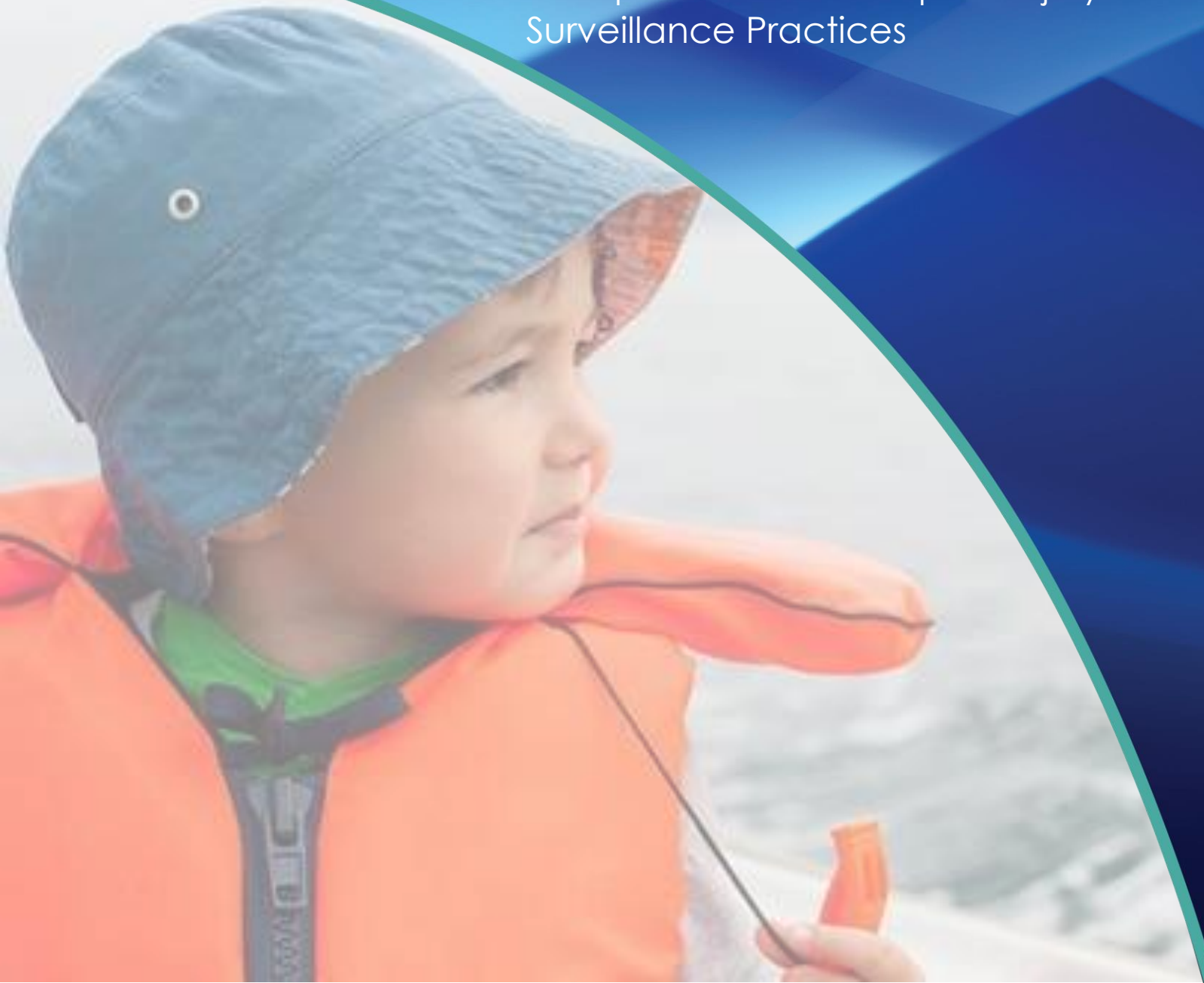


THE RECREATIONAL BOAT OCCUPANT INJURY SURVEILLANCE ROUNDTABLE

Tier One of a Three-Tiered Approach
to Improve Boat Occupant Injury
Surveillance Practices



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LIST OF ACRONYMS & ABBREVIATIONS

(In alphabetical order)

