

# NSTSCCE

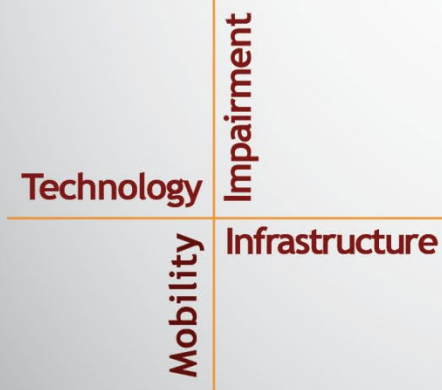
## National Surface Transportation Safety Center for Excellence

### Pediatric Vehicular Hyperthermia Injury

#### Feasibility of Data Collection

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## EXECUTIVE SUMMARY

Pediatric vehicular hyperthermia (PVH) remains a critical public health issue, characterized by the rapid and dangerous increase in a child's body temperature when left in a hot vehicle. Despite public awareness campaigns and legislative efforts, PVH continues to account for an average of 37 fatalities annually in the United States. PVH cases are a combination of complex situations involving the unique vulnerability of children to hyperthermia and caregiver memory lapses, intentionally leaving a child unattended, and children gaining access to vehicles. The research conducted aimed to assess the feasibility of collecting detailed data on non-fatal PVH cases, which are currently underreported and poorly understood.

This investigation utilized interviews with personnel from a variety of organizations likely to be involved in PVH incidents, such as police departments, fire departments, emergency medical services (EMS), and hospitals. The findings revealed critical gaps in the existing data collection systems that impede accurate tracking and reporting of PVH events. None of the interviewed organizations had specific data fields to capture PVH cases, leading to the reliance on narrative fields, which are inconsistent and subjective. This research hence highlights the need for the implementation of required, standardized data fields across national databases, such as the National EMS Information Systems (NEMSIS) and the National Fire Incident Reporting System (NFIRS), as well as within hospital coding systems. Furthermore, the addition of a specific International Classification of Diseases (ICD) code for PVH is recommended to facilitate more accurate case tracking once medical organizations are involved. Improved data collection and reporting would provide a clearer understanding of the prevalence of PVH and guide more effective public health interventions and legislative actions.



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## **LIST OF ABBREVIATIONS AND SYMBOLS**

CPS	child protective services
EMS	emergency medical services
ICD	International Classification of Disease code
NEMSIS	National EMS Information Systems
NFIRS	National Fire Incident Reporting System
NPTDB	National Pediatric Trauma Data Bank
PVH	pediatric vehicular hyperthermia
VTI	Virginia Tech Transportation Institute



## CHAPTER 1. INTRODUCTION

Pediatric vehicular hyperthermia (PVH) is a condition that occurs when a child is left in a hot vehicle, resulting in a rapid and potentially dangerous increase in body temperature. In extreme cases, PVH can escalate to pediatric vehicular heatstroke, which can be fatal. Children are particularly vulnerable to heatstroke due to their higher body-surface-area-to-mass ratio and less efficient perspiration compared to adults—a child’s body temperature can rise 3 to 5 times faster than an adult’s temperature (American Academy of Pediatrics, 2020; Garcia-Souto & Dabnichki, 2016). Once a child’s temperature reaches 104 °F, their major body organs begin to shut down; death is likely to occur as the temperature rises to 107 °F or above (American Academy of Pediatrics, 2020). Unfortunately, despite efforts for increased public awareness and legislative efforts about PVH, the condition remains a significant public health concern and cause of vehicle non-traffic child fatalities in the United States (Kids and Cars, 2024).

More specifically, PVH, backover events, and frontover events have topped the list of most common non-traffic incidents and fatalities of children 0–14 years old in the U.S. since 1990 (Zonfrillo et al., 2018). Ironically, the introduction of frontal airbags and their safety benefits required the placement of children in the back seat for safety. In turn, this shift may have inadvertently increased the risk of PVH by placing infants and toddlers in rear-facing car seats in the back seat, which are not easily seen by drivers. These young children may fall asleep or remain silent during car rides and, upon destination arrival, fail to provide any auditory reminders about their presence to the driver (National Safety Council, 2018). Once the driver leaves and the car doors and windows are closed, studies have shown that vehicle temperatures can increase by 41 °F within an hour, with 80% of this rise occurring in the first 30 minutes. This quick rise in temperature can make even a short period of exposure potentially fatal for a child that is left behind in a vehicle (McLaren et al., 2005). On average, the U.S. records 37 PVH fatalities annually, amounting to 987 child deaths to date since record-keeping began in 1998, with potentially thousands more suffering non-fatal injuries (Null, 2024; Zonfrillo et al., 2018).

