

Hyperthermia Deaths of Children in Vehicles in North Carolina: 1999 – 2011

Exposure to heat can cause an overheating in the body (hyperthermia) that, left untreated, can rapidly progress to illness, heat stroke and death. While heat-related illnesses are most often associated with outdoor activities and extreme outside temperatures the confined space of a motor vehicle can be particularly dangerous for children as excessive heat can cause organ failure and fatal injury in a short time.

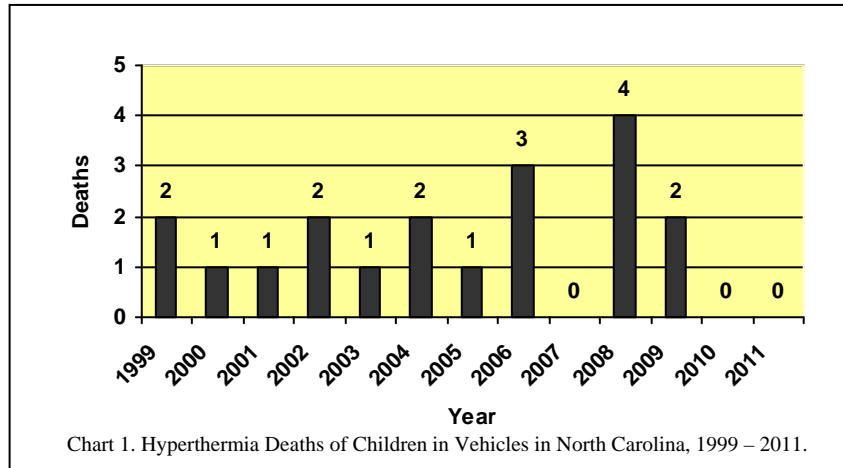


Chart 1. Hyperthermia Deaths of Children in Vehicles in North Carolina, 1999 – 2011.

The San Francisco State University Department of Geosciences has been tracking these deaths since 1998 and report that 530 children (approximately 38 per year) have died from hyperthermia in vehicles nationwide¹. North Carolina accounted for **19** of these deaths from **16*** events between 1999 & 2011 (13 years). Over the 13-year period, Wake County had two fatal events and is the only county with more than one event. Hyperthermia events also occurred in: Alamance, Carteret, Cumberland, Dare, Davidson, Guilford, Hoke, Iredell, Jackson, Nash, Richmond, Rutherford, Scotland and Watauga counties.

**In 2006 all three deaths occurred in one incident. In 2008 four deaths resulted from three incidents including the death of a child who was visiting North Carolina.*

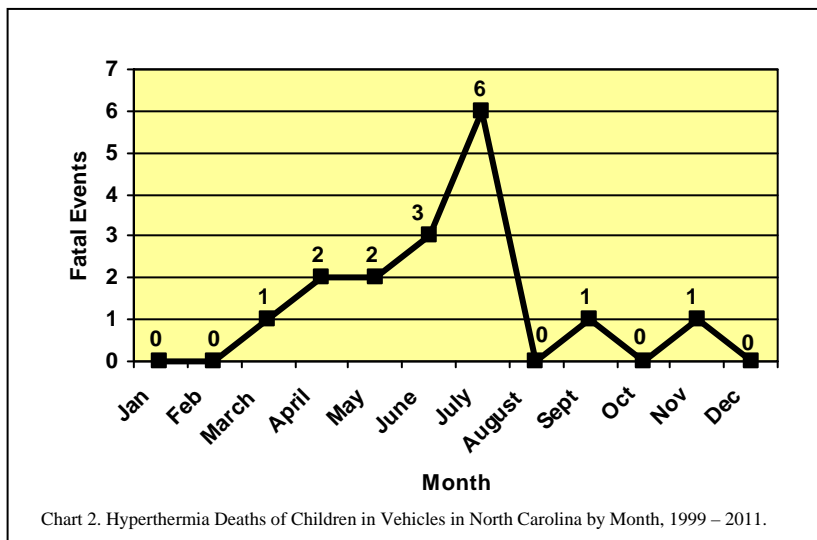


Chart 2. Hyperthermia Deaths of Children in Vehicles in North Carolina by Month, 1999 – 2011.

Time of Year

Despite the absence of deaths in North Carolina for the past two years the danger for injury and death from hyperthermia in vehicles still remains. The first three US deaths of 2012 occurred in May¹. Statewide, North Carolina is entering the time of year when fatal hyperthermia deaths peak.

Temperature

A 2005 study of vehicle temperatures found that when

the ambient temperature is between 72 degrees and 96 degrees Fahrenheit outside the vehicle the temperature can increase inside the vehicle by roughly 40 degrees within one hour, with 80% of that increase occurring within the first 30 minutes². Therefore on a sunny 72 degree day, a vehicle’s internal

temperature can reach 117 degrees Fahrenheit within an hour. The historical temperature data for the area for each North Carolina fatal event was obtained from archived data³. The mean temperatures ranged from 62 degrees to 84 degrees Fahrenheit. The highest maximum temperature was 95 degrees. Temperatures inside the vehicles could easily surpass 100 degrees Fahrenheit on sunny days.

Temperature	Ranges	Average
Minimum	46 – 73 F	64.8 F
Mean	62 – 84 F	75.4 F
Maximum	73 - 95 F	86.8 F

Table 1. Hyperthermia Deaths of Children in Vehicles in North Carolina by Temperature, 1999 – 2011.