AHA: American Hospital Association

APHA: American Public Health Association

BAR: Boating Accident Report

BARD: Boating Accident Report Database

BLA: Boating Law Administrator

BRFSS: Behavioral Risk Factor Surveillance System

BUI: Boating Under the Influence

CDC: Centers for Disease Control and Prevention

CFR: Code of Federal Regulations

CODES: Crash Outcome Data Evaluation System

Core SVIPP: Core State Violence and Injury Prevention Program

CSTE: Council for State and Territorial Epidemiologists

FAA: Federal Aviation Administration

GIS: Geographic Information System

HCUP: Healthcare Cost and Utilization Project

HHS: U.S. Department of Health and Human Services

HIPAA: Health Insurance Portability and Accountability Act

ICD: International Classification of Diseases

ICEHS: Injury Control and Emergency Health Services Section

IEC: Industrial Economics, Incorporated

ISW: Injury Surveillance Workgroup

NASBLA: National Association of State Boating Law Administrators

NCHS: National Center for Health Statistics

NCIPC: National Center for Injury Prevention and Control

NHTSA: National Highway and Traffic Safety Administration

NOAA: National Oceanic and Atmospheric Administration

NTSB: National Transportation Safety Board

NVDRS: National Violent Death Reporting System

NVSS: National Vital Statistics System

OSHA: Occupational Safety and Health Administration

QALY: Quality Adjusted Life Years

SAR: Search and Rescue

SDoH: Social Determinants of Health

SRPF: Shared Risk and Protective Factors

USCG: United States Coast Guard

VSL: Value of a Statistical Life

WISQARS: Web-based Injury Statistics Query and Reporting System

YPLL: Years of Potential Life Lost

YRBSS: Youth Risk Behavior Surveillance System

EXECUTIVE SUMMARY

The Recreational Boat Occupant Injury Surveillance Roundtable is Tier 1 of a three-tiered approach to improve boat occupant injury surveillance practices nationally. The roundtable process was organized and convened by the Safe States Alliance and the National Association of State Boating Law Administrators (NASBLA) to support the United States Coast Guard (USCG) in carrying out their [National Recreational Boating Safety Program 2017-2021 Strategic Plan](#). Recreational boating safety and public health experts assembled to:

- Discuss current efforts to improve recreational boating-related injury data collection and analyses.
- Examine data sources that could be used to monitor recreational boating-related injuries at the national, state and local jurisdictional levels.
- Describe at-risk populations for recreational boat occupant injuries.
- Identify key limitations and barriers in the collection and use of existing data sources.
- Share innovative approaches used in states and communities to address barriers.
- Identify key opportunities for improving and standardizing surveillance related to recreational boat occupant injuries and fatalities.
- Develop stronger relationships between public health and recreational boating safety professionals.

The Recreational Boat Occupant Injury Surveillance Roundtable project was comprised of four elements: **(1)** The identification and invitation of participants from public health and boating safety; **(2)** A series of four, hour-long virtual meetings (which took place from February – April 2019) that included homework assignments completed by participants between virtual meeting sessions; **(3)** A two-day in-person meeting in Atlanta, GA, which took place July 11-12, 2019; and **(4)** A report summarizing recommendations.

Four foundational publications were used to guide and inform the roundtable process. A summary of the purpose and key recommendations from each is included in Appendix A. Two publications were summary reports of USCG-sponsored work; the other two publications were

peer-reviewed articles from medical journals. The key recommendations of the four documents were similar in nature. The foundational publications all called for:

- Enhanced approaches to estimate non-fatal injuries;
- Improvements in surveillance systems that would allow crosswalks of injuries by type of treatment and severity;
- Improved techniques for reporting on the economic burden of boat-related injuries;
- The establishment of reporting standards and training for those who enter data into the USCG Boating Accident Report Database (BARD);
- The provision of a forum for states to share “best practices” related to boating-related injury surveillance;
- Improvements in data quality;
- Improvements in alcohol and drug reporting;
- The use of data linkage methodologies to improve boat-related injury surveillance;
- The establishment of additional risk factors for boat-related injuries;
- Changes to the currently accepted culture of boating and alcohol consumption;
- An examination of related health problems that stem from initial boat-related injuries; and
- Multidisciplinary collaborations at federal and state levels.

Informed by the foundational documents above and the roundtable process, participants developed nine recommendations for improving boat occupant injury surveillance. Participants proposed that each of these recommendations be further investigated through the Injury Surveillance Workgroup (ISW) process in Tier 2 of the approach as outlined in Figure 1 below.

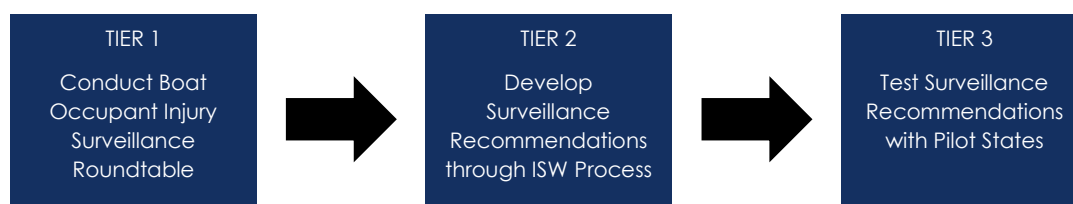


Figure 1: Three-Tier Process to Improve Boat Occupant Injury Surveillance Practices

The nine recommendations for the ISW to investigate are:

1. Create, increase, and maintain multidisciplinary collaborations between public health, health care, injury prevention and boating professionals.
2. Create consistent terms and definitions across agencies and databases.
3. Improve and expand data elements captured.
4. Improve data collection processes and strategies within BARD.
5. Improve and expand data accessibility to all sources of boat injury surveillance data.
6. Link and integrate existing boating-related injury data sources.
7. Utilize expanded data analyses and methodologies with existing data.
8. Investigate sources of sustainable funding for recreational boating surveillance.
9. Work toward long-term social, political, and cultural change.

The intended use of this report is to provide a framework for the ISW to prioritize and develop pilot projects as part of Tier 2.

