

Fire and Burn Related Injuries in Virginia, 2001-2005

Dear Injury Prevention Advocate,

Although it takes only minutes for an injury to occur, the effects can be long lasting. Fire and burn related injuries are no exception. While the physical injury may heal, victims can be left with a lifetime of physical and psychological scars. Fortunately the vast majority of fire and burn related injuries (94.5%) and deaths (90%) are unintentional in nature and therefore are preventable. Safe Kids Worldwide states that 75% of scald burn-related injuries among children could be prevented with behavioral and environmental modifications. These modifications are simple, inexpensive and easily implemented. Knowledge and behavior changes can not only prevent these types of injuries, but also reduce the severity of injuries if an incident is to occur.

According to a 2006 Virginia telephone survey, 47% of residents indicated that they had a home fire escape plan, of those, 43% had not practiced their plan. National Fire Prevention Week occurs every October. The theme this year is "Practice Your Escape Plan." Most people acknowledge the importance of having a working smoke alarm in the home. However, it is important to remember that this device is only intended to alert when there is a fire. Therefore it is important to know what to do when the alarm sounds.

This report and previous reports are available for download at www.vahealth.org/civp.

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

Sincerely,



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Introduction

Burns are one of the most devastating and painful injuries one can sustain. Burn injuries require long rehabilitation and physical therapy. Burn survivors usually have to deal with a lifetime of physical and psychological trauma¹. One can sustain a burn injury through a number of different mechanisms: exposure to fire, hot liquids and objects, chemicals, electrical currents, and extreme cold.

In 2004, in the United States there were 3,322 deaths due to fire and burn related injuries. During the same year an estimated 443,957 people were treated in U.S. emergency rooms for fire and burn related injuries². It is important to note that most victims of fires die from inhalation of smoke and toxic gases, not burns. However, these injuries are still counted as fire related deaths and hospitalizations.

For this report, fire and burn related deaths and hospitalizations in Virginia were analyzed from 2001-2005. Unintentional fire and burn related mortality are analyzed together. This is followed by an analysis of unintentional fire and burn morbidity, whereby, fire and burn injuries were analyzed separately by age and gender. All rates were calculated using population data from the national Center for Health Statistics and are per 100,000 population.

Case Briefs

Case One:

A 4 year old boy was trying to help prepare dinner for himself and his siblings by microwaving a cup of instant soup. When trying to remove the soup from the microwave, he found it too hot to handle and dropped it. The contents spilled over his face, neck, chest and right arm. The boiling liquid instantly produced second and third degree burns. The hot noodles and his shirt stuck to his skin providing further injury. In the emergency room, the child was immediately provided analgesic for pain control

and wound care. Child Protective Services was contacted due to the concern of poor supervision or possible neglect. The child was admitted to the burn unit for pain control and initial burn wound care. His ongoing therapy will include further wound management and psychological counseling.

Case Two:

A father of four small children was in the shower when he heard the smoke alarm going off. He investigated to find a fire on and around a mattress in one of the children's bedrooms. He got his four children out of the house and called 911. The Fire Department arrived and extinguished the fire. The father's three year old son had plugged in an open element hot plate in the bedroom. The element ignited bedding materials and clothing causing moderate damage to the bedroom and smoke damage throughout the home. The father had suffered minor burns to the bottom of both feet.

Virginia Fire and Burn Related Mortality

In Virginia, from 2001-2005, there were 482 deaths as a result of a fire or burn related injury. Ninety-seven percent (n=468) of these deaths were due to fire/flame exposure while the remaining 3% (n=14) were from exposure to a hot object/substance.

Fire and burn related injury deaths are overwhelmingly unintentional in nature. Over the five year period, 90% of deaths were unintentional, while 6% were the result of homicide/suicide.

