

Drowning/Submersion Related Injuries in Virginia, 2002-2006

Dear Injury Prevention Advocate,

As the days become warmer and water related activities become more common, so do the opportunities for drowning/submersion incidents. Fortunately, this also is the perfect opportunity for prevention efforts targeting the use of safety devices such as personal floatation devices and behavior and environmental changes.

As a leading cause of unintentional injury related death in Virginia, drowning can result in life long injury or death. Supervision of children in and around water is a critical prevention strategy. The stereotype of a drowning victim shouting and splashing in the water is a false image and should not be expected to signal a problem. The more realistic scenario is a victim floating motionless in the water or silently slipping under the water.

On December 19, 2007, federal legislation was adopted to address environmental changes as a means of prevention through the Virginia Graeme Baker Pool and Spa Safety act which was signed into law. The new law is aimed at reducing pool and spa drownings involving children younger than 5 years of age and suction entrapment deaths and injuries, by making pools and spas safer, securing the environment around them, and educating consumers and industry on pool safety. The Act specifies that by December 19, 2008, swimming pool and spa drain covers available for purchase in the U.S. MUST meet specific requirements. Additionally, public swimming pools, wading pools, spas and hot tubs MUST meet requirements for installation of compliant drain covers. In certain instances, public pools and spas MUST have additional devices or systems designed to prevent suction entrapment.

This report examines drowning data in Virginia over the five year period from 2002-2006 and uses the 2005 World Health Organization definition of drowning: "the process of experiencing respiratory impairment from submersion/immersion in liquid." This simple, comprehensive, and internationally accepted definition includes both fatal and non-fatal cases.

Thank you for your efforts in preventing injuries in your community.

Sincerely,



Heather Funkhouser Board, MPH
Director, Unintentional Injury Prevention



Christina Sloan, MPH
Data and Evaluation Coordinator

Introduction

Drowning is the sixth leading cause of unintentional injury death in the United States. Among children 1-14, drowning is the second leading cause of unintentional drowning death. In 2005, there were 3,582 unintentional fatal drownings in the United States. During the same year an estimated 4,436 people were treated in U.S. emergency rooms for drowning/submersion-related injuries¹.

This report examines Virginia drowning/submersion related mortality and hospital discharge data over a five year period from 2002 – 2006. Mortality data was coded using ICD-10 codes and hospital discharge data was coded using ICD-9-CM E-codes. This report uses the ICD-10 injury mortality framework developed by The International Collaborative Effort (ICE) on Injury Statistics, sponsored by the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS)². All rates were calculated using population data from the national Center for Health Statistics and are per 100,000 population. Age-adjusted rates were computed using 2000 U.S standard population.

Case Briefs

Case One: A mother was in the water with her small child when she noticed another group of small children playing nearby. One child did not come up when the others did. This child's mother was not nearby, so a man pulled the child out of the water with the help of another woman who began patting the child on the back. There was no response from the child. The mother saw that the efforts of the other woman were not effective. The mother took over care, cleared the child's airway, and checked for breathing and a pulse. The child was not breathing and had no pulse, so CPR was started. The child was transported to the hospital and survived.

Case Two:

Two teenage girls went swimming at the beach, but instead of swimming in the designated swim area where the lifeguards were positioned, they went off the boat ramp

into deep water. Neither girl knew how to swim; they were both overcome with fear and splashed around frantically. A lifeguard noticed the two girls in the water at the boat ramp and went in to save them. When he got to them, they were both unconscious and foaming at the mouth. They were pulled out of the water where they vomited and came to.

Case Three: A toddler attends an in-home daycare with an inground pool in the backyard. The owner of the daycare goes into another room where other children are playing. The toddler wanders in to the backyard where the pool is located. The toddler has easy access to the backyard pool as there are no barriers (such as a fence) to the pool from the house. The toddler goes into the pool and sinks without a sound. The toddler is later found floating face down in the water. The toddler is pulled from the water and CPR is initiated. The toddler died as a result of drowning.