ABSTRACT

The Recreational Boat Occupant Injury Surveillance Roundtable was the deliverable of Tier One of a three-tiered approach to improve boat occupant injury surveillance practices nationally. Safe States Alliance and the National Association of State Boating Law Administrators (NASBLA) convened and organized the Roundtable to support the United States Coast Guard (USCG) in carrying out their [National Recreational Boating Safety Program 2017-2021 Strategic Plan](#).

Recreational boating safety and public health experts convened to identify surveillance gaps and needed improvements that would be further investigated by an Injury Surveillance Workgroup (ISW) in Tier 2 of the process.

The recommendations are to:

1. Create, increase, and maintain multidisciplinary collaborations between public health, health care, injury prevention and boating professionals.
2. Create consistent terms and definitions across agencies and databases.
3. Improve and expand data elements captured.
4. Improve data collection processes and strategies within BARD.
5. Improve and expand data accessibility to all sources of boat injury surveillance data.
6. Link and integrate existing boating-related injury data sources.
7. Utilize expanded data analyses and methodologies with existing data.
8. Investigate sources of sustainable funding for recreational boating surveillance.
9. Work toward long-term social, political, and cultural change.

The products of this grant include this summary report of all grant activities and a list of recommendations for the ISW to investigate. The intended use of this report is to provide a framework for the ISW to prioritize and develop pilot projects as part of Tier 2 of the project.



BACKGROUND: THE RECREATIONAL BOAT OCCUPANT INJURY SURVEILLANCE ROUNDTABLE PROCESS

The Recreational Boat Occupant Injury Surveillance Roundtable was comprised of four elements:

1. The identification and invitation of participants from public health and boating safety;
2. A series of four, hour-long virtual meetings (which took place from February – April 2019) that included homework assignments completed by participants between virtual meeting sessions;
3. A two-day in-person meeting in Atlanta, GA, which took place July 11-12, 2019; and
4. A report summarizing recommendations.

Background on each of these elements is provided in this section to provide context for the recommendations.

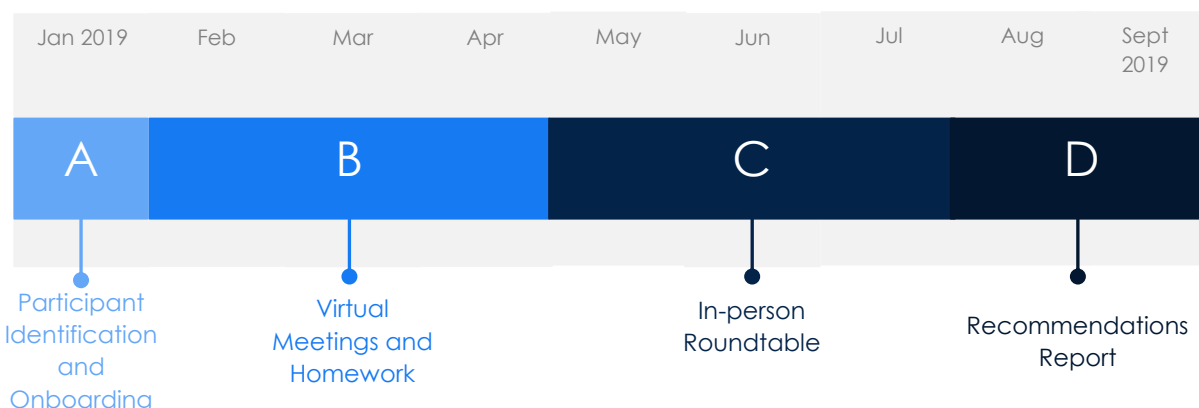


Figure 2: Timeline of Major Activities

Participant Identification and Onboarding

Participants were identified by Safe States Alliance and National Association of State Boating Law Administrators (NASBLA). The Safe States Alliance recruited public health and injury prevention professionals and NASBLA recruited boating safety professionals. A list of all participants and their organizational affiliations is included in Appendix B.

Virtual Meetings

Four, hour-long virtual meetings were conducted with all participants to ensure foundational familiarity with and understanding of specific injury prevention and epidemiologic tools, including the Public Health Approach to Prevention¹ (Figure 3), the Injury Pyramid² (Figure 4), epidemiological triangle³ (Figure 5) and Haddon Matrix⁴ (Figure 6).

The public health approach begins with surveillance: the collection of data that will allow for the description of the extent and nature of the problem (i.e., recreational boating-related injuries).⁵

¹ National Center for Injury Prevention & Control. Available at: [cdc.gov/violenceprevention/publichealthissue/publichealthapproach.html](https://www.cdc.gov/violenceprevention/publichealthissue/publichealthapproach.html)

² Espitia-Hardeman V, Paulozzi L. Injury Surveillance Training Manual. Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2005.

³ Ibid.

⁴ Ibid.

⁵ Christoffel T & Gallagher SS. Injury Prevention and Public Health: Practical Knowledge, Skills and Strategies. Ch. 12 Injury Surveillance: A 10-Step Plan. 2006: Jones and Bartlett, Boston.