More generally, PVH can result from many different scenarios. Caregivers may forget the child is there or leave the child in the vehicle intentionally, not wanting to disturb their sleep. They may feel that they are just making a quick stop, or use the vehicle as a substitute for childcare. Alternatively, children may gain access to an unlocked vehicle without parental knowledge (Null, 2024). The majority of PVH fatalities (~52%) are attributed to caregivers unintentionally forgetting a child, often due to lapses in prospective memory triggered by stress or routine disruptions (Null, 2024). Another 24% of fatalities are attributed to children gaining access to vehicles. About 20% of PVH fatalities occur due to caregivers knowingly leaving children in the vehicle, likely not being aware of the potential harmful consequences. Each of these tragic scenarios highlights the complex interplay between human behavior and vehicular safety.

To address these dangers, legislative measures such as the HOT CARS Act have been proposed to mandate rear seat reminder technologies (RSRTs) in new vehicles (HOT CARS, 2019). These technologies aim to alert caregivers to a child’s presence in the back seat through auditory and/or visual signals. However, the legislation is still pending, and its implementation faces challenges such as technological reliability and the potential for false alerts (Glenn et al., 2021). Despite the National Highway Traffic Safety Administration’s delay in issuing a Notice of Proposed Rulemaking, now postponed from December 2022 to April 2025, both car manufacturers and

aftermarket companies continue to develop safety countermeasures for both new and existing vehicles (Cybex, 2024; Genesis, 2024; Kelly Blue Book, 2023; Mid Florida Newspapers, 2024).

While the legislative efforts continue, public health campaigns currently play a crucial role in preventing PVH. Initiatives such as “Look Before You Lock” and “Don’t Leave Me Behind” emphasize the importance of checking vehicles for children and ensuring that cars are securely locked so that children are unable to gain access. These campaigns aim to change caregiver behaviors and raise awareness about the dangers of leaving children unattended in vehicles. However, in order to implement a behavior change such as looking in the back seat every time before locking a car door, an individual has to admit to themselves that they are fallible and could potentially forget a child in a vehicle. Very few parents and caregivers (~12%) actually believe they have any risk of a child in their care overheating in a vehicle (Sartin et al., 2023). Additionally, many caregivers and parents hold a negative view of individuals who have had a child in their care succumb to PVH, further distancing themselves from the possibility that it might actually happen to them.

In spite of these educational efforts, PVH fatalities have unfortunately not decreased substantially over the last 25 years and remain a pressing public health concern. The number of PVH deaths per year is currently determined using articles and press reports, which do not provide a complete depiction of all PVH-related incidents (Null, 2024). More importantly, these approaches do little to inform the prevalence of situations that can lead to PVH. An Australian non-profit, for example, reports that over 5,000 children are rescued every year in that country from being left unattended in a vehicle (Kidsafe, 2022). Thus, it is possible that similar trends are present in the United States, and that ultimately there is a far higher prevalence of PVH-related injuries than currently perceived based on the fatal cases.

Thus, this investigation was formulated to understand the extent to and form in which data collection is done in the U.S. for PVH, particularly non-fatal cases. This is important for two reasons. First, if the true rate of PVH injuries (i.e., non-fatal cases) and fatalities is understood, caregivers may be less likely to conceptualize PVH as something very rare that could never possibly happen to them, possibly leading to increased vigilance. Second, once more precise incidence and prevalence rates of PVH incidents in the U.S. can be determined, more detailed examination and monitoring can be supported (Rothman et al., 2017). This information, in turn, can guide public health and policy-making efforts and enable effectiveness evaluations for such efforts.

## **CHAPTER 2. METHODS**

The general approach for this investigation leveraged one-on-one or small group interviews of representatives from different organizations that were deemed by the team as likely to have some level of involvement when a PVH injury or fatality occurs. The sample of personnel and organizations was primarily one of convenience, but with a reasonable expectation that representative and generalizable data could be obtained.