Virginia Drowning Mortality

In Virginia, from 2002-2006, there were 516 drownings. Eighty-three percent were unintentional, 12% were suicides, 2% were homicides, and 3% were of an undetermined intent.

Unintentional Drowning Mortality

There were 430 unintentional drowning deaths in Virginia from 2002-2006 for a five year crude rate of 1.15 per 100,000. Drowning was the fifth leading cause of unintentional injury death in Virginia during this time period. The most current five year age-adjusted rate (2001-2005) for the United States was 1.14³. The Virginia age-adjusted rate of 1.16 per 100,000 is slightly higher than the national rate.

A majority of drownings occurred among males (79%) and white, non-Hispanic (62%). Almost half (46%) of drowning deaths occurred in a natural body of water (river, lake, bay, etc.), 13% in a swimming pool, and 12% in a bathtub.

Certain age groups have a higher risk of drowning than others. Across the life span, drowning death rates were highest among infants, 1-4 year olds, 15-24 year olds, 45-54 year olds, individuals 65 and over.

The circumstances surrounding drownings differed based on the age of the victim. All drownings among infants less than one year of age occurred in a bathtub. Half (50%) of all 1-4 year old drowning deaths occurred in a swimming pool. A majority of drownings among all teenagers and adults occurred in natural bodies of water (see Table 1).

Figure 1. Virginia and United States Unintentional Drowning Mortality Rates, 2002-2006

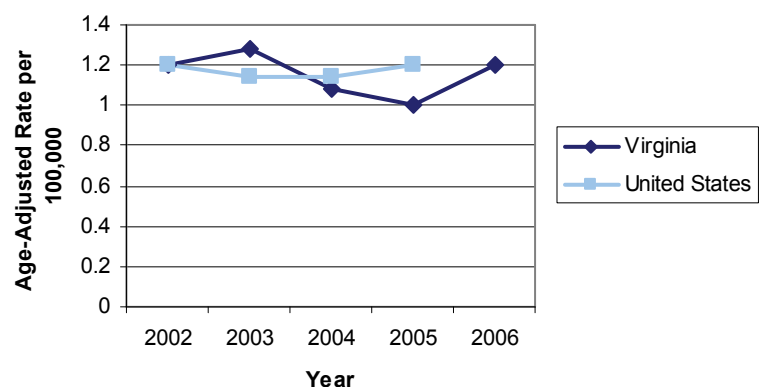
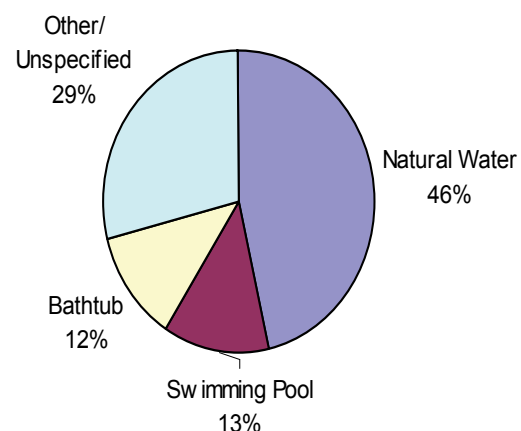