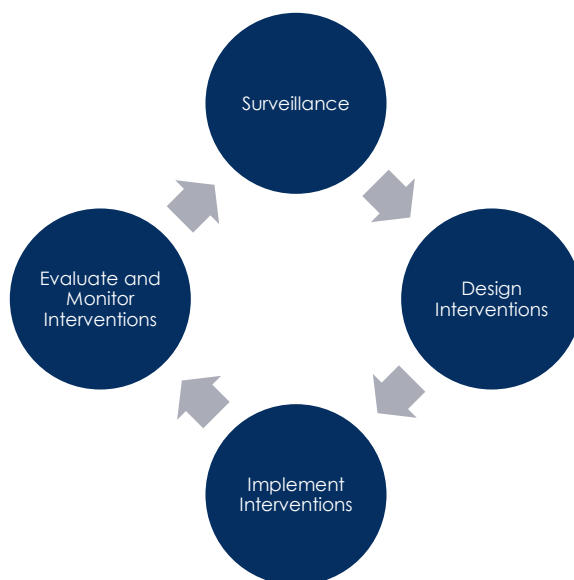


Figure 3: The Public Health Approach to Prevention⁶.

The injury pyramid (Figure 4) is used to demonstrate that fatalities – while an important data source – only represent the “tip of the iceberg” on the entire scope of injuries. ***While mortality data are important, an ideal surveillance system also incorporates additional sources of non-fatal injuries to fully understand the problem of any injury.***



Figure 4: The Injury Pyramid

⁶ National Center for Injury Control and Prevention. Available at: www.cdc.gov/violenceprevention/publichealthissue/publichealthapproach.html

Participants of the virtual meetings also discussed the epidemiologic triangle and its connection to recreational boating-related injuries. The epidemiological triangle (Figure 5) is a surveillance tool used to describe how the determinants of injury (e.g., people, objects, environments) relate to each other through an incident. The host is the human occupant. The agent is the boat, and the environment is the setting and context where the agent and host interact.

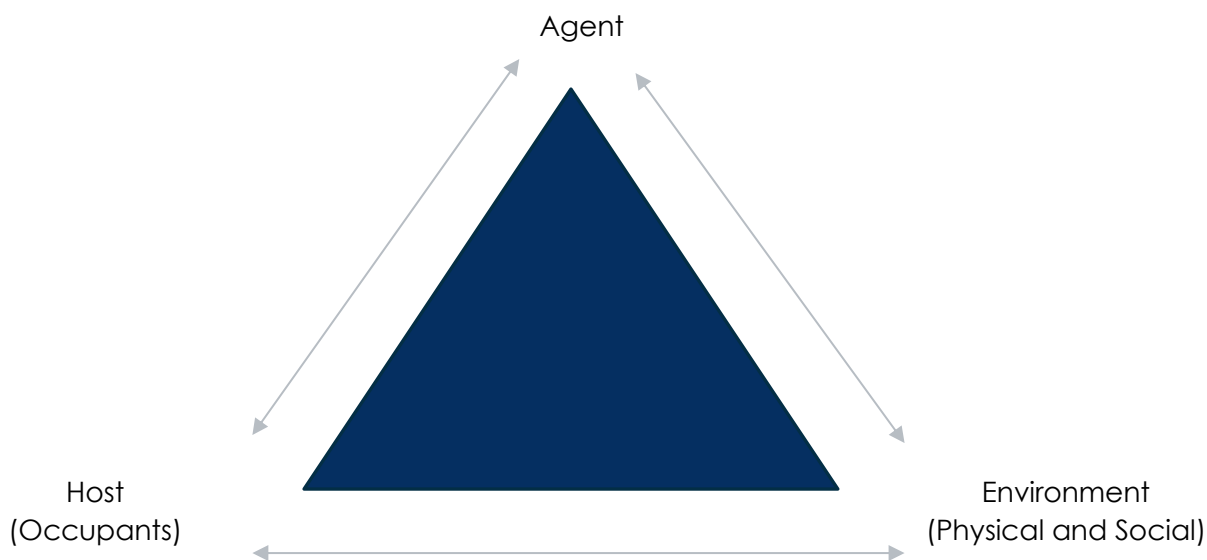


Figure 5: The Epidemiological Triangle

The Haddon Matrix (Figure 6) builds on the epidemiologic triangle to further classify the determinants of injury along a timeline of pre-event (what was occurring prior to the incident/injury), event (what occurred at time of incident/injury) and post-event (what occurred in the aftermath of the incident/injury).

FACTORS				
PHASES	Host / Occupant	Vector / Vessel	Environment – Physical	Environment – Social
Pre-Event (Before the incident occurs)	<i>All Occupants:</i> <ul style="list-style-type: none"> Alcohol / drug use Life jacket use Restraint use Lookout / awareness of surroundings <i>Operator:</i> <ul style="list-style-type: none"> Vision Experience / ability Knowledge <i>Occupant:</i> <ul style="list-style-type: none"> Seating 	<ul style="list-style-type: none"> Maintenance of boat and propulsion units Storage of onboard gear and safety equipment Speed of travel Load characteristics Loaded per capacity plate Hull type Vessel type 	<ul style="list-style-type: none"> Adequate waterway markings Weather and water conditions Time of day Depth of water Temperature of water Time of year 	<ul style="list-style-type: none"> Public/community attitudes of boating under influence of alcohol/drugs BUI laws Mandatory wear/education Enforcement and adjudication of boating laws Social life jacket safety norms Public attitudes on boating and boating education
Event (During the incident)	<ul style="list-style-type: none"> Spread out energy in time and space with lookout persons Take action to land properly or clear vessel Proper safety procedures Swimmer competence and water confidence Age and gender of victim 	<ul style="list-style-type: none"> Vessel size hull type gear loaded and balanced Engine cut-off switch used Closed cell foam compartments Access to safety equipment 	<ul style="list-style-type: none"> Gunwale rails Presence of fixed objects such as submerged objects Nature of ejection, collision, vessel turn 	<ul style="list-style-type: none"> Adequate life jacket laws Other safety requirements Social norms of wearing a life jacket
Post-Event (After the incident)	<ul style="list-style-type: none"> Victim's overall health 	<ul style="list-style-type: none"> Gas tanks designed to minimize fires Items secured on deck Emergency communication and distress signal devices 	<ul style="list-style-type: none"> SAR response Good Samaritan response Distance to quality health care Situational assessments 	<ul style="list-style-type: none"> SAR availability Policies and funding supporting emergency and medical response systems Public outreach