### **ORGANIZATIONS**

To support the interviews, VTTI staff compiled a comprehensive list of organizations that could be involved in reported cases of children left in vehicles and potentially experience PVH. Given limited time and resources, along with increased accessibility via existing connections, organizations within a 5-hour driving radius from Blacksburg, Virginia, were prioritized. This list encompassed organizations that might engage in situations ranging from minor to severe. For example, a minor incident could be a situation where a caregiver accidentally locks a child and their keys inside the vehicle, realizes their mistake, and immediately calls for assistance without leaving the child unattended. A severe incident, on the other hand, could involve a child being left behind in a vehicle on a hot day, resulting in PVH or heatstroke. The inclusion of this range of scenarios aimed to ensure a thorough view of any data flows related to PVH incidents and potential injuries. Based on these specifications, the organizations identified for possible involvement included police departments, sheriff's offices, fire departments, first responders, state emergency medical services (EMS) data managers, medical directors of the state EMS office, emergency department personnel in a hospital, and primary care physicians. The team used personal contacts, referrals, and web/directory searches to identify individuals that could then be interviewed for this project.

### **PARTICIPANT RECRUITMENT**

The research team disseminated recruitment emails and made phone calls to provide information about this study to local individuals associated with the identified organizations ( $N = 15$ ). Additionally, VTTI staff contacted one more individual who expressed interest in participating upon learning about the study through word-of-mouth. Researchers engaged in follow-up communications with interested individuals through one additional email or phone call to answer questions before an interview was scheduled. Individuals who volunteered to participate then received an email containing an interview appointment reminder, Zoom meeting details, and informed consent information (Appendices A). There were no exclusion criteria based on sex, health status, or ethnicity for participation in this research.

### **INTERVIEWS**

Online one-on-one or small group interviews were conducted with organizational personnel. Each interview commenced with attendee introductions, followed by a confirmation that all participants had received and reviewed the information sheet (Appendix A). A brief overview of the study and participant expectations was then provided. All participants were then asked to give verbal consent before proceeding with the interview. The interview questions focused on the following topics:

- Organization protocols for handling PVH incidents
- Data recording, including the feasibility of collecting detailed data on PVH events
- Data reporting

Additionally, interview participants were invited to disclose or discuss any other details regarding their organization's handling of PVH scenarios. Appendix B contains a complete list of topics and questions that were used, which were developed by the project team to be applicable to a wide array of organizations. Each online interview lasted approximately 60 minutes and was audio recorded for subsequent transcription. Content analysis was then used to summarize the different ways in which PVH scenarios, and particularly any resulting data, were handled by the various organizations.

## CHAPTER 3. RESULTS

### ORGANIZATION RESPONSE

During recruitment, researchers contacted a total of 15 individuals representing the identified organizations. Of these individuals, eight agreed to participate in seven different interviews representing six different organizations:

- police department (1)
- fire department (2)
- first responders (1)
- state EMS data manager (1)
- medical director of the state EMS office (1)
- emergency department in a hospital (2)

### ORGANIZATION INTERVIEWS

Interviews to discuss the organizations' experience, protocols, and data recording of PVH scenarios lasted between 26:32 and 57:12 minutes, with an average duration of 41:15. Responses from participants are summarized below, organized by topic area and, when relevant, specific agency.

While interviewees were asked about their first-hand experience with PVH events, none reported any direct experience. Instead, interviewees relayed PVH events that they learned about from other individuals who were on a call, and situations in which they were called to a lockout event at which the parent or caregiver was present. Given the nature of indirect knowledge regarding these incidents with interviewees and the inability to locate those individuals with the mentioned direct experience, these potential events were not analyzed further for any investigation into possible prevalence rates, etc.

#### **Protocols for Handling PVH Incidents**

##### ***Initial Contact with Potential PVH Victim***

All organizations stated that a situation responding to a child in a vehicle (whether knowingly left, unknowingly left, or where the child gained unauthorized access) would start with a call to 911. Various organizations could then be dispatched depending on the identified severity. Law enforcement would always be called and potentially EMS.