Unintentional Fire and Burn Related Mortality

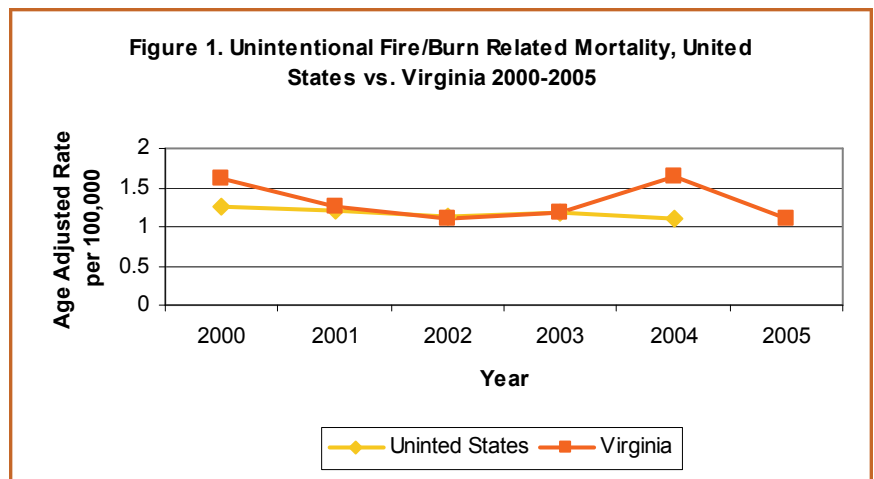
There were 437 unintentional fire and burn related deaths in Virginia from 2001-2005 for a five year crude rate of 1.2 per 100,000. Comparing age adjusted rates, Virginia fire/burn related mortality rates have not been as stable as U.S. rates. U.S. fire/burn rates have declined slightly since 2000 (2004 is the most current available national data). On the other hand, Virginia experience a large spike in fire/burn related deaths during 2004.

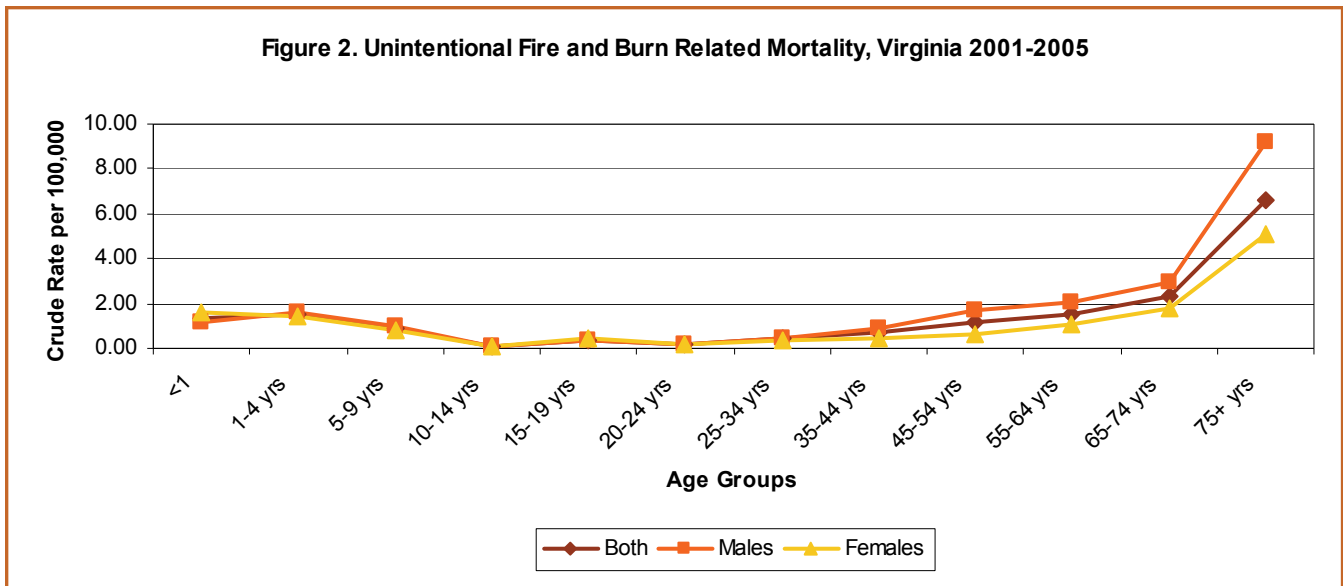
Most burn related deaths are the result of exposure to fire/flame. During the five year period 97% of unintentional burn deaths were the result of fire/flame exposure, while the remaining 3% were from exposure to a hot object/substance.