Figure 6: Sample Haddon Matrix for Boating Injury Prevention.

Homework Assignments

In addition to the virtual meetings, homework assignments were assigned to encourage multidisciplinary connections between participants at the state level. Participants were asked to connect with the public health and recreational boating safety professionals in their states. If a participant self-identified as a boating safety professional, he or she was asked to connect with a public health injury prevention professional and vice versa. Through the homework assignments, participants worked with their state-level boating safety or public health injury prevention colleague to develop lists of known databases, challenges, and opportunities. Approximately 67% of the homework respondents (N=8) indicated they had never used any of the databases listed for recreational boating injury surveillance.

Subsequent homework assignments asked participants if they knew how to access the databases that had been identified through previous homework assignments. The United States Coast Guard (USCG) Boating Accident Report Database (BARD) was the most often mentioned database. BARD contains data on recreational boating incidents that are reported to the USCG in accordance with regulations outlined in 33 CFR 173.⁷ These regulations require the operator of any vessel to file a boating accident report if:

- A person dies.
- A person disappears from the vessel under circumstances that indicate death or injury.
- A person is injured and requires medical treatment beyond first aid.
- Damage to the vessels and other property totals \$2,000.
- The vessel is a complete loss.

Outside of the BARD, few participants knew how to access other national-level databases that could contribute to recreational boating injury surveillance (Figure 7). A description of these databases is provided in Appendix C.

⁷ United States Coast Guard. <http://uscgboating.org/recreational-boaters/accident-reporting.php>

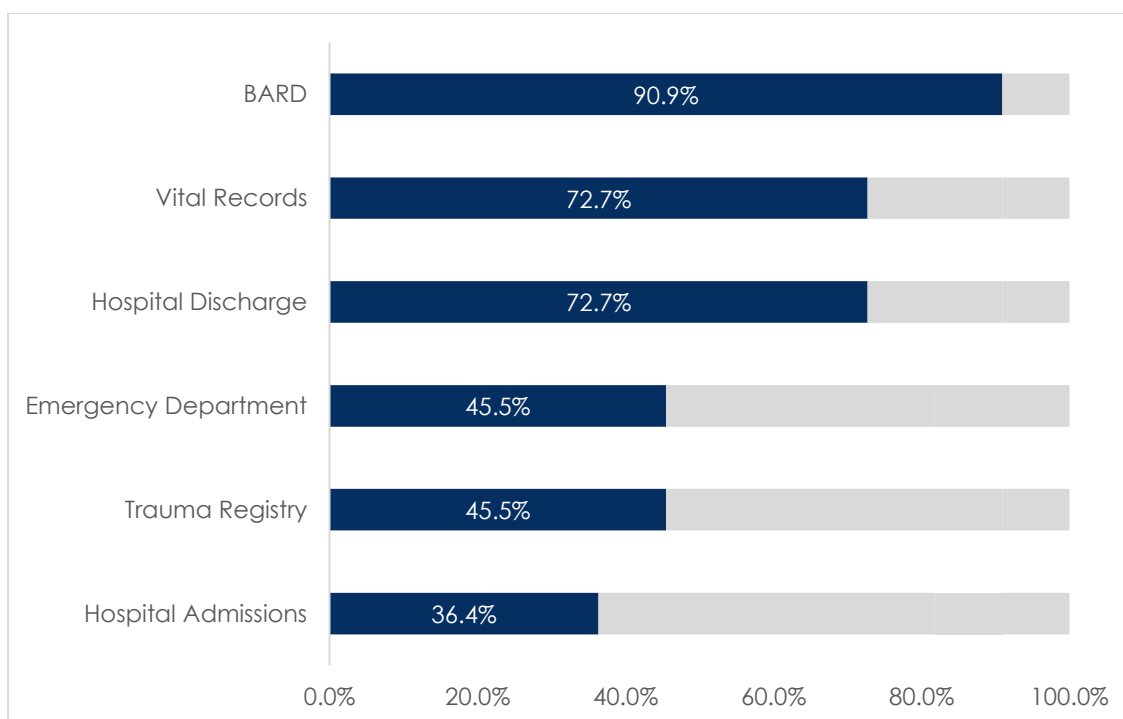


Figure 7: Percent of roundtable participant respondents (N=11) who indicated that their state has access to the listed database AND they know how to access it.

