

Improving Messaging for Pediatric Vehicular Heatstroke Deaths

Lillian Muller
NOAA/NWS Louisville



How can we
reach caregivers
more effectively?

How can we
increase
education
and
awareness
on PVH
deaths?



Building a
Weather-
Ready
Nation

Objectives

NWS messaging surrounding pediatric vehicular heatstroke (PVH) deaths can be improved to increase awareness and education, ultimately leading to fewer deaths.

To improve messaging for PVH deaths, it is necessary to have:

- More consistent messaging
- Improved formats of consumption geared towards parents and caregivers
- Lesser known circumstances and risk prevention techniques included
- Information more readily accessible to the public

Methodology & Results

All of the content was produced by combining social science and targeted design strategies with previous research results on parental perceptions surrounding PVH deaths.

Social Media Graphics:

- Focus on one important element for each
- Highlight "Look Before You Lock"
- Attention grabbing headline

Informational Flyer (English/Spanish):

- Attention grabbing statistics
- In-depth information on the circumstances surrounding PVH deaths
- Science behind why heat is so dangerous for children and vehicle heating
- Actions caretakers can take to protect their children
- Highlight "Look Before You Lock"
- To be distributed to child care centers through emergency managers

Over **900** Children Have Died Inside Hot Vehicles Since 1998



The inside of a car heats up very quickly and **death can occur within 10 minutes.**

Children's bodies **heat up 3 to 5 times** as fast as healthy adults.

It is **never safe** to leave a dependent in the car, not even for a minute.

Look Before You Lock

weather.gov/heat



Children Should **NEVER** Be Left in a Car, No Matter the Time of Year



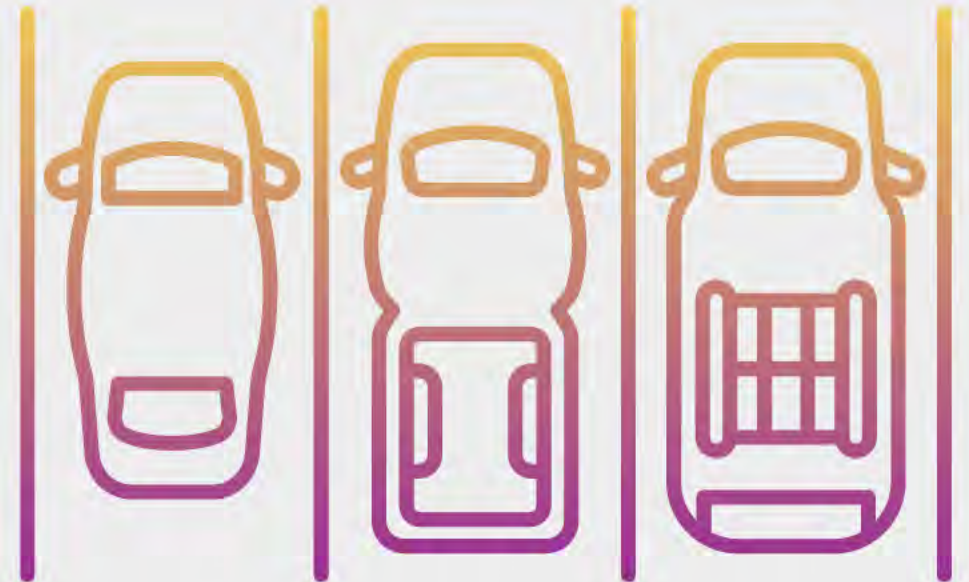
34% of children have died in a hot car outside of the summer months.



Be on **ALERT** year round. At least one child has died in a hot car during each month of the year.



Vehicular heatstroke can occur when outside temperatures are **below 70°F**.



Look Before You Lock

DON'T LEAVE ANYONE BEHIND IN A HOT CAR



Move an important item to the backseat to remind you of any passengers after you park.



Move a stuffed animal to the front seat as a reminder to check for passengers when you leave.



Set a reminder on your phone to remember your passengers when you arrive.

LOOK BEFORE YOU LOCK





Over **900** Children Have Died Inside Hot Vehicles Since 1998



25% of children gained access to a parked car without supervision.