The five year male death rate (1.4 per 100,000) was higher than the female rate (0.96 per 100,000). The minority death rate (1.95 per 100,000) was higher than the white death rate (1.04 per 100,000).

Elderly Virginians 65 and older are at greatest risk of dying from a fire or burn related injury than any other age group. The elderly five year crude death rate was 4.31 per 100,000.

Elderly males had a higher death rate than elderly females. Over half (67%) of these deaths were from exposure to an uncontrolled fire in a building or structure and 10% were from the ignition or melting of bedtime or other clothing.





Virginia Burn Morbidity

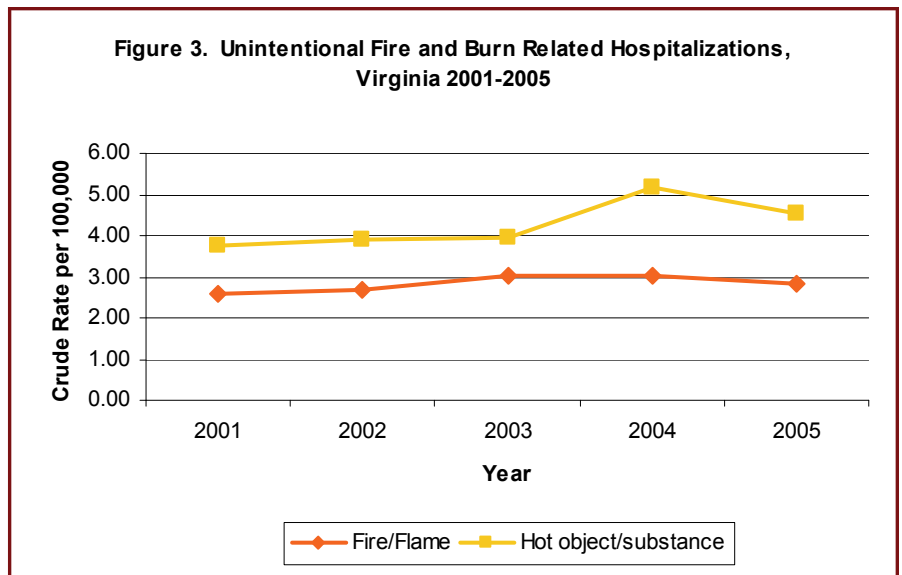
During the same five year period (2001-2005), there were 2,777 hospitalizations related to fire and burn injuries. The crude five year rate was 7.52 per 100,000.

58.9% of burn hospitalizations were the result of exposure to a hot object/substance, while the remaining 41.1% of burn hospitalizations were the result of exposure to fire/flame. 94.5% of these hospitalizations were considered unintentional.

Unintentional Fire and Burn Morbidity

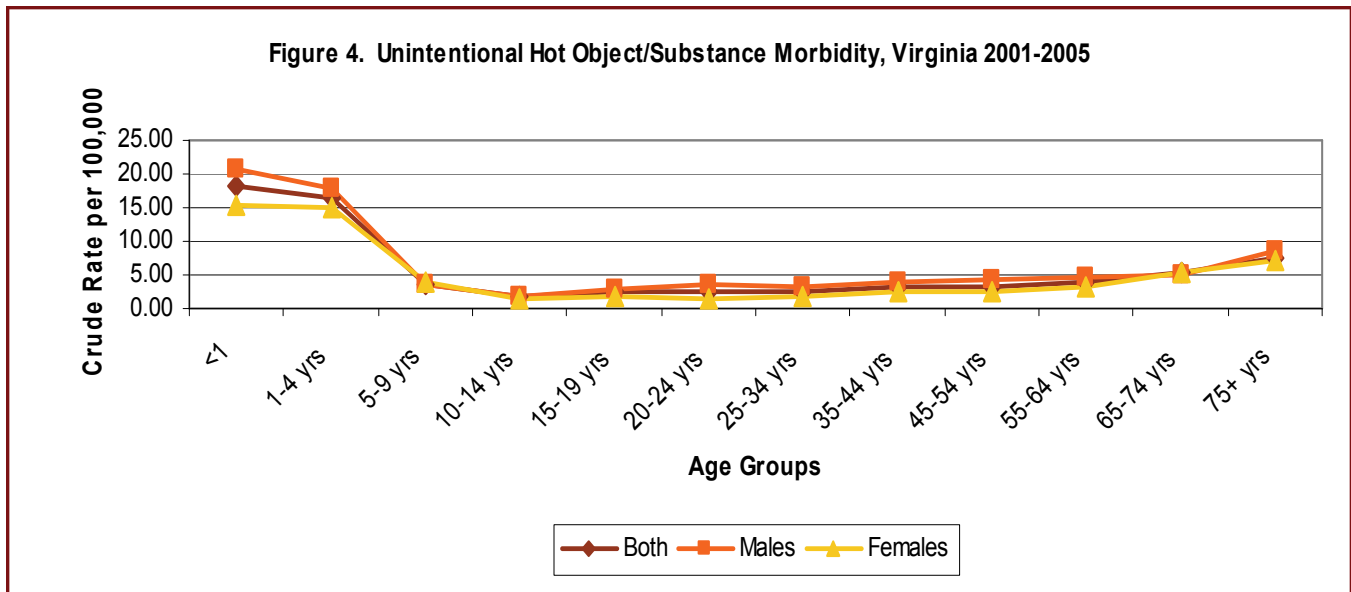
There were 2,625 unintentional fire and burn related hospitalizations in Virginia from 2001-2005, accounting for almost 95% of all fire/burn hospitalizations. The five year crude rate was 7.1 per 100,000.