Figure 2. Drowning Deaths by Intent, Virginia 2002-2006



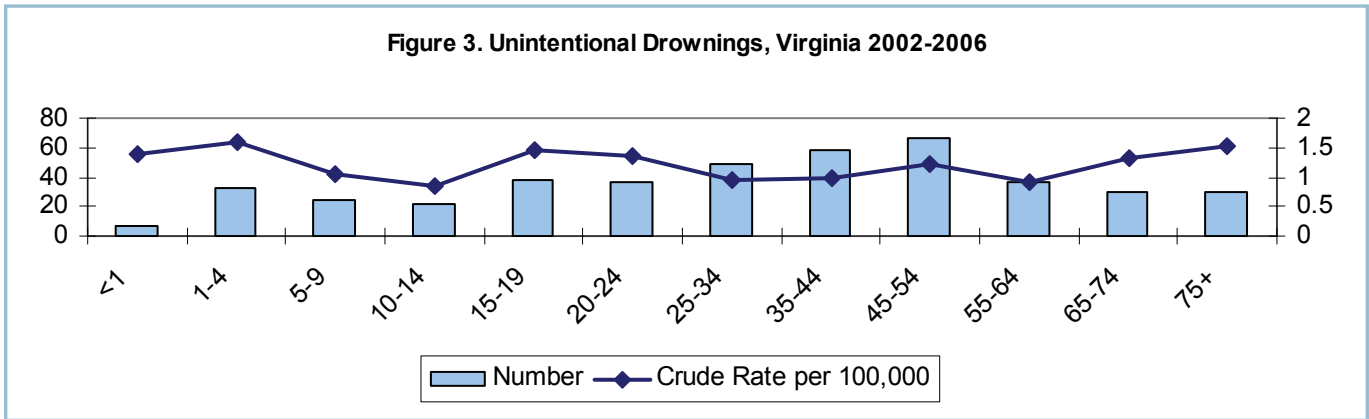
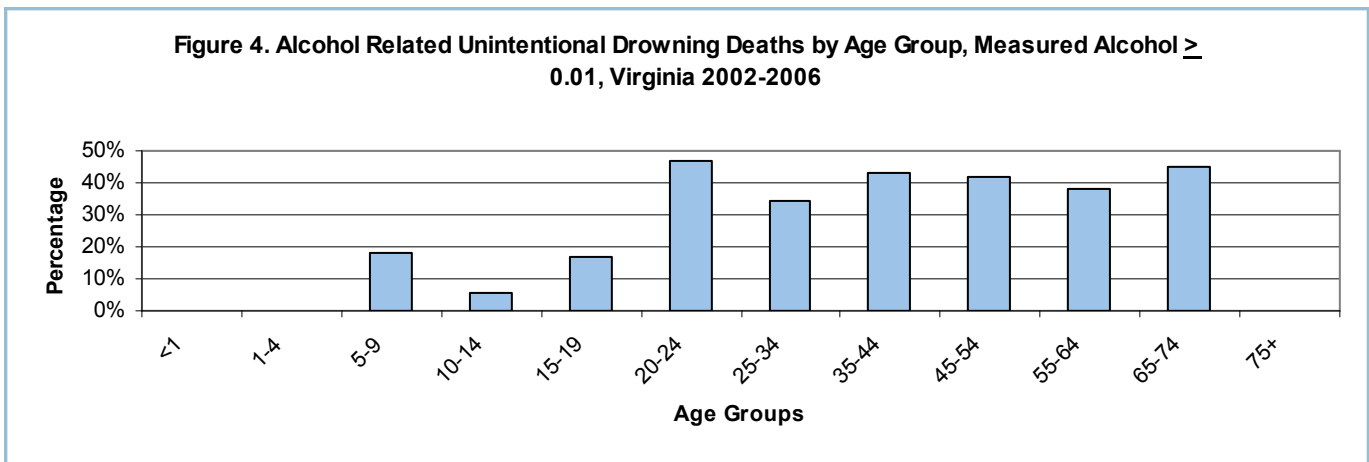


Table 1. Type of Drowning Death by Age Group, Virginia 2002-2006

Type of Drowning Death	Age Groups												Total
	<1	1-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	
Following Fall into...													
Bathtub				1					1	1			3
Natural water		3		1	1	3	5	5	8	1	4	7	38
Swimming pool		3	1					1		1			6
While in...													
Bathtub	7	1	2	3	1	3	2	9	8	1	8	4	49
Natural Water		2	5	10	21	16	27	21	29	15	7	8	161
Swimming Pool		13	8	5	3	3	1	1	4	4	3	3	48
Other/Unspecified		10	9	2	12	11	14	21	17	13	8	8	125
Total	7	32	25	22	38	36	49	58	67	36	30	30	430