##### ***Treatment of Potential PVH Victim***

Participants suggested that the standard operating procedure in these situations is relatively uniform. Whichever organization arrives first on scene would assess the situation and determine

whether a window needed to be cracked open immediately based on the child and environmental assessment, or whether the situation was not severe and a lockout kit could be used to gain entry into the vehicle without property damage. Law enforcement, fire departments, and EMS organizations all generally have the tools and ability to either break a window or use a lockout kit as safely as possible. In addition, some fire departments have vehicles with thermal imaging cameras on them. This equipment can measure the temperature of the window and provide an idea of the possible temperature inside the vehicle. After access is gained to the vehicle interior, the child is removed from the hazard so that EMS can check vitals to get a baseline understanding of the child's status and decide whether further treatment (e.g., transfer to a cooler environment, using ice packs to cool the child down, and/or give fluids to reduce dehydration) is needed. A state medical director of EMS would be in charge of specifying the exact protocols that EMS professionals would follow for treatment when called to a PVH scene. PVH protocols can vary from state to state or not even exist at all. Generally, however, if fluids are given to a patient, they will always be transported to a hospital for further evaluation.

### **Data Recording**

Responses provided to these prompts varied substantially between organizations. Therefore, results for different organizations are summarized in different subsections.

### ***EMS Services***

All EMS departments are required to report all the services they provide to the National EMS Information System (NEMSIS) in order to standardize collected data. NEMSIS mandates what data is to be reported and creates data fields with possible data entry variables for EMS crews to complete. In addition, each EMS department can request from their administrator to add data fields in order to easily collect data that might be of particular interest to them. However, this additional information is only conveyed to NEMSIS upon request.

Much of the data collected by EMS has prefilled response options. For example, the "reason for dispatch" question has prefilled response possibilities such as breathing problems, hot/cold exposure, and wellness check. All three of these possibilities could be used to describe a call for a child left or found in a vehicle. The "location for the call" question also has pre-filled answers, allowing for responses such as commercial building, residence, street road, and private building. Unfortunately, there is not an option for either "parking lot" or "inside vehicle" as a location of emergency. There is also a "request for patient symptoms" prompt. Possible responses in that field that could indicate a PVH scenario include diaphoresis, skin flushed, excessive crying, altered mental status, convulsions, spasms, abdominal rigidity, cramping, and syncope. There is also an "impressions" request in which responders can record what they feel was going on that resulted in the call and can choose options such as heat exhaustion or heat stroke. Finally, responders also input vitals of their patient, transportation provided if applicable (i.e., ambulance, emergent or non-emergent), and their transport destination. In more local data recording at the individual department or state level, responders may also document the scenario by writing narratives that include any information they wish to provide.

### ***State EMS Data Management***

Currently, there is not a data system in place to track instances of PVH at the state level. If an individual were to make a request for data on PVH events, the agency would have to conduct a narrative search on their databases using search terms such as “heat related illness” and constraining the search to incidents associated with a vehicle and/or taking place inside a vehicle. However, a search would also return events where individuals were treated for a fever while in a vehicle. The International Classification of Disease (ICD) system also provides fields to indicate patient diagnoses, but a specific code for PVH does not exist. Thus, ICD code searches would require combining diagnoses that could be tied to PVH, but without complete assurance that PVH was present.

Interviewees stated that in order to accurately record PVH instances, a discrete data element needs to be defined and added into NEMESIS. The framework for the data collection is already created, but the codes for this situation are not. The request for these codes to be implemented should also be national in scope.

### ***Fire Department***

Fire departments also have tools to document all incidents in which they assist. These documentation tools can be individualized based on requests from local areas for information important to the region, for example, whether drugs were potentially involved in a specific event (e.g., a drug overdose). All fire stations are further asked to voluntarily complete a report for the National Fire Incident Reporting System (NFIRS). A completed NFIRS report includes information on the nature of the call, the actions the firefighters took while on the call, and all end results from the call. However, it is up to the data recorder to provide specific details they deem important to the situation in a narrative section. This could include PVH-relevant information such as the state of the child in a PVH scenario and whether the incident took place inside a vehicle. While there is guidance as to what the recorder should include in a report, ultimately the level of detail provided is at the recorders’ discretion. Situations in which a child was locked in a vehicle would often be coded in vague terms such as “public service call,” or even “EMS call” if the situation is ultimately handed off to an EMS team.

Similar to other organizations, for the fire department to collect data that would then be easily coded as a potential PVH scenario, a specific data field would need to be added to their data log. Interviewees suggested that the biggest challenge to overcome, if such a field existed, would be to ensure that reporters completing the data entry take the time to complete all the information that is requested.