During the virtual meetings, the group also discussed processes that are currently being used to investigate recreational boating incidents, national and state-level databases that house recreational boating data and public health injury data, and the challenges and opportunities that exist within respective “boating” and “injury” databases.

Challenges Encountered with Recreational Boating Injury Surveillance

Participants discussed how barriers faced in injury surveillance can be related to data collection, data analysis, and reporting processes. Use of the term “data” in the lists below pertains to global injury surveillance data and is not limited to BARD.

By the conclusion of the four virtual meetings, the challenges and opportunities listed below had been listed and discussed by roundtable participants.

Data Collection Challenges

- Data on boating-related injuries are missing important details and/or information, including environmental factors, information on non-operator occupants, and race/ethnic group.
- Non-fatal injuries are often not reported in BARD and data from emergency department visits and hospitalizations are limited to medical perspectives.
- “Data out” are only as good as “data in” for all systems. Each database investigated may be subject to incomplete information, unreported incidents, and duplicated data.
- Having many data collectors inputting information into the same database increases the risks of duplicative data and variance in answering fields.
- No catch-all code for “boating incidents” exists across injury data sets exists; data may be classified among multiple causes of injury. Furthermore, classification of injury varies by dataset.
- Many details can be found in narratives, particularly in a state’s boating accident report; however, often this narrative is often lacking or incomplete.
- The amount of information required by various systems at the federal level (Boating Accident Report) and regional/state level (Boating Accident Incident Report, Great Lakes Synthesis, Observations and Response System program, and Statewide Electronic Collision and Ticket Online Records reporting) is both time consuming and has a lot of duplication across systems, particularly at the state level for data collection and entry.
- The means for data collection for boating accident reports are inconsistent, including documenting through an online system, use of paper, from memory, or at the time of the incident.
- A lot of variance exists at the state level for who and what organizations are responsible for data collection and entry for boating accident reports, which are subsequently entered into BARD. Additionally, the boat operators complete and submit reports in some states.

“A key boating safety message is that when on-board a vessel, everyone has the responsibility of acting as a vigilant lookout for potential hazards and immediately notifying the vessel operator of those hazards. In addition, the vessel operator must remain sober, while taking into account the reliability of passengers that have consumed or are consuming alcohol and/or drugs.”

*Sergeant Mark D. Rorvik
King County Sheriff's Office
Marine Rescue Dive Unit,
Washington*

Data Analysis and Reporting Challenges

- Access to complete, raw injury datasets is limited, protected, requires several permissions and forms depending on the dataset – e.g., Health Insurance Portability and Accountability Act (HIPAA), privacy laws, and suppression of cells in data sources.
- Some entities have limited ability to provide technical assistance on data access, analysis and interpretation.
- Lack of technology, capacity, personnel, and/or resources to analyze and perform advanced epidemiologic analyses (e.g., link databases) or locale-specific analyses at the local, state, and federal levels for many injury datasets, including, but not limited to BARD.

"The traditional way to measure the effectiveness of boating education and outreach programs has been the use of fatality data. If we use injury data in conjunction with fatality data, we would get a better and more consistent picture of what is really happening. If you can prevent an injury, it may prevent the fatality from taking place."

Mark Chanski, NASBLA Deputy Education Director, Roundtable Participant
- The people who summarize data may not be tasked with sharing the information with other stakeholders interested in prevention both in the boating and public health communities.

Cross-Cutting Challenges

- Currently, no comprehensive data source for boating injuries exists. Data on boating fatalities and injuries exists in multiple datasets which are owned and operated by different sectors who have different goals and objectives with their data. Lack of collaboration and alignment between and across sectors contributes to challenges with understanding the full picture of boat occupant injuries.
- Language of the public health community is not the same as the language of the boating safety community, which impacts the ability to fully understand the databases that exist and utilize them. Furthermore, definitions of "injury" and "boat" are guided by different entities and may not be consistent across databases or standardized within systems (i.e., not all systems have a data dictionary to guide data collection or analysis). The information collected in all databases is important to the organization collecting it or the entity that mandated collection. However, the information may not be in the form another organization can use or could be misinterpreted because of "language" or "definition" barriers.

- There is a lack of financial support for boat injury surveillance at state and federal levels (across entities.)

Opportunities Associated with Recreational Boat Injury Surveillance

Data Collection – BARD

- Develop standardized training on data collection and data collection tools for boating incident reports.
- Improve reporting of incidents to BARD and boating law administrators (BLAs). Several ideas to this end include developing a way to make hospital/emergency/trauma data automatically available to state BLAs, such as an alert when a new boating report has been filed in a state system. While much of the information from the incident report is entered into BARD, many details are not. Participants stated having access to incident reports at the state level when reporting and designing prevention activities would be helpful.
- Standard inclusion of toxicology reports for all boating deaths is recommended.
- Create ease of use data tools to minimize duplicate data entry by multiple agencies having jurisdiction.
- Addition of “other” fields on boating accident report forms where the forced choice doesn’t include all the options.
- Expand data collection on occupant demographics.

Data Collection – Other

- Routine collection of observational survey data and surveys of boating occupants for surveillance purposes.