Alcohol and Drowning Deaths

Alcohol influences balance, coordination, and judgment, and its effects are heightened by sun exposure and heat. According to the Office of the Chief Medical Examiner, from 2004-2006 306 unintentional drowning deaths occurred in Virginia. Of these, alcohol, at a level of 0.01 or greater, was detected in the blood of 93 (30.4%) decedents. Sixty-six percent of the 93 cases had a measured level of 0.08 or greater (the legal limit for operating a motor vehicle in Virginia). As seen in Figure 4, alcohol related drowning deaths are more prevalent among adults, with 20-24 year olds experiencing the highest percentage of alcohol related drowning deaths. Males also experienced a higher percentage of alcohol related drownings; 33% compared to 20% among females⁴.



Virginia Drowning/Submersion Morbidity

During the same five year period (2002-2006), there were 205 hospitalizations related to drowning/submersion injuries. The five year crude rate was 0.55 per 100,000. Almost all (97%) of drowning/submersion hospitalizations were unintentional.

Unintentional Drowning Morbidity

There were 199 unintentional drowning/submersion related hospitalizations in Virginia from 2002-2006, accounting for 97% of all drowning/submersion hospitalizations. The five year crude rate was 0.53 per 100,000. As seen in Figure 5., drowning/submersion hospitalizations decreased over the five year period. From 2002 to 2006 unintentional drowning/submersion hospitalization rates decreased by 32%.

The average length of stay for an unintentional drowning/submersion hospitalization was 3.3 days. These hospitalizations resulted in charges of more than 3 million, with a median charge of \$6,890.00 per episode of care.

Sixty-nine percent of drowning/submersion hospitalizations occurred among males and 59% among white, Non-Hispanics. While over half (54%) of the hospitalizations were categorized as “other”, 33% were associated with swimming and diving.

Drowning/Submersion rates were highest among infants (1.77 per 100,000), 1-4 year olds (2.67 per 100,000), and 5-9 year olds (1.12 per 100,000). Circumstances surrounding the drowning/submersion differed based on the age group. Among infants, 78% of hospitalizations were associated with a drowning in a bathtub. Eighteen percent of hospitalizations among 1-4 year olds were associated with bathtubs and swimming/diving (9% respectively). Swimming/Diving was associated with 26% of the hospitalizations among 5-9 year olds.