Circumstances

There are three general circumstances in which children die from hyperthermia in vehicles: the child accesses the vehicle on his or her own; the caregiver forgets that the child is in the vehicle (often with a change of routine) and does not remove them upon exiting the vehicle; or the child is intentionally left unattended while the caregiver goes to perform a task or run an errand.

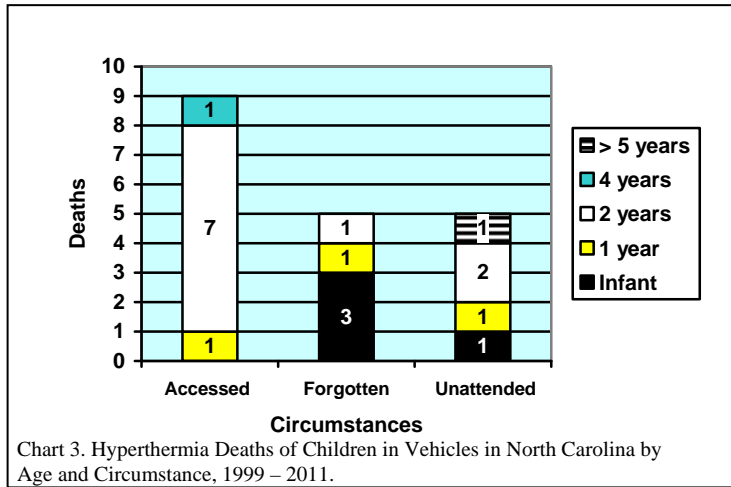


Chart 3. Hyperthermia Deaths of Children in Vehicles in North Carolina by Age and Circumstance, 1999 – 2011.

Accessed: Nine children died in six events when the children accessed a vehicle unnoticed. The range of time in the vehicle was approximately 30 minutes to six hours after they were discovered missing.

Forgotten: Five children (three infants) died in five separate events when they were forgotten in a vehicle by a caregiver. These children were found between 1 and 8 hours later either by a passerby, when a caregiver realized the child was not where he or she was supposed to be or only upon the caregiver’s return to the vehicle.

Unattended: Five children died in five events when they were intentionally left in a vehicle while the caregiver performed another task or ran an errand. These children were discovered unresponsive or deceased after being left unattended in a vehicle for less than an hour (two deaths), for one to three hours (two deaths) and one child remained in the vehicle for over 10 hours. Of note, almost all of these deaths were ruled accidental by the Office of the Chief Medical Examiner. However, there was one unattended death in which the manner was determined to be homicide and one unattended death in which the circumstances did not lead to an identifiable manner of death.

Children who accessed a vehicle on their own did so at their own home (5) or at a relative’s home (1). Children intentionally left unattended were left in a vehicle at home, a relative’s home, a caregiver’s work place and a church. Children who were forgotten were in a vehicle at the caregiver’s work (4) or at a relative’s home.

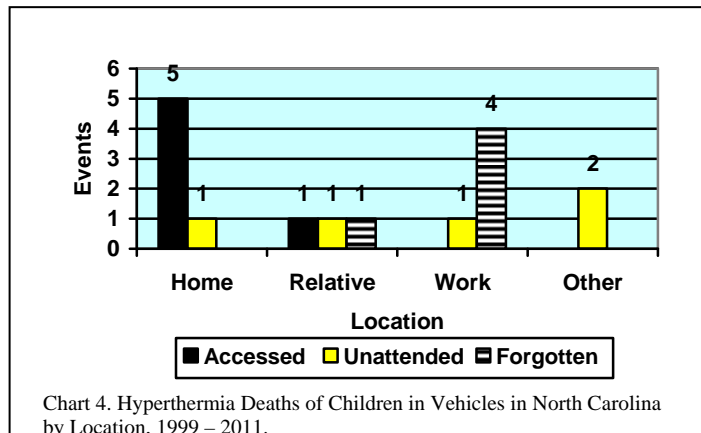


Chart 4. Hyperthermia Deaths of Children in Vehicles in North Carolina by Location, 1999 – 2011.

Prevention

Injury and death from hyperthermia in vehicles is preventable. While most of these deaths occur in the summer it is necessary to be aware of the dangers of hyperthermia year round. Safe Kids North Carolina offers the following prevention tips⁴:

- Never leave a child alone in a vehicle. Check to make sure all children exit the vehicle when you reach your destination.
- Lock the doors when your vehicle is parked. Teach children that cars are not places to play.
- Busy parents have a lot on their minds, so give yourself a reminder. Place your purse, briefcase or other important items in the backseat next to your child's car seat to help you remember to look in the back before leaving the car.
- Set a reminder on your cell phone or other mobile device to remind you to drop off children at school or daycare when routines change.
- Make an agreement with your child's school or daycare that you will be notified if your child is not dropped off at the normal time.
- If you see a child or pet left unattended in a vehicle, call 911 immediately.
- Check vehicles and trunks first if a child goes missing.

References:

1. <http://ggweather.com/heat/>
2. McLaren, C., Null, J., Y Quinn, J. (2005). Heat stress from enclosed vehicles: Moderate ambient temperatures cause significant temperature rise in enclosed vehicles. *Pediatrics*, 116 (1), e109 – e112.
3. Weather Underground: www.wunderground.com
4. Safe Kids NC: www.ncsafekids.org

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