Each year, dozens of children and an unknown number of pets die inside parked vehicles. In just over two minutes, the inside of a car can reach deadly temperatures. A dark dashboard, steering wheel or child car seat can cause the temperature to reach more than 200 degrees due to heat or air conduction and convection. The dashboard, steering wheel and child car seat can also give off longwave radiation, increasing the temperature. This causes rapid warming of the air trapped in the vehicle. Leaving windows slightly open does not significantly decrease this heat rate.

The temperature inside a vehicle can increase by 20 degrees over the outside temperature in just 10 minutes and increase by more than 30 degrees in 30 minutes.

Infants and children (and pets) are even more at risk for adverse health effects caused by extreme heat than adults because of their small body sizes. They absorb heat more quickly and have trouble cooling off. Sweating doesn’t cool down an infant or young child in the same manner as it does for an adult. Infants and young children cannot extract themselves from a car seat or take off their clothing to help adjust their body heat. Even a brief time in a locked vehicle can cause heat stroke, delirium, seizures, increased heart rate, shock, damage to vital organs and, eventually, death.

**HOW CAN THIS POSSIBLY HAPPEN?**

While it can occur, rarely are heat deaths of adults, children and pets the result of intentionally being left inside a vehicle; most are tragic accidents. For instance, a man in Mississippi fell asleep in his car, with the windows rolled up, and died of heat stroke. Children playing “hide and seek” in vehicles have become locked inside the vehicle without the parents being aware. Pets are often left in vehicles and die after the owner “ran into the store for just a few minutes”. Sadly, it only takes a few short minutes.
Neuroscientist, Dr. David Diamond, Professor of Psychology at the University of South Florida, has hypothesized that memory failure, which results in tragically forgetting a child/infant in a car seat, is the result of competition between the brain’s “habit memory” system and its “prospective memory” system – and the “habit memory” system prevails.

Prospective memory refers to the planning and execution of future actions, such as planning to deliver a child to daycare. Habit memory refers to tasks involving repetitive actions that are performed automatically, such as driving from one known location to another known location. Prospective memory is processed by two brain structures, whereas the habit memory system is centered in one area – enabling people to perform repetitive tasks automatically.

Have you ever planned to stop at the grocery store on your way home from work and arrived at home only to realize that you forgot to stop at the grocery store? In this case, “habit memory” kicked in during your drive home. Children mistakenly left in vehicles are often left there by a caregiver who does not routinely deliver the child to the intended destination, or when the routine has changed. More information on this study can be found at theconversation.com/an-epidemic-of-children-dying-in-hot-cars-a-tragedy-that-can-be-prevented-60909.

HEAT AND HUMIDITY

Excessive environmental heat occurs when temperatures rise, humidity increases, the sun gets stronger and there is no air movement. You should be aware of, and watch for, local heat advisories about elevated temperatures in your area:

• **Excessive Heat Watch** - Conditions are favorable for an excessive heat event to meet or exceed local Excessive Heat Warning criteria in the next 24 to 72 hours.

• **Heat Advisory** - Heat index values are forecast to meet or exceed locally defined advisory criteria for 1 to 2 days (daytime highs= 100-105° Fahrenheit).

• **Excessive Heat Warning** - Heat index values are forecast to meet or exceed locally defined warning criteria for at least 2 days (daytime highs= 105-110° Fahrenheit).

Outside “feels like” temperatures increase with relative humidity. So a temperature of 90 degrees, with a relative humidity of 55 percent, has a “feels like” temperature of 97 degrees. As humidity levels increase, “feels like” temperatures also increase. The higher the temperature and humidity combined, the more dangerous the temperatures become.