Figure 5. Unintentional Drowning/Submersion Hospitalizations, Virginia 2002-2006

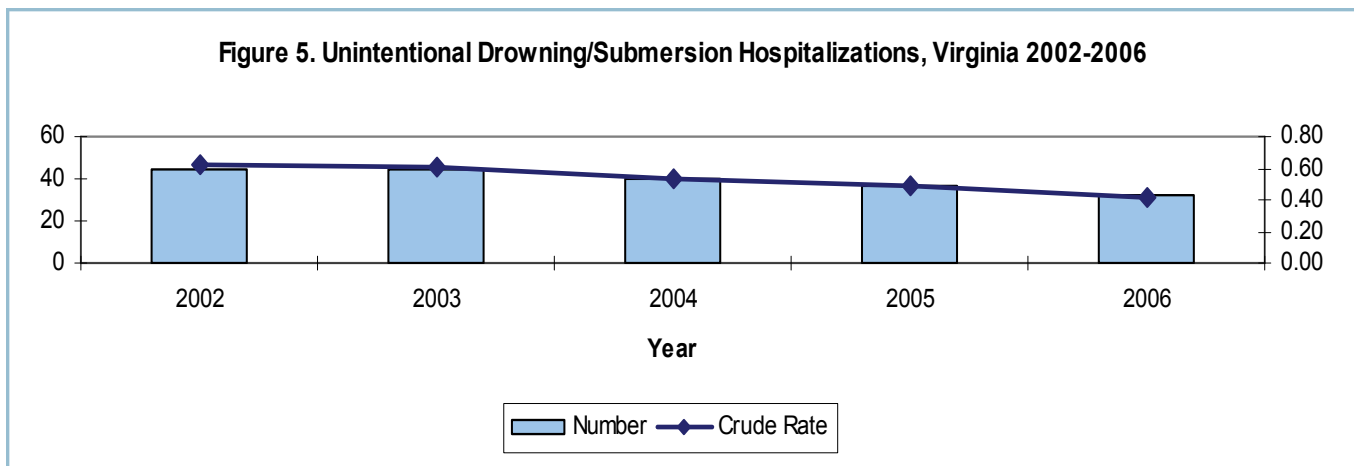


Table 2. Type of Drowning Hospitalization, Virginia 2002-2006

Type of Drowning/Submersion	Number
Swimming/Diving	65
Bathtub	14
Boat	6
Scuba Diving	4
Water Skiing	2
Other/Not elsewhere classifiable	108
Total	199

PREVENTION TIPS

Drownings can be prevented. The following tips will help prevent drownings:

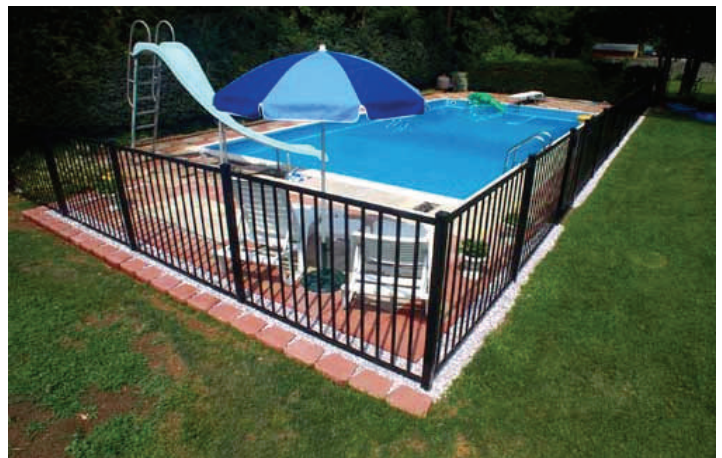
- Designate a responsible adult to watch young children while in the bath and all children swimming or playing in or around the water. Adults should not be involved in any other distracting activity (such as reading, playing cards, talking on the phone, or mowing the lawn) while supervising children.
- Always swim with a buddy. Select swimming sites that have lifeguards whenever possible.
- Avoid drinking alcohol before or during swimming, boating, or water skiing. Avoid drinking alcohol while supervising children.
- Prescription and over-the-counter medicines sometimes cause drowsiness or have other side effects. If you are taking medicine, check with your doctor before engaging in water activities.
- Use US Coast Guard approved life jackets when boating
- Learn to swim. Be aware that the American Academy of Pediatrics does not recommend swimming classes as the primary means of drowning prevention for children younger than 4 years of age. Constant vigilant supervision and barriers such as pool fencing are still necessary even when children have completed classes.
- Diving into shallow water can cause spinal injuries. Never allow diving in above ground pools, shallow water, or unknown areas.
- Learn cardiopulmonary resuscitation (CPR). Because of the time it might take for paramedics to arrive, your CPR skills can make a difference in someone's life. CPR performed by bystanders has been shown to improve outcomes in drowning victims.
- With young children, do not use air-filled or foam toys, such as "water wings", "noodles", or inner-tubes, in place of life jackets (personal flotation devices). These toys are not designed to keep swimmers safe.
- Avoid swimming after dark.
- Never leave children alone in the tub for even a moment.
- Don't rely on bath rings or seats—they are not safety devices.
- Prepare ahead when giving a child a bath—have a towel, cordless phone and diaper close by BEFORE the bath.

If in or around natural bodies of water:

- Know the local weather conditions and forecast before swimming or boating. Strong winds and thunderstorms with lightning strikes are dangerous.
- Use US Coast Guard approved life jackets when boating, regardless of distance to be traveled, size of boat, or swimming ability of boaters.
- Heed colored beach warning flags.
- Watch for dangerous waves and signs of rip currents (e.g. water that is discolored and choppy, foamy, or filled with debris). If you are caught in a rip current, swim parallel to shore; once free of the current, swim toward shore.
- Risk of drowning increases in the muddy water of lakes, ponds, and rivers.
- Avoid weak or thawing ice on any body of water.