60% of the unintentional fire and burn hospitalizations were from exposure to a hot object/substance, while the remaining 40% were from exposure to fire/flame. As seen in Figure 3, hot object/substance injury rates were higher than fire/flame injuries across all five years of the study. While fire/flame rates remained fairly stable across the five year study, hot object/substance rates jumped 35% in 2004 before decreasing slightly in 2005.



Hot Object /Substance Injuries

Injury hospitalizations due to hot object/substances accounted for 60% of all unintentional fire and burn hospitalizations. As seen in figure 4, infants (less than 1 year) and children 1-4 experienced higher rates of



hospitalization than any other age group. Among this age group, injury hospitalization rates were higher among males than females. 42% of the burn hospitalizations were caused from hot substance vapors and 21% were from boiling tap water.

Scalds (caused by hot liquids or vapors) are the most common types of burn related injuries among children. Hot tap water accounts for almost one-fourth of all scald burns among children; these injuries are most likely to occur in the bathroom³.

SNAPSHOT!

A Look at Injury Related Emergency Room Visits

The following data covers **scald** related burns among children seen at the VCU Health System Emergency Department in Richmond Virginia, from 1993-2006*:

- ◆ 465 children, 17 and younger, were seen in the ER for scald related burns.
- ◆ 40% of these children were 1 or younger.
- ◆ The parts of the body most injured by scald burns, in order, were: Trunk, Leg/Foot, Arm, Head, Hand.
- ◆ The number of scald related visits to the Emergency Department increased 160% from 1994 to 2005.