**HEAT-RELATED ILLNESSES**

Hyperthermia (greatly increased body temperature) occurs when the body absorbs more heat than it can handle; it can occur inside a vehicle even with outside temperatures are in the 70s. The younger the person, the more severe the effects because their body has not developed the ability to sufficiently regulate the internal body temperature. Heat exhaustion and heat stroke can lead to death if not treated immediately.
**Heat Exhaustion:** Symptoms include headache, nausea, dizziness, weakness, irritability, thirst, heavy sweating, elevated body temperature and decreased urine output.

**Heat Stroke:** Symptoms include high body temperature, confusion, slurred speech, hot/dry skin, profuse sweating, very high blood pressure, seizures and loss of consciousness.

**REPORTS OF HUMANS IN A LOCKED VEHICLE**

These calls require immediate action! Before EMD can be provided, the patient must be accessible. Does your agency have a policy? Policy should include responses for patients that are responsive (able to follow directions to get out of the vehicle) and for patients that are non-responsive. The policy should identify responses such as law enforcement, fire, or EMS, or a combination of these responders. The policy should also include information on breaking a window – or prohibiting it. If breaking of a window is permitted, the policy should include safety instructions – for both the person in the vehicle as well as for the person breaking the window.

EMD questions about a patient removed from a locked vehicle may include:
- Are they conscious?
- Are they breathing?
- Are they short of breath?
- Can they answer questions/follow instructions?
- Are they sweating profusely?
- Any signs of seizure?
- If conscious, are they dizzy, weak or feeling faint?
- How long were they in the vehicle?

EMD instructions may include:
- Loosen clothing to assist with cooling;
- If possible, move them to a cool environment;
- Fan them, if possible;
- It is important to note that these EMD questions and instructions are suggestions only. You should always follow your agency’s policy and procedures.

**REPORTS OF PETS IN A LOCKED VEHICLE**

The Humane Society of the U.S. recommends the following to help a pet left in a hot car:
- Take down the car’s make, model and license plate number.
- If there are businesses nearby, notify their managers or security guards and ask them to make an announcement to find the car’s owner. Many people are unaware of the danger of leaving pets in hot cars and will quickly return to their vehicle once they are alerted to the situation.
- If the owner can’t be found, call the non-emergency number of the local police or animal control and wait by the car for them to arrive. In several states Good Samaritans can legally remove animals from cars under certain circumstances, so be sure to know the laws in your area and follow any steps required.

Your agency should have a policy for handling calls about pets in vehicles, including information about any Good Samaritan laws.

Signs/symptoms of an overheated animal, or one that is suffering from hyperthermia, include excessive panting, dry/pale gums, excessive drooling, groaning with heavy breaths, glazed eyes, confusion or dizziness.

**NOT JUST SUMMERTIME**

While temperatures rise quicker and higher during the summer months, deadly temperatures can also occur during other times of the year, depending on the degree of sunlight, outside temperature and humidity.
- In the month of April, a mother in North Carolina left her 15-month-old son in a car for nine hours while she was at work. She is now serving a 20-year prison sentence for his death.
- In the month of March, a 3-year-old girl died when her father left her in a car seat for an hour and a half while he visited friends. This occurred in Hawaii when the outside temperature was 81 degrees.
- In the month of December, a 6-month-old Texas infant died after being left in a car for two hours by his mother. The outside temperature was 81 degrees.

**PRECAUTIONS THAT CAN BE TAKEN**

No adult, infant, child or pet should ever be left in a vehicle with the windows rolled up. Infants/children should never be left alone in a vehicle at all, even with the windows rolled down. When transporting infants/children, consider:
- posting a reminder note on the dashboard;
- setting an alarm on your phone;
- asking the caregiver to call you if the child hasn’t been dropped off as scheduled;
- taking off one shoe and placing it in the backseat;
- placing the diaper bag or child’s toy in the front seat.

**EDUCATE YOUR COMMUNITY**

You can help prevent these serious and deadly incidents through public education.
Consider posting warnings and information on your agency’s website and/or via social media sites. Discuss these dangers via 9-1-1 educational exhibits and crime or fire prevention presentations.