If you have a swimming pool at your home:

- Install a four-sided, isolation pool fence that totally separates the house and yard from the pool area. The fence should be at least 5 feet high and should completely separate the pool from the house and play area of the yard. Use self closing and self latching gates that open outward, and have latches that are out of a child's reach. Consider additional barriers such as automatic door locks or alarms to prevent or notify you regarding access to the yard or pool. Have emergency equipment nearby.
- Toys should be removed from the pool immediately after use. Floats, balls and other toys might encourage children to enter the pool area or lean over the pool and potentially fall in.



BEST PRACTICES IN INJURY PREVENTION

Research tells us that injuries are preventable by changing the environment, individual behavior, products, social norms, legislation and governmental and institutional policies to reduce or eliminate risks and increase protective factors. In addition to following safety tips that can reduce risk of injury, there are some best practices in injury prevention that have been identified based on the best available evidence. The Virginia Department of Health, Division of Injury and Violence Prevention supports best or promising practice local community-based injury prevention projects every year. Some of these projects are listed on the Division's Web page www.vahealth.org/civp/community/index.asp. These projects are highlighted because of their successful strategies in reducing risky behavior in their communities, developing working partnerships with other community leaders, and finding low-cost means to reduce preventable injuries.

When considering implementing a prevention program in your community, research best practice or promising practice programs that have been tested for effectiveness. Below is a list of useful sources for injury prevention research from Safe Kids Canada⁵:

1. Harborview Injury Prevention and Research Center Best Practices Overview

<http://depts.washington.edu/hiprc/practices/index.html>

This project include reviews of studies that have been evaluated using some type of comparison group and measure specific outcomes using injury indicators like deaths, hospitalizations and or observed behavior change. Studies that measure changes in attitudes, beliefs, self-reported, behaviors or knowledge are excluded from the review.

2. The Cochrane Library Reviews (109 reviews on injuries)

http://www.mrw.interscience.wiley.com/cochrane/cochrane_clsystrev_subjects_fs.html

The Cochrane Library is a collection of databases and systematic reviews that contain high-quality, independent evidence that can inform healthcare decision-making.

3. EuroSafe - Child Safety Good Practice Guide <http://www.eurosafe.eu.com/csi/eurosafe2006.nsf/wwwVwContent/14goodpracticeguide.htm?OpenDocument>

The guide provides injury stakeholders with evidence-based strategy options that address child injury within the areas of education, environment and enforcement. It also has selection of case studies that illustrate programs in Europe that have applied these strategies and lessons learned for their application.

4. The Injury Prevention Journal

<http://ip.bmj.com/>

This is an international journal dedicated to injury prevention and includes peer-reviewed articles that focus on injury for all ages. Furthermore, Injury Prevention regularly includes a 'News and Note' section and many other special features: program reports, guest editorials, commentaries, fillers, book reviews, and letters.

5. CDC's National Center for Injury Prevention and Control

<http://www.cdc.gov/ncipc/pub-res/pubs.htm>

The CDC's National Center for Injury Prevention and Control is the lead National agency in the United States for injury prevention. This Center monitors trends in injury in the United States, conducts research and evaluates prevention programs in collaboration with national, state, and local organizations; state and local health departments; and research institutions.

6. SafetyLit

<http://www.safetylit.org/>

SafetyLit is an injury research weekly update service that provides abstracts of English language research articles and reports on injury prevention from a variety of disciplines that are relevant to preventing unintentional injuries, violence, and self-harm. *SafetyLit* service scans 2600 scholarly international journals, conference proceedings, government and agency reports.

7. Society for Public Health Education (SOPHE)

<http://www.sophe.org/>

SOPHE is an independent, international, professional association made up of a diverse membership of health education professionals and students. The society promotes healthy behaviors, healthy communities, and healthy environments through its membership, its network of local chapters, and its numerous partnerships with other organizations. With its primary focus on public health education, SOPHE provides leadership through a code of ethics, standard for professional preparation, research, and practice; professional development; and public outreach.