### ***Police Department***

The police are often the first on the scene because they are generally posted throughout the community, particularly during the day. They also operate in smaller vehicles than an ambulance or firetruck and thus can travel more efficiently than these larger vehicles. Typically being first on scene implies that the police are commonly tasked with an initial assessment of the situation, particularly whether breaking a window or using a lockout kit is necessary. The department interviewed stated that their officers had received training from animal control on vehicular

heatstroke as it relates to non-human animals. Their training involved how to assess the severity of the situation based on the outside temperature and how long it was estimated that the animal had been inside the vehicle. If in their estimation the situation is severe and a window needs to be broken, officers are required to obtain permission from their supervisor before proceeding and may also call for EMS services to be on standby.

The filing of a police report after responding to an event involving a child in a vehicle would differ based on the severity of the situation. In these documents, police officers generally report what they saw in a call and what they did during a call. Mentions of an “assist rescue,” “assist citizen for unlocking car,” or “breaking window” could be present in case narratives and potentially indicate PVH, but these descriptors could also be present in non-PVH scenarios. Additional documentation is usually not generated because police usually pass off these scenarios to EMS services after the initial response. However, the department interviewed does identify if there is a “case vehicle” involved with a situation. This field can be used to constrain a search to calls that involved a vehicle. Unfortunately, there is not an option to describe whether an incident was “heat related.” If there are any suspicions of neglect, however, the police will handle the filing of criminal charges and report their findings in a narrative box within their report.

### ***Hospital Pediatric Emergency Department***

A PVH case would be transferred to the hospital if the situation was severe enough to warrant more medical attention than is able to be provided by EMS. While at the hospital, any patient that presents symptoms of PVH would be treated immediately to cool the core body temperature with items such as cooling blankets, ice, and fluids. The individual’s vitals would be recorded in flow sheets along with timestamps for each measurement, but any specifics related to treatment would be written in a notes section rather than a specific data field. There is also a “chief complaint” data field which can be completed by a physician/provider using an ICD code.

Unfortunately, as noted by interviewees in state EMS offices, there are multiple possible ICD codes that a provider could choose to list as a chief complaint for a PVH scenario. Some possibilities include heatstroke associated with heat (vs. exertion), hyperthermia of pediatric patient, hyperthermia of newborn, environmental hyperthermia of newborn, hyperthermia induced defect, environmental exposure, environmental illness, accident due to environment, and heatstroke (exertional or other). Furthermore, there is no specific coding to document where the incident occurred. Therefore, that information, if known by the provider or stated by witnesses or caregivers, may only be included in the notes section of the report. If that information is not included, a case may not be positively identified as PVH.

One important obstacle highlighted by hospital interviewees for recording PVH scenarios distinctly is that different providers record situations differently. In order to search data to obtain a reliable count of PVH instances, there would need to be a distinct data field completed by the provider indicating whether the case was an occurrence of PVH. Currently, this could occur locally at different hospitals. However, as was mentioned for NEMESIS and NFIRS, a national requirement for collecting this data within hospitals would need to be enacted in order to have every hospital record these occurrences and report them to a national database.

Interviewees noted that the documentation system for hospitals is set up to facilitate access to data and primarily intended to inform any individual who comes in to care for the patient (e.g., after a shift change) about the patient's status and treatment requirements. The main purpose of this system is generally not to support data queries. That said, providers do have the option of contributing information to the National Pediatric Trauma Registry, which is designed to support research. This reporting, however, is also based on diagnosis and injury codes from the ICD, which lacks a PVH code.

### **Data Reporting**

Interviewees from all organizations stated that their mandated reporting depended on the situation. Police stated that they would be required to report any activity they deemed criminal. All other agencies (i.e., EMS services, fire departments, and hospitals) were required to report suspected abuse or neglect to child protective services (CPS).



## CHAPTER 4. DISCUSSION

PVH continues to be a public health issue with no noticeable decline in fatalities over the past 25 years. There are public health campaigns and legislative efforts aimed at mitigating the risks associated with PVH; however, all these efforts are based on our knowledge of PVH fatalities and not the unknown number of overall PVH occurrences and/or associated injuries. Accurate prevalence and injury data concerning PVH is critical to obtain a full understanding of the PVH landscape in the United States. Ultimately, such understanding can better inform public education campaigns and legislative efforts aiming to reduce or eliminate PVH events. This study highlights critical gaps in data collection across organizations responding to PVH incidents. Acknowledging and documenting gaps found in PVH reporting by EMS, fire departments, police, and hospitals is an essential first step in motivating actions to address this issue and gain the necessary data to inform effective interventions and ultimately save lives.