Debbie Gailbreath is Communications Accreditation Manager for the Sarasota County, Florida, Sheriff’s Office PSAP. She has more than 30 years of public safety communications experience. She is a Past President and Executive Council Representative of FL APCO and previously served as a Gulf Coast Regional Representative on the APCO International Board of Directors. She is a certified Florida Public Safety Telecommunicator, a CALEA Assessor and a Registered Public Safety Leader (RPL).

References:
- www.kidsandcars.org/how-kids-get-hurt/heat-stroke/
- www.osha.gov/SLTC/heatstress/#hot
- www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/heat-wave-safety#about
- www.humanesociety.org/animals/resources/tips/help-dog-in-hot-car.html
- www.littlethings.com/dog-overheating-signs/
- www.redcross.org/prepare/plan/household-emergency-plan/#heat-wave-safety
- www.cdc.gov/motorvehiclesafety/child_passenger_safety/cps-factsheet.html
- www.cdc.gov/howtoavoidheat/index.html
- www.cdc.gov/howtoavoidheat/safety/cps-factsheet.html
- www.cdc.gov/howtoavoidheat/safety/cps-factsheet.html

CDE EXAM #47926

1. Based on the Estimated Vehicle Interior Air Temperature vs. Elapsed Time chart, when it’s 80 degrees outside, the interior temperature reaches ________ degrees after 30 minutes.
   a. 99
   b. 80
   c. 114
   d. 108

2. Infants and children (and pets) are at less risk for damage caused by extreme heat than adults because of their small body size.
   a. True
   b. False

3. Habit memory refers to tasks involving repetitive actions that are performed automatically, such as driving from one known location to another known location.
   a. True
   b. False

4. _________ refers to the planning and execution of future actions, such as planning to deliver a child to daycare.
   a. Habit memory
   b. Hyperthermia
   c. Humidity
   d. Perspective memory

5. According to the NWS Heat Index chart, an outside temperature of 84 degrees with a relative humidity of 70% is equal to a “feels like” temperature of
   a. 80 degrees
   b. 90 degrees
   c. 83 degrees
   d. 89 degrees

6. Hyperthermia is a greatly increased body temperature which occurs when the body absorbs more heat than it can handle.
   a. True
   b. False

7. Signs/symptoms of an overheated animal include excessive panting, dry/pale gums, excessive drooling, groaning with heavy breaths, glazed eyes, confusion/ dizziness.
   a. True
   b. False

8. Humans in a locked vehicle can suffer from heat stroke, delirium, seizures, increased heart rate, shock, damage to vital organs and, eventually, death.
   a. True
   b. False

9. When heat index values are forecast to meet or exceed locally defined warning criteria for at least 2 days (daytime highs = 105-110° Fahrenheit), a/an ________ is issued.
   a. Excessive Heat Warning
   b. Excessive Heat Watch
   c. Humidity Warning
   d. Heat Advisory

10. There are no known precautions that can be taken to prevent children from being left in a locked vehicle.
    a. True
    b. False

FOR CREDIT TOWARD APCO RECERTIFICATION(S)

Each CDE article is equal to one credit hour of continuing education.
1. Study the CDE article in this issue.
2. Answer the test questions online (see below for online exam instructions) or on the exam page from the magazine article (photocopies are not required).
3. Add/upload your CDE article information and certificate of achievement in the “My Classes Taken” section of APCO’s Training Central at www.apcointl.org/trainingcentral.

Questions? Call us at (386) 322-2500.

You can access the CDE exam online!
To receive a complimentary certificate of completion, you may take the CDE exam online. Go to http://apco.remote-learner.net/login/index.php to create your username and password. Enter the “CDE article” in the search box, and click on the “2018 Public Safety Communications Magazine Article Exams,” then click on “enroll me” and choose “Heat Hazard (47926)” to begin the exam. Upon successful completion of the quiz, a certificate of achievement will be available for download/printing.