Please note that most of the above listed sources provide information in English only.

RESOURCES

- ◆ Division of Injury and Violence Prevention, Virginia Department of Health
www.vahealth.org/civp/
- ◆ Office of the Chief Medical Examiner, Virginia Department of Health
www.vdh.virginia.gov/medexam/
- ◆ Virginia Water Safety Coalition
www.watersafety.org/
- ◆ American Red Cross
www.redcross.org
- ◆ Center for Disease Control and Prevention, National Center for Injury Prevention and Control
www.cdc.gov/ncipc/default.html
- ◆ Consumer Product Safety Commission: Neighborhood Safety Network
www.cpsc.gov/nsn/nsn.html
- ◆ National Safety Council
www.nsc.org/
- ◆ Safe Kids USA
www.usa.safekids.org/

REFERENCES

1. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2005) Available from URL: <http://www.cdc.gov/ncipc/wisqars>.
2. International Collaborative Effort (ICE) on Injury Statistics. National Center for Health Statistics. Centers for Disease Control and Prevention. <http://www.cdc.gov/nchs/advice.htm>.
3. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2005) Available from URL: <http://www.cdc.gov/ncipc/wisqars>.
4. Virginia Office of Chief Medical Examiner. <http://www.vdh.virginia.gov/medexam/>.
5. Safe Kids Canada. Best Practices in Injury Prevention. <http://www.sickkids.ca/SKCFForPartners/section.asp?s=Research&SID=18890&ss=Best+Practices+in+Injury+Prevention&ssID=22439>.

The Virginia Injury Update has been prepared by the Division of Injury and Violence Prevention, Virginia Department of Health with assistance from the Office of the Chief Medical Examiner, Virginia Department of Health.

For more information, or to obtain additional copies, contact:

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109 Governor Street, 8th Floor
Richmond, VA 23219
Phone: (804) 864-7745
www.vahealth.org/civp

For more information from the Office of the Chief Medical Examiner, contact:

Anna C. Noller, PhD
Forensic Epidemiologist
Office of the Chief Medical Examiner
400 East Jackson St
Richmond, VA 23219
Phone: 804-786-6063
Fax: 804-371-8595

Case Briefs were provided by:

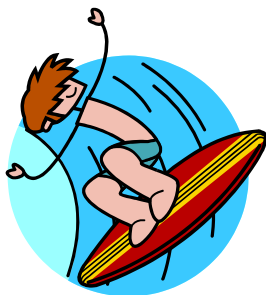
Jodi Jensen
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And

Pat Meadows
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Greater Richmond Chapter
American Red Cross
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Division of Injury and Violence Prevention

Virginia Department of Health



Free Water Safety Kit for Aquatic Professionals

Order Form

Help parents and caregivers become **Water Watchers** and prevent drowning. A **Water Watcher** is the adult on duty who is responsible for actively supervising children in and around water. A **Water Watcher** wears an “official” tag and whistle when supervising children at the pool or in open water. To receive **Water Watcher** kits for your consumers, mail or fax this completed form to the *Division of Injury and Violence Prevention*. Due to a limited supply, the maximum number of kits per order is 50. Requests will be filled on a first come basis. Please allow 2-3 weeks for delivery. **Water Watcher** kits are only available to aquatic professionals, aquatic related service providers, programs or for events in Virginia.