In general, the interview findings highlighted the absence of standardized data fields specific to PVH within local and national databases such as NEMSIS and NFIRS. This absence creates a huge challenge in accurately capturing and analyzing these incidents on a large scale. Across agencies, interviewees reported that the specifics of a PVH incident would normally be placed in a narrative field. Narrative fields are indeed useful in allowing the individual reporting to highlight important issues about the incident that might not be clear from completing the discrete data fields alone. However, narratives tend to be highly subjective and only include what a specific reporter deems pertinent to fully describe the situation. Without training and standards, different reporters may generate vastly different descriptions for the same event. Ultimately, identification of potential PVH events would be possible if terms were present in the narrative to suggest a heat-related condition along with whether the event took place in a vehicle. In order for a reporter to deem these two data elements as valuable information, they need to be trained in the seriousness of PVH and be invested in creating a report that reflects the incident thoroughly. In addition, while consistently including these facts in a narrative would create records of PVH incidents, searching through narratives for key words is more difficult and time-consuming than filtering data using discrete data fields.

Interviewees indicated that none of their organizations had a reporting system that included a discrete data field to specify a PVH incident. More specifically, the police had no option of reporting a call as a heat-related incident and, although NEMSIS and NFIRS records may offer options for a chief complaint being heat-related, there are a multitude of such options that the reporter can choose. None of these options consider whether the event took place inside a vehicle, a key element of PVH. To generate clear documentation with easily searchable fields, all of these reporting systems would need to add a discrete data field for recording PVH occurrences. Though local departments can address the need for this reporting at a local level and adjust their reporting to reflect this data collection need, at a national level this change needs to be mandated by the agencies that oversee databases such as NEMSIS and NFIRS. Similar changes would also be required with hospital records.

Specific to hospital records, while ICD codes provide a broad framework for medical coding, the lack of a specific code for PVH makes it difficult to accurately track these cases within the healthcare system. In the 11<sup>th</sup> edition of the ICD there are 3.3 million concepts, 15 million names, and 7.9 million codes. The lack of a PVH-specific code is somewhat puzzling,

particularly when there are highly specific codes for unusual events such as a space crash collision, being struck by a macaw (initial encounter), or being injured while swimming in a prison swimming pool. The addition of a specific PVH code would allow health care providers to more specifically identify these cases and researchers to easily create data queries that quantify and qualify the number and medical outcomes of PVH cases. It is important to note, however, that hospital personnel would generally not be involved in the initial on-scene care of PVH patients and may not be provided with specific information that would lead to a PVH diagnosis. This can be combated by redundancy in the reporting systems and better and more standardized communication across agencies.

Ultimately, interviewees alluded to a lack of a unified reporting system that links cases across different agencies, making it difficult to trace a single PVH incident from initial response to hospital care. This disconnect underscores the need for improved communication and collaboration between agencies to ensure that all relevant data is captured and shared. A consistent case number that could be used from the first on-scene report and throughout all involved agency reporting could improve that communication and reduce the potential for duplication of reported incidents.

The most important finding from these interviews is how essential it is to advocate for the implementation of standardized and PVH-aware reporting protocols across all organizations involved in PVH response. This includes the creation of discrete data fields for PVH incidents within national databases and training for reporters on the importance of thorough and accurate data collection. The resulting data can be used to develop more targeted public education campaigns while disclosing the true prevalence of fatal and non-fatal PVH in our nation. In particular, knowing the frequency with which PVH events occur, regardless of outcome, can hopefully persuade caregivers that PVH happens more often than we think, and that it could happen to anyone. Individuals need to believe that they are subject to a particular harmful behavior before they will take preventive steps to mitigate that behavior. If a majority of the population does not believe that it is possible for them to leave their child in a car (knowingly or unknowingly), or that their child would gain access to a vehicle by themselves, no amount of education or technological inventions will be of use. Precise data collection and analysis related to the scope of the PVH problem will allow the traffic safety community to take meaningful steps toward preventing future PVH tragedies.

## APPENDIX A. PARTICIPANT INFORMATION SHEET



### Information Sheet for Participation in a Research Study

Principal Investigator: Laurel Glenn

IRB# and Title of Study: #24-273 PVH Injury Rate Data

Sponsor: National Surface Transportation Safety Center for Excellence

You are invited to participate in a research study. This form includes information about the study and contact information if you have any questions.