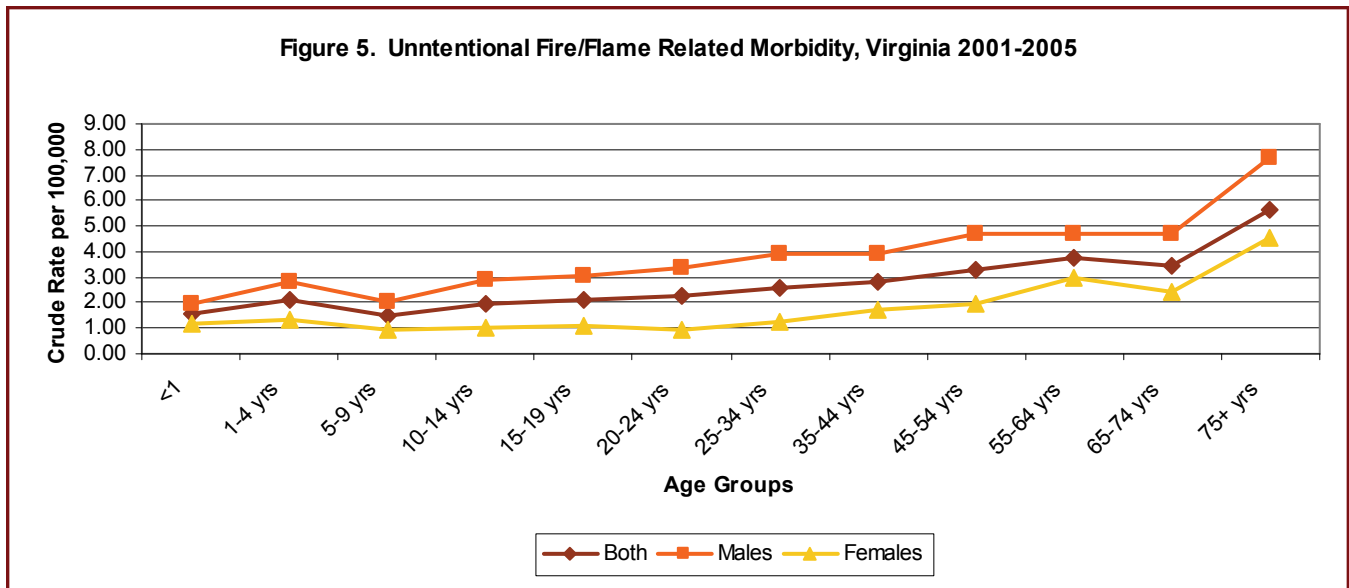
*These numbers are intended as a snapshot of burn injuries seen in one local Virginia emergency room. They can not be generalized to the Richmond area or to all of Virginia.

Fire/Flame Related Hospitalizations

Injury hospitalizations due to fire/flames accounted for 40% of all unintentional fire/burn hospitalizations. The five year crude rates was 2.83 per 100,000. Male fire/flame hospitalization rates (3.89 per 100,000) were two times higher than female hospitalization rates (1.82 per 100,000). The risk of injury from fire/flame exposure increases with age (see Figure 5).

Virginian elderly 75 and older had the highest rate of injury hospitalizations due to fire/flame exposure than any other age group. 40% of these hospitalizations were from fire exposure in a private dwelling, while 23.6% were from clothing or other flammable material catching fire.

Physical and cognitive changes experienced by the elderly place them at higher risk of being injured and dying from a fire⁴. Complications from these changes increase elderly adults' likelihood of starting a fire and decreases their chance of being able to escape a fire. According to U.S. Fire Administration, the leading causes of fires in which elderly have been injured are: cooking (27%), smoking (19%), and heating (12%)⁵.



Conclusion/Limitations

There are a number of limitations regarding the surveillance of fire and burn injury in Virginia. The counts of fire and burn hospitalizations represent discharges not individuals. One individual may have been admitted and discharged from a hospital on several occasions throughout the period of study. Also, the data does not include fire or burn injuries that were treated by Emergency Medical Services, Emergency Rooms, Primary Care Physicians, or in the home.

As evidenced by the snapshot on scald burn related injuries seen at the VCU Emergency Department, a large number of burn injuries are not captured by hospitalization and mortality data sets. These data sets exclude burn injuries that did not result in a hospital admission or death. A more comprehensive surveillance system that could include Emergency Room data, Emergency Medical Responders (EMS), Burn Centers, and Virginia Fire Programs is needed to track and prevent fire and burn related injuries in Virginia.

PREVENTION TIPS

Fire and burn related injuries can be prevented. Up to 75% of scald burn-related injuries among children could be prevented with behavioral and environmental modifications⁶. Fire/Burn injuries among children and the elderly can be prevented by following these tips:

Childhood Fire and Burn Prevention Tips

In the U.S. fires caused by children's play is the leading cause of residential fire-related death and injury among children ages 9 and under, while the leading cause of burn injuries are scalds (mostly from hot tap water)⁷. The following tips will help prevent childhood fire and burn injuries:



FIRE

- Install smoke alarms on every level and in every sleeping area of your home. Test the smoke alarms every month and replace batteries every six months. (Refer to manufactures instructions)
- Replace smoke alarms every ten years.
- Keep matches, lighters, gasoline, and other flammable materials locked away out of children reach.
- Teach children to tell you when they find matches and lighters.
- Avoid dressing children for sleep in loose-fitting, 100 percent cotton garments, i.e. oversized t-shirts.
- Develop and practice a home fire escape plan and designate a meeting place outside.
- Demonstrate how to Stop, Drop, and Roll if clothes catch on fire.
- Teach children not to hide from firefighters; but to get out quickly and call for help from another location.