Full Name (Please Print)

Organization Name

Street Address, City, State, Zip Code (*The kits cannot be mailed to a PO box.*)

Phone #

Fax #

E-mail Address

Number of Kits Requested (maximum is 50) _____

Please tell us your plan for educating and distributing the kits to your consumers:

Would you like to be put on the Division of Injury and Violence Prevention’s list serve to receive up-to-date injury prevention information by E-mail? Yes No

Mail or Fax Completed Form To:

Leonard Recupero
Division of Injury and Violence Prevention
109 Governor Street, 8th Floor
Richmond, VA 23219
Phone: (804) 864-7734
Fax: (804) 864-7748

*The **Water Watcher** kit contains:*

- A Water Watcher tag, Whistle and Lanyard
- Information card that explains the Water Watcher program, responsibilities of a Water Watcher, and life saving information
- Drowning Prevention Tip Card
- 9.25” by 12” bag that holds the materials and has space for your agency’s information

Division of Injury And Violence Prevention Materials Request Form

REQUESTER'S INFORMATION

(VIRGINIA RESIDENTS ONLY)

SEND COMPLETED FORM TO

Attention To (Please Print)

Company Name

Street Address: (NO PO Box)

City VA State Zip

Phone# Fax# Special Instructions or Due Date

E-Mail address

MATERIAL REQUEST

Record the quantity desired for each item in the space provided. Please note that all materials are available to Virginia residents **without charge**. As noted, a few of the items are available in limited quantities only.

TIP CARDS

The following tip cards are printed with English text on one side and Spanish on the other.

Description	Qty.
Bicycle & Skate Safety	_____
Pedestrian & School Bus Safety	_____
Child Passenger Safety	_____
Playground Safety	_____
Sweet Dreams, Safe Sleep for Babies	_____
Choking & Strangulation Prevention for Infants/Toddlers	_____
Drowning Prevention	_____
Home Fire Safety	_____
Fire & Fall Prevention for Older Adults	_____
Fall Prevention for Children	_____
Inhalant Abuse Prevention	_____
Gun Safety	_____
Bullying Prevention	_____
Youth Suicide Prevention	_____
Rape & Sexual Assault Prevention	_____
Teen Dating Violence Prevention (tips for parents)	_____
Domestic Violence Prevention	_____
Poisoning Prevention for Children	_____
Poisoning Prevention for Older Adults	_____

POSTERS

Description	Qty.
Welcome Safety into Your Home (poster)	_____
Safe On the Road, At Home & At Play (poster)	_____

FLIERS

Description	Qty.
Welcome Safety into Your Home	English _____
Welcome Safety into Your Home	Spanish _____

VIDEOS

Description	limit 1
Pirate Pete's Playground Safety (Targets children ages 5-9)	DVD _____ VHS _____
Ride Smart, It's Time to Start: Bike Safety	DVD _____ VHS _____
Bike Safety, Bike Smart	DVD _____ VHS _____
Talk to Me: Talking to your teen about dating violence and sexual assault	VHS _____

ADDITIONAL FREE RESOURCES AND HOTLINES

Stop It Now!® Prevent Child Sexual Abuse 1-888-PREVENT www.stopitnow.org

Virginia Child Abuse and Neglect Hotline: 1-800-552-7096 (voice/TTY) www.preventchildabuseva.org

Virginia Family Violence and Sexual Assault Hotline: 1-800-838-8238 (V/TTY)

National Poison Help Line: 1-800-222-1222 (For poison emergencies)

National Suicide Prevention Lifeline: 1-800-273-TALK, www.suicidepreventionlifeline.org

National Highway Traffic Safety Administration (NHTSA): www.nhtsa.gov (Free transportation and bike safety materials)

VA Department of Transportation- Bicycle Safety: <http://virginiadot.org/infoservice/bk-orderinfo.asp> (Free bike safety brochures and reflectors)

VA Department of Fire Programs- VDFP Kids: www.vdfp.state.va.us/kidscampaign.htm (Free downloadable activities and lesson plans)

U.S. Consumer Product Safety Commission (CPSC): www.cpsc.gov (Free injury prevention brochures)

Window Covering Safety Council: www.windowcoverings.org (Free window safety information and free cord-repair kits)

Health Smart Virginia: <http://www.healthsmartva.org> (Resources for VA educators to support the Health Education SOL)

PoisonPrevention.org: www.poisonprevention.org (Free brochures, posters and downloads)

You may access our web site at www.vahealth.org/civp for additional injury and violence prevention information and resources. The above tip cards and some of our past brochures can be downloaded from our web site.



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