#### ➤ **WHAT SHOULD I KNOW?**

If you decide to participate in this study, you will complete an interview designed to gather information from various organizations such as police, first responders and medical professional that might be involved in a Pediatric Vehicular Hyperthermia (PVH). Researchers will ask questions about your organization's experience with PVH cases, specific documentation and reporting procedures, and support needed for documentation. The information gathered will be used to investigate the feasibility of tracking the prevalence and injury rate of PVH.

The study should take approximately 60 minutes of your time.

There is a small risk of minor discomfort from talking to a researcher, or possibly other participants who may be taking part in the phone interview, about PVH scenarios. In addition, any details you wish to disclose about your organization during the interview may be used anonymously in the publicly available report in reference to your general organization (such as "police department" but not the name of the department or those individuals interviewed). You are never required to answer any question you are not comfortable with discussing and are free to tell the researcher you would like to skip a section or terminate the interview at any time.

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse

to answer any questions you don't want to answer and remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

### ➤ **CONFIDENTIALITY**

We will do our best to protect the confidentiality of the information we gather from you, but we cannot guarantee 100% confidentiality.

Any data collected during this research study will be kept confidential by the researchers. Your interview will be audio-recorded using a digital recorder and then transcribed. The researchers will code the transcripts using a pseudonym (false name). The recordings will be uploaded to a secure password-protected computer in the researcher's office. The researchers will maintain a list that includes a key to the code. The master key and the recordings will be stored for 5 years after the study has been completed and then destroyed.

### ➤ **WHO CAN I TALK TO?**

If you have any questions or concerns about the research, please feel free to contact **Laurel Glenn at 540-231-1543 or [LGlenn@vti.vt.edu](mailto:LGlenn@vti.vt.edu)**. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research participant, contact the Virginia Tech HRPP Office at 540-231-3732 ([irb@vt.edu](mailto:irb@vt.edu)).

***Please print out a copy of this information sheet for your records.***

## APPENDIX B. INTERVIEW QUESTIONS

### I. Introductions and Warm-up (5 minutes)

Facilitator Question/Directions:

- To get started, I'd like to know your position(s) at **ORGANIZATION** and what you do as part of your job.
- Let's take a moment and discuss your role(s) when a potential or confirmed PVH incident presents to your organization. Can you tell me specifically how you may be involved?

### II. Incidents (10 minutes)

- Are you aware of your organization ever encountering a PVH case?
  - If so, how frequently do you recall PVH cases occurring?
- Who is/would be the first person contacted in your organization should a potential PVH case present? I am looking for the position of that person (or persons) within the organization, not their names.
- What are the current protocols for handling PVH incidents that present to your organization?

### III. Data Recording (20 mins)

- I would like to understand what a case report would look like when a child is left in a vehicle. More specifically, related to that case report:
  - Would there be any discrete data fields in the report that indicate this happened? For example, the location of the incident being inside a vehicle, and/or that hyperthermia occurred.
  - What information would you typically document when responding to such cases?
  - **[For hospital personnel]** What type of ICD-11 code would be used to for this type of incident?
    - Would there be any modifiers that you would add to this(ese) code(s) given that the hyperthermia occurred in a vehicle?
    - How consistent would you expect this coding to be across different health care organizations?
  - Can I obtain a copy or a blank record-keeping form which would be used in such an instance?
- How feasible do you think it is to collect detailed data on PVH during interventions/treatments? Such data could include the specific location of incident, the demographics of those involved, additional associated injuries, and weather conditions.
- Are there any challenges in your current data collection systems that prevent complete and accurate documentation of these incidents?
  - For these challenges, what resources or support would be necessary to overcome them?

### IV. Data Reporting (15 mins)

- Are you mandated to report PVH incidents to any local, state, or federal agencies?
  - If there is some mandate, where would you report such incidents?
- Are there any collaborations or partnerships between different agencies at the private, local, state, or federal level that could enhance data collection efforts in this area?

**V. Closing Suggestions (5 minutes)**

- In closing, I'd like to ask if there was an important issue that I should have covered during this interview but missed. More precisely, is there anything that I did not ask about but could be important to discuss regarding incident and injury data collection of PVH within your organization? If so, please tell us—any information you can provide is important to us.

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