BURNS

- Set your water heater thermostat to 120 degrees Fahrenheit or below. Consider installing water faucets and shower heads containing anti-scald technology.
- When giving a child a bath, run cold water into the tub first, then add hot water.
- Use back burners and turn pot handles to the back of the stove when cooking.
- Keep appliance cords out of children's reach, especially if the appliances contain hot foods or liquids.
- When using the microwave, be careful of steam escaping from containers.
- Keep hot foods and liquids away from table and counter edges.
- Never carry or hold children and hot foods or liquids at the same time.
- Cover unused electrical outlets with safety devices.
- Never leave young children alone, especially in the bathroom or kitchen.



PREVENTION TIPS

Elderly Fire and Burn Prevention Tips

The elderly are at increased risk of hospitalization and death from a fire or burn related injury. This risk is largely due to changes in cognitive and physical abilities as one ages. These changes greatly diminish an elderly adult's ability to hear, feel, and see potential fire and burn dangers⁸. The following tips can help to prevent fire and burn related injuries among the elderly:

FIRE

- Install smoke alarms on every level and in every sleeping area of your home. Test the smoke alarms every month and replace batteries every six months. (Refer to manufactures instructions)
- Replace smoke alarms every ten years.
- If your clothing catches on fire, Stop, Drop, and Roll.
- Develop and practice a home fire escape plan. Plan your escape around your abilities. Have a telephone in your bedroom and post the local emergency number nearby in case you are trapped by fire.
- Keep glasses, medicines, a telephone, a flashlight and walking aids close to your bed.
- Wet cigarette butts and ashes before emptying ashtrays into a wastebasket.
- Never smoke when lying down, drowsy, or in bed.
- Keep space heaters at least three feet away from anything that can burn. Unplug heaters when they are shut off, you leave your home, or go to bed.
- Wear tight-fitting or rolled-up sleeves when cooking. If a pan of food catches fire, slide a lid over it and turn off the burner.
- Do not cook if you are drowsy from alcohol or medication.
- Do not store or use flammable liquids near furnaces and water heaters.

BURNS

- Set your water heater thermostat to 120 degrees Fahrenheit or below. Consider installing water faucets and shower heads containing anti-scald technology.
- If you use a wheelchair: When moving hot liquids, place a large, sturdy tray with a sold lip in your lap to decrease the risk of lap burns.
- Consider alternate cooking equipment (slow cookers, toaster ovens or microwaves) placed on lower counters or tables if the stove or oven is too high to reach safely.
- Consider the weight of pots and pans. Attempt to move only those items that you can easily handle.
- Place a rubber mat in front of your stove to prevent slipping and falling against the stove.
- All appliance cords need to be kept coiled and away from counter edges. Cords may get caught in cabinet doors, causing hot food and liquids to spill onto you or others.
- Use of heat protection devices geared toward protecting those with disabilities such as; microwave dish holders, hot hand protectors and stove monitors.
- Look for and repair outlets that do not work, light switches that are hot to the touch, and lights that flicker.



RESOURCES

- Division of Injury and Violence Prevention
www.vahealth.org/civp/index.asp
- Virginia Department of Fire Programs
www.vafire.com
- Old Dominion Professional Firefighters Burn Foundation
www.networkrichmond.com/_odburn/index.htm
- National Center for Injury Prevention and Control, CDC
www.cdc.gov/ncipc
- Safe Kids USA
www.usa.safekids.org
- American Burn Association
www.ameriburn.org
- National Fire Protection Association
www.nfpa.org/index.asp

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5. U.S. Fire Administration, National Fire Incident Reporting system, 1996.
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7. National Safe Kids Campaign (NSKC). Burn Injury Fact Sheet. Washington (DC): NSKC, 2004. http://www.usa.safekids.org/tier3_cd.cfm?folder_id=540&content_item_id=1011
8. American Burn Association. Campaign Kit for Burn Awareness Week 2003—Senior Safety.

The Virginia Injury Update has been prepared by the Division of Injury and Violence Prevention, Virginia Department of Health with assistance from the VCU Health System Emergency Department.

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