Data Analysis and Reporting

- While many routine public health databases (e.g., vital statistics, emergency department visits, and hospitalizations) contain boating information, these data are not routinely used for this purpose. An opportunity exists to create a standard communication plan to share data summaries created by personnel in both fields. Participants were not aware of a state where this type of plan exists.
- Collaboration between public health injury prevention and boating safety entities to utilize each other’s data. This includes investigating the possibility of a data linkage between boating and open water injury hospitals/trauma centers/emergency rooms and the state boating accident reports and/or BARD.

In-Person Roundtable Meeting

From July 11-12, 2019, nineteen participants met in Atlanta, Georgia for the Recreational Boat Occupant Injury Surveillance Roundtable Meeting. A list of participants is included in Appendix B.

Building on conversations started during the virtual meetings, the two-day, in-person meeting brought together public health injury and violence prevention professionals and boating safety professionals to discuss recommendations for improving and standardizing surveillance of recreational boating-related injuries and deaths. The agenda for the meeting is included in Appendix D.

Activities were designed to facilitate dialogue between meeting participants. The first discussion asked participants to share why recreational boating surveillance is important to them.

Why is working on recreational boating surveillance important to YOU?

- To eliminate injuries and deaths due to boating.
- To understand our target audience.
- To create better outreach and education messages.
- To save boating lives.
- To access data already being collected.
- To understand where accidents are happening.
- To open public's eye to more than just fatal victims being impacted by vessel operation.
- To give a voice to people that live – even though their whole life has changed!
- To listen and learn from everyone and understand how to move forward together.
- To provide the data needed to make policies and programs to prevent boating injury.
- To correctly estimate exposure.
- To close the gaps in the data.
- To learn more about injuries.
- To convey that injuries far exceed fatalities yet garner less focus.
- To improve data to convey the problem.
- To understand what is causing injuries.
- To have data to understand if our prevention programs and policies are working.

Overview of BARD

A large portion of the morning was dedicated to ensuring that participants had a baseline understanding of the BARD system, as well as current projects that have been working to make modifications to the system. Susan Weber, Statistician for USCG, and Deb Gona, PhD, Research Consultant for NASBLA, provided an overview of BARD and current USCG projects. Legal references for BARD reporting were covered in the presentation. Chapter 46 of the United States Code, Section 6102 mandates the creation of federal regulations for collection, analysis and publications of data reports. This code also allows statistics to be released if permissible by the state that submitted the data.

The Code of Federal Regulations 33 CFR 173 outlines the criteria for the public responsibility to report an accident to the state, as outlined on page 13 of this report. Additionally, the contents of a report are outlined, including overview information, vessel information, and people information. It was noted that although the CFR describes data elements that are required to be collected, it does not always specify fields.

Participants discussed the Coast Guard Recreational Boating Accident Report Form (CG-3865) (Appendix E). This form contains and details elements that are outlined in the Code of Federal Regulations. It specifies eleven fields to describe the nature of the injury (scrape/bruise, cut, sprain/strain, concussion/brain injury, spinal cord injury, broken/fractured bone, dislocation, internal organ injury, amputation, burn, other), as well as two fields to document the extent of the injury (treatment beyond first aid, admitted to a hospital). This form must be approved every three years; as such, this approval process provides an opportunity for changes to be made. This discussion brought up important points that were documented in the roundtable recommendations:

- Most states use their own boating accident report form, which *may or may not contain the same information as that of the USCG*.
- The CFR-required elements may have different fields. The example provided was that the CFR requires the element “operator experience” but does not specify the ranges.
- On that note, ranges that are used to complete fields vary across each state's boating accident report form. For example, USCG uses “over 500 hours” as the highest range, whereas some states may use “over 100 hours”.
- Persons who fill out the boating accident report forms vary from owners/operators of vessels to law enforcement investigators; owner/operator forms can introduce bias to the data collection.

BARD is an electronic reporting system states can use to submit recreational boating accident reports to USCG, either by manual data entry or electronic transfer from a State's own system. BARD is only accessible by authorized state and USCG personnel. In addition to data entry, authorized personnel can query records, track incidents reported in media, map incidents, and produce comprehensive statistical reports.

Data from BARD have public-facing uses, as well as internal utility. The USCG standardizes data from BARD to create an annual statistics publication for the public that provides a national perspective on causes and types of accidents, operator and victim information, and registration data. Data are also uploaded to a public-interfacing website that allows the user

to create specific tables or charts.⁸ Finally, the USCG releases a public version of the database upon request. This public database does not contain personally-identifiable information or records from states that do not give permission for their data to be included. Internally, data from BARD are used in USCG performance reports to the U.S. Department of Homeland Security, to guide the development of the National Recreational Boating Safety Strategic Plan, measure program compliance with regulations, and advance regulatory efforts.

Strengths and challenges of BARD were outlined in this presentation. BARD is considered a good source of information for fatal incidents and a good source of information for validated fields such as incident causes and events, injury type and body location, cause of death, life jacket use for fatal victims, and vessel types. Challenges of BARD that were outlined include:

- Lack of knowledge of reporting requirements, which results in severe underreporting for injury-only and damage-only incidents.
- Lack of uniformity in data fields and definitions, which poses challenges to standardization.
- Lack of detail in some reports, which poses challenges to analysis.
- Fields that are not required in CFR are not collected uniformly across states, and as a result, have limited utility for comparison on a national scale.
- Data are not fully validated.
- BARD contains limited demographic information.