Even if you are not a caretaker, make sure parked cars are **locked**



If you can't find your child, you should always **check the car.**

Look Before You Lock

Over **900** Children Have Died Inside Hot Vehicles Since 1998

It can happen at familiar locations when a caretaker's routine is interrupted.



58% of these deaths occurred at home



23% of these deaths occurred at a caretaker's work



7% of these deaths occurred at child care

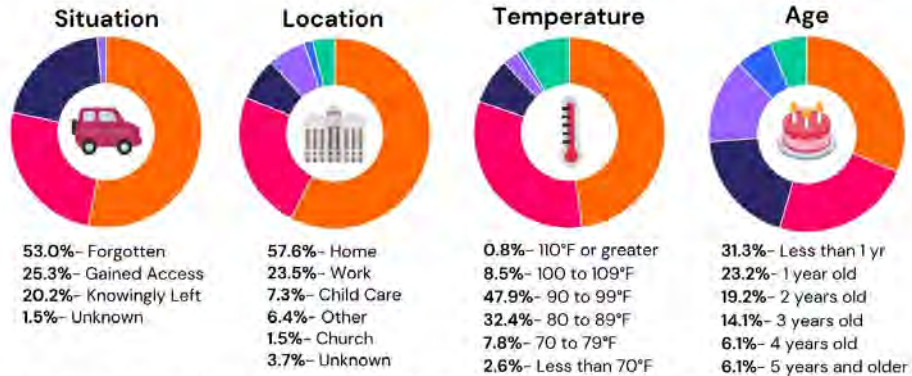
Look Before You Lock

Pediatric Vehicular Heatstroke Death



- Over **900 children** have died inside hot vehicles since 1998.¹
- On average, **38 children** die each year from Pediatric Vehicular Heatstroke (PVH).¹
- PVH is the **leading cause** of death for non-crash vehicular deaths among children.²

The Circumstances¹



In many cases of PVH where a child is forgotten, their caregivers experienced a **change of routine**. The brain can easily go on auto pilot trying to stick to a routine, and because of this, important things can be easy to forget when you are out of routine. This is why many PVH deaths occur at **familiar locations** like home, work, and child care.

A lesser-known cause of PVH is **children gaining access to a parked car**. When children are playing, they could use car keys or find an unlocked car to gain access, whether it is the caregiver's or a stranger's vehicle.

34% of PVH deaths have occurred outside of the summer months (June, July, August) and a child has died of PVH each month of the year. PVH **deaths can and have occurred at temperatures in the 60s and 70s**, temperatures many incorrectly believe are too low for PVH to occur. The majority of PVH deaths involve **children under the age of 2 years old**, with the average age being 21 months old. This is because young children often fall asleep in their rear facing car seat, making it even easier to forget your child.

The Science



A child's body heats up **3 to 5 times** as fast as a healthy adult. A child's major organs begin to fail at 104°F and a child can die when their temperature reaches 107°F.²



Temperatures inside a car can **quickly become life threatening** regardless of the outside temperature. Leaving windows down or cracked has little to no effect on the temperature inside of a vehicle. Leaving the A/C on can still be dangerous as it might not be strong enough, could stop working, or accidentally be turned off.

Temperatures Inside of a Vehicle over Time¹

Time	Temperature					
Outside Air Temp	70°F	75°F	80°F	85°F	90°F	95°F
10 min	89°F	94°F	99°F	104°F	109°F	114°F
20 min	99°F	104°F	109°F	114°F	119°F	124°F
30 min	104°F	109°F	114°F	119°F	124°F	129°F
60 min	113°F	118°F	123°F	128°F	133°F	138°F

Things You Can Do

You should never leave a child in a car for any period of time. When you get out of a routine or are exhausted, it can be easy for anyone who takes a child somewhere in a car, to forget someone important. Doctors, nurses, principals, and hardworking parents have all forgotten their child in a hot car. You should **give yourself audio and visual cues** to remember.



Move a belonging such as your bag or jacket to the backseat to remind you of any passengers after you park. This is a tool to break the brain's autopilot.



Keep a **stuffed animal** where your child sits when they are not in the car. Move the stuffed animal to the front seat when driving with a child. This will serve as a reminder to check for passengers when you leave.



