,37}
4. Firearm safety: In addition to removing firearms from the home environment where children explore and play, it is important for parents to ask whether there is a gun in any home that their child visits. If parents choose to keep a firearm in the home, the unloaded gun and ammunition must be kept in separate locked cabinets.²⁵

ADOLESCENTS

Injury-prevention advice to adolescents ideally is included in a broader discussion of healthy lifestyle choices, especially the avoidance of alcohol, tobacco, or other drug use. It is important for pediatricians, parents, and schools to remain united in their efforts to promote community choices that, by modifying the adolescent environment, make adolescent risk-taking less likely to occur, thus decreasing the risk of significant injury. Specific areas of injury-prevention guidance include the following:

1. Traffic safety: Encourage seat belt use and discuss the role of alcohol and drugs in teenage motor vehicle crashes. Discuss specific ways to minimize distracted driving, including eating, drinking, and especially using a cellular phone or electronic device while driving. Alert parents and adolescents to the dangers of high-risk situations, including speeding and reckless driving. Encourage compliance with graduated driver-licensing laws. Parents should enact strict rules to limit nighttime driving and the number of passengers in the car.³⁸ A helmet should be worn whenever riding a bicycle, motorcycle, or ATV.^{28,30} ATVs should not be used by children younger than 16 years.²⁸
2. Water safety: Discuss the risks of swimming in remote locations and at sites that are not designated as swim areas as well as the dangers of alcohol and other drug consumption during aquatic recreation activities (eg, swimming, diving, boating). The first entry into any body of water should be feet first, and it is important to know the water’s depth and the location of any underwater hazards before jumping or diving. Discuss the need to use an approved personal flotation device whenever the child is riding on a boat or other watercraft or fishing.¹⁷
3. Sports safety: Adolescents participating in organized sports programs and recreational activities need to be reminded of the importance of safety equipment, including protective eyewear, for their particular sport as well as appropriate physical conditioning for that sport.³²⁻³⁵ The importance of using protective equipment for in-line skating and skateboarding needs emphasis.^{36,37}
4. Firearm safety: In-home firearms are particularly dangerous during adolescence because of the potential for impulsive, unplanned use by teens resulting in suicide, homicide, or serious unintentional injuries. Firearms, and especially handguns, should be kept out of the home. If parents choose to keep a firearm in the home, the unloaded gun and ammunition must be kept in separate locked cabinets. Parents should ask whether there is a gun in any home that teenagers visit.²⁵

CONCLUSIONS

Injury-prevention counseling should be integrated into every well-child visit. Because of time constraints, specific topics could be addressed at different visits and tailored to be appropriate for the season, the child's activities, and concerns and questions raised by the parent. The topics addressed should be documented in the medical record. TIPP information sheets could be attached to vaccine information sheets on each visit. Telephone numbers (eg, poison control center) and Web sites could be posted in the waiting room along with brochures and posters. Parents and children are often receptive to injury-prevention counseling during a sick visit, especially if it is related to an injury, a recent emergency department visit, or injury to a sibling.³⁹ Finally, pediatricians can be more effective advocates for injury prevention by working with community resources that have a major influence on children,¹¹ such as the school system, park district, Head Start, child care centers, organizations such as the YMCA, and local media.

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The Car Seat Lady

Explains the 2014 Car Seat LATCH changes

What to Use When the Weight of	 is less than 65lbs combined?	 is more than 65lbs combined?	
 child + car seat			
 Rear-facing	Lower Anchors or Seat Belt  Tether	Choose one, not both If present, use if allowed	Seat Belt If present, use if allowed
 Forward-facing	Lower Anchors or Seat Belt  Tether	Choose one, not both Always use	Seat Belt Always use

For lots more info go to <http://bit.ly/LATCH2014>

LATCH stands for Lower Anchors and Tethers for Children. The lower anchors are a way of connecting the car seat to the vehicle that does not use the vehicle's seat belts. The **tether** is an additional strap that secures the top of the car seat to the frame of the vehicle. In effect since 2012, LATCH is meant to make it easier to install child car seats.

Effective **February 2014**, NHTSA now requires that the **lower anchor weight limits be 65 lbs** (child's weight + car seat's weight). As part of the amendment, every car seat will have a label stating the maximum child's weight for which the lower anchors can be used, based on the car seat weight. Once children and their seats are past the weight limit, parents can secure the seat using the safety-belt system.

The switch away from lower anchors at the combined 65-pound weight limit is a safety precaution, as there is concern that the **lower anchors may not be strong enough to hold heavier kids in heavier seats in some crashes**. When LATCH was first conceived, most car seats weighed well under 20lbs. Today, car seats weigh 20-25lbs and can accommodate kids up to 90 lbs.

Of note, the revision to the rule only applies to the lower anchors. **Use of the tether strap that is attached to the top anchor is not affected.** Generally, top tethers are used for forward-facing car seats and can be used either with LATCH or seatbelts. But NHTSA recommends first checking with the makers of the seat and the car to be sure.

Much more information on child car seats is at the [American Academy of Pediatrics](http://www.aapublications.com/). The academy also has created a [Car Seat Check app](#) for iPhones and iPads (\$1.99).

Injury Prevention Quiz

1. What is the leading cause of death in kids >1year? _____

2. List the top 5 causes of unintentional injury mortality in kids **1-19years**. What is unique about the <1 year and the 1-4year age group?
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.