Potential upcoming changes to BARD were also discussed. These might include changes to:

- Thresholds for injury and damages reporting.
- Types of incidents that need to be reported.
- Types of vessels that are applicable to reporting.
- Data collection processes.
- Data system updates.
- Shifting responsibility of reporting from the public to states.
- Timelines for reporting.

Deb Gona presented on special projects that also work to improve BARD including the following:

- Accident Reporting Terms and Definitions Project⁹
 - The Accident Reporting Terms and Definitions Project is a collaborative effort between NASBLA, states, and USCG that is designed to update and standardize terms in five of the major boating accident report categories.
- National Policy Project on Recreational Boating Incident Reporting
 - This project focused on the outdated regulations and updating the reporting system and structure.
- Human Performance Investigation in Recreational Boating Incidents¹⁰
 - The Human Performance Investigation in Recreational Boating Incidents project developed guidance and a supplemental report form based on the U.S.

⁸ Available at: <https://bard.knightpoint.systems/PublicInterface/Report1.aspx>

⁹ Available at: <https://www.nasbla.org/nasblamain/lighthouse/get-equipped/accident-reporting-terms>

¹⁰ Available at: <https://www.nasbla.org/nasblamain/lighthouse/get-equipped/human-performance>

Department of Defense's Human Factors Analysis and Classification for analyzing incidents and human performance investigation tools developed by the National Transportation Safety Board (NTSB). These data provide a greater level of detail than was typically recorded in BARD.

Overview of National Injury Datasets

An overview of national injury datasets that contain some information on recreational boating incidents was also shared with participants, along with details on strengths, weaknesses, and the dataset's location. This outline is included as Appendix C.

The World Health Organization's International Classification of Diseases (ICD) is the official world classification of medical conditions, diseases, and injuries, which characterizes and standardizes health events. The ICD and its clinical modification (CM) are the basis for three major injury data sets: Vital statistics (deaths), emergency department visits, and hospitalizations.¹¹ The ICD is periodically revised to reflect changes in the medical system. The 10th version of ICD has been used since January 1, 1999 in mortality data and since October 15, 2015 in morbidity (non-fatal) data. External cause of injury codes is a system for coding injuries and provide a standardized set of categories on emergency department data. The external cause of injury codes within ICD-10 are the V, W, X and Y codes. The surveillance definition promoted by the National Center for Health Statistics (NCHS) and the National Center for Injury Prevention and Control (NCIPC) at the Centers for Disease Control and Prevention (CDC) for emergency department visits is based on the presence of one of these external-cause codes.¹² The use of e-codes is not mandated federally, however, health systems are incentivized to use them in order to help ensure timely reimbursement from payers.¹³ Boat injuries are categorized in the V90 – V94 codes in ICD-10. An expanded detail of these codes is provided in Appendix F.

The NCHS, NCIPC, and the Injury Control and Emergency Health Services (ICEHS) Section of the American Public Health Association (APHA) collaborated to create the *Recommended Framework for Presenting Injury Mortality Data*, which uniformly defined and grouped external cause of injury codes in order to "provide the basis for comparison of national and state injury-mortality statistics."¹⁴ The matrix demonstrates that boat related e-codes are classified in the larger category of "other transport" and include two codes that were previous classified as drowning in ICD-9. This classification is important because the grouping of the boat-related codes into a larger category does not allow for boat-specific queries to be made on public-facing injury dataset websites, such as the Web-based Injury Statistics Query and Reporting System (WISQARS).¹⁵

¹¹ Christoffel T & Gallagher SS. Injury Prevention and Public Health: Practical Knowledge, Skills and Strategies. Ch. 3 Epidemiology of Injury. 2006: Jones and Bartlett, Boston.

¹² Hedegaard HB, Johnson RL, Ballesteros MF. Proposed ICD-10-CM surveillance case definitions for injury hospitalizations and emergency department visits. National health statistics reports; no 100. Hyattsville, MD: National Center for Health Statistics.2017.

¹³ North Carolina Injury and Violence Prevention. "What are e-codes and why should you use them?" Available at: https://ncdetect.org/files/2016/12/CCHI_E_CodeFactSheetJan2014.pdf

¹⁴ Ibid page 57.

¹⁵ Centers for Disease Control and Prevention. External Cause of Injury Mortality Data Matrix available at: https://www.cdc.gov/nchs/data/ice/icd10_transcode.pdf.

Intersection of BARD and National Injury Datasets

At present, **it is difficult to discern the overlap between BARD and injury datasets for both fatal and non-fatal information using publicly available datasets.** The USCG funded a study conducted by Industrial Economics, Incorporated (IEC), which examined various data on recreational boating incidents to gauge gaps in recreational boating-related data. A report on this work was published in September 2011 and reviewed throughout this roundtable process.¹⁶ IEC examined boat-related injuries and fatalities in the National Vital Statistics System (NVSS) using codes V90-V94 and BARD data for 2005-2007. The Roundtable workgroup analyzed data from the years 2008-2017 using a methodology consistent with the IEC report (Figure 8) and found that counts of boat-related fatalities in BARD were at least 33.3% higher, and at most 68.8% higher, than NVSS estimates during this 13-year time span (2005-2017).¹⁷