Make sure that your **child care provider has a plan to call** you or other caregivers if your child does not show up at a certain time.



Always **check for passengers first, then make sure your car is locked** at all times. In addition, keep your keys away from children, especially those that would be able to access a car with them. If your child is missing, the car should be one of the **first places you check**.



Set a **location reminder** using a reminders app on your phone. Set it up to check the backseat when you get out of your car or arrive at a frequent location like home, work, etc.

Always Look Before You Lock

Sources

- Jan Null, CCM, Department of Meteorology and Climate Science, San Jose State University, <http://noheatstroke.org>
- NHTSA, Keeping Kids Safe, [nhtsa.gov/road-safety/child-safety#topic-heatstroke](https://www.nhtsa.gov/road-safety/child-safety#topic-heatstroke)

National Weather Service
[weather.gov/heat](https://www.weather.gov/heat)



NWS Children, Pets, and Vehicles Heat Page Content

Changes

Increase messaging for lesser known situations:

- Children gaining access to vehicles
- Deaths outside of the summer months
- Deaths in lower temperatures

Replace the case examples to achieve:

- Varying temperatures
- A range of geographic locations
- Differing situations
- More impactful messaging by removing possibly harmful wording

Additions



The science behind why children cannot handle the heat like adults.



A table of temperatures over time inside of a car at different outside temperatures.



Actions that caregivers can take to protect their children and pets.

NWS Children, Pets and Vehicles Site Graphics:

- Focus on the statistics of PVH deaths
- Highlight "Look Before You Lock"

Pediatric Vehicular Heatstroke (PVH) Death

38 children
die of PVH
each year



58% occur at
home



24% occur at
work



7% occur at
child care

LOOK BEFORE YOU LOCK

Source: Jan Null, CCM, Department of
Meteorology and Climate Science, San Jose
State University, <http://noheatstroke.org>

38 children
die of PVH
each year

Pediatric Vehicular Heatstroke (PVH) Death



53% of children were forgotten, often happening
when the caregiver has a change in routine.



25% of children gained access to a
parked car without supervision.

LOOK BEFORE YOU LOCK

Source: Jan Null, CCM, Department of
Meteorology and Climate Science, San Jose
State University, <http://noheatstroke.org>

Pediatric Vehicular Heatstroke (PVH) Death

38 children
die of PVH
each year



The average age
is **21 months old**.



88% are 3 years
old or younger.

LOOK BEFORE YOU LOCK

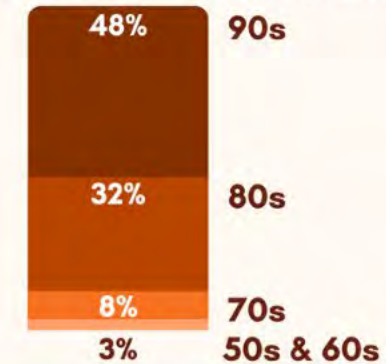


Source: Jan Null, CCM, Department of
Meteorology and Climate Science, San Jose
State University, <http://noheatstroke.org>

38 children
die of PVH
each year

Pediatric Vehicular Heatstroke (PVH) Death

Percent of PVH Deaths at Different Temperatures (°F):



LOOK BEFORE YOU LOCK



Source: Jan Null, CCM, Department of
Meteorology and Climate Science, San Jose
State University, <http://noheatstroke.org>

References

1. Null, J. (2022). Heatstroke Deaths of Children in Vehicles. <https://www.noheatstroke.org/>
2. *Child Safety*. (2022). NHTSA. <https://nhtsa.gov/road-safety/child-safety#topic-heatstroke>
3. William, C.A., & Grundstein, A.J. (2017). Children Forgotten in Hot Cars: A Hybrid Mental Models Approach for Improving Public Health Messaging. *Injury Prevention* 24(4), 0:1–9. <https://doi.org/10.1136/injuryprev-2016-042261>

Acknowledgments

John Gordon

Danielle Nagele

David Johnson

Kelly Allen

Ryan Sharp

Kimberly McMahon

Adrian Lopez Lago

Jan Null

Funding Sponsor:

Ernest F. Hollings

Undergraduate

Scholarship Program