3. Discuss the current AAP recommendations for the following:
 - **Rear facing carseats:**

 - **Forward-facing carseats:**

 - **Belt-positioning booster seat:**

 - **Seat-belt alone:**

4. **Hot water heaters** should be set to no more than _____ degrees F.

5. The phone number for **Poison Control** is _____.

Injury Prevention Mega-Case

You are seeing 2 new families in your continuity clinic today. The families are identical in composition: both sets of parents are bringing in their healthy 2 month old daughter and 3 year old son in for routine well-visits. Review of their charts and history obtained from the parents reveals unremarkable birth, past medical, and past surgical history. Growth and development are appropriately tracking. You obtain a social history from each:

Family #1:

- Father is AD Marine Enlisted E-3
- Mother works part-time at night as a waitress
- Family lives in an older 2 bedroom apartment on the 10th floor in a “rough” neighborhood
- No daycare—cared for by mom when dad is at work and vice versa

Family #2:

- Father is AD Marine Officer O-5
- Mother is a PhD who works at NIH
- Family lives in a newly renovated house in Chevy Chase
- No daycare—family has a nanny

What other questions do you want to ask the parents regarding safety issues, and what kind of anticipatory guidance will you give for each family?

You find out the following:

Family 1:

- The 3 year old is restrained in a belt- positioning booster seat in the back seat of the car most of the time (he proudly tells you that he sometimes gets to ride in the front seat of car if he’s “a good boy.”) The family received this booster as a hand-me-down from a cousin.
- The 2 month old is in older brother’s old infant carseat in the back seat of the car, rear facing.

What do you tell the parents? Is anything in this information against the law?

Family 2:

- The 3 year old is restrained in a forward-facing car seat in the back seat of the car.
- The 2 month old is in a rear facing infant seat in the back seat.

- The 3 year old sleeps in his own room in a “big boy” bed.
- The 2 month old sleeps in bed with mom and dad.

How do you counsel the parents about safe-sleeping practices?

- The 3 year old loves to ride his tricycle. When asked about helmet use, mom laughs and says he doesn’t have one—after all, it’s only a tricycle! Plus, he tends to ride mainly in the grass in front of the house.

What guidance can you give regarding helmet use?

Three weeks later, you are seeing both families back in clinic for an acute visit.

Family 1:

- After a busy night at work, mom fell asleep on the couch with the baby on her chest—woke up when the baby rolled off onto the carpeted floor and started to cry. When she woke up, she also noticed that her 3 year old was playing in the kitchen “cooking” with the oven turned on.

Family 2:

- Over the weekend while enjoying a quiet day at home, the 3 year old “got into” his vitamins and ate approximately 20 before his parents realized that he wasn’t in his playroom and found him in the kitchen.

After ensuring that all children are well with no major injuries, what kind of counseling do you give the parents?

Injury Prevention Board Review

1. During the prenatal visit with new parents, a mother expresses concern about regulating the temperature of the bath water for the new baby. You tell her that standards regarding hot water heaters have been determined.

Of the following, the temperature that has been determined to be appropriate for hot water heaters is CLOSEST to

- A. 110°F
- B. 120°F
- C. 130°F
- D. 140°F
- E. 150°F

2. You are seeing 16-year-old twin brothers for health supervision visits. They tell you that they plan to spend most of the summer boating and fishing at their camp on the lake.

Of the following, the advice MOST likely to decrease their risk of a boating-related fatality is to

- A. conduct regularly scheduled engine maintenance
- B. have both boys take swimming lessons before the summer
- C. install a carbon monoxide detector on the boat
- D. post the phone number to the United States Coast Guard on the boat
- E. wear life jackets at all times while on the boat

3. An 18-year-old young man comes to your office for his precollege health supervision visit. In screening for psychosocial risk factors, you find that he has ridden in a car with a drunk driver and driven himself after having four to five drinks.

Of the following, you are MOST likely to counsel him that

- A. a blood alcohol level of 0.05% is not considered illegal for driving among those younger than 21 years of age
- B. alcohol involvement in crashes peaks during daylight and non-holiday periods
- C. at any blood alcohol concentration, the risk of being involved in a motor vehicle crash is higher for teen drivers than older drivers
- D. teen drivers are more likely to drive after drinking than are older drivers
- E. the minimum alcohol purchasing age of 21 years in all states has not been successful in reducing alcohol-related crashes among teenagers

4. In researching a presentation you are making at your son's high school, you learn that unintentional injuries are the leading cause of death in the adolescent age group. You plan to address this issue in your discussion of preventive care.

Of the following, the LEADING cause of death from unintentional injuries in adolescents is

- A. automobile crashes
- B. bicycle injuries
- C. drowning
- D. firearms
- E. sports injuries

5. You are seeing a 14-year-old boy for a physical examination, which he needs to have completed to attend summer camp. In screening him for safety issues, you find that he does not use a seat belt.

Of the following, a TRUE statement about seat belt use by adolescents is that

- A. alcohol consumption is not significantly related to low seatbelt use in teens
- B. male teens are more likely to use seatbelts than female teens
- C. most high school students report that they rarely or never wear a seatbelt when riding as a passenger in a car
- D. most youth who died as occupants in passenger vehicle crashes were not wearing seatbelts
- E. motor vehicle collisions rank behind cancer and suicide as the leading cause of death for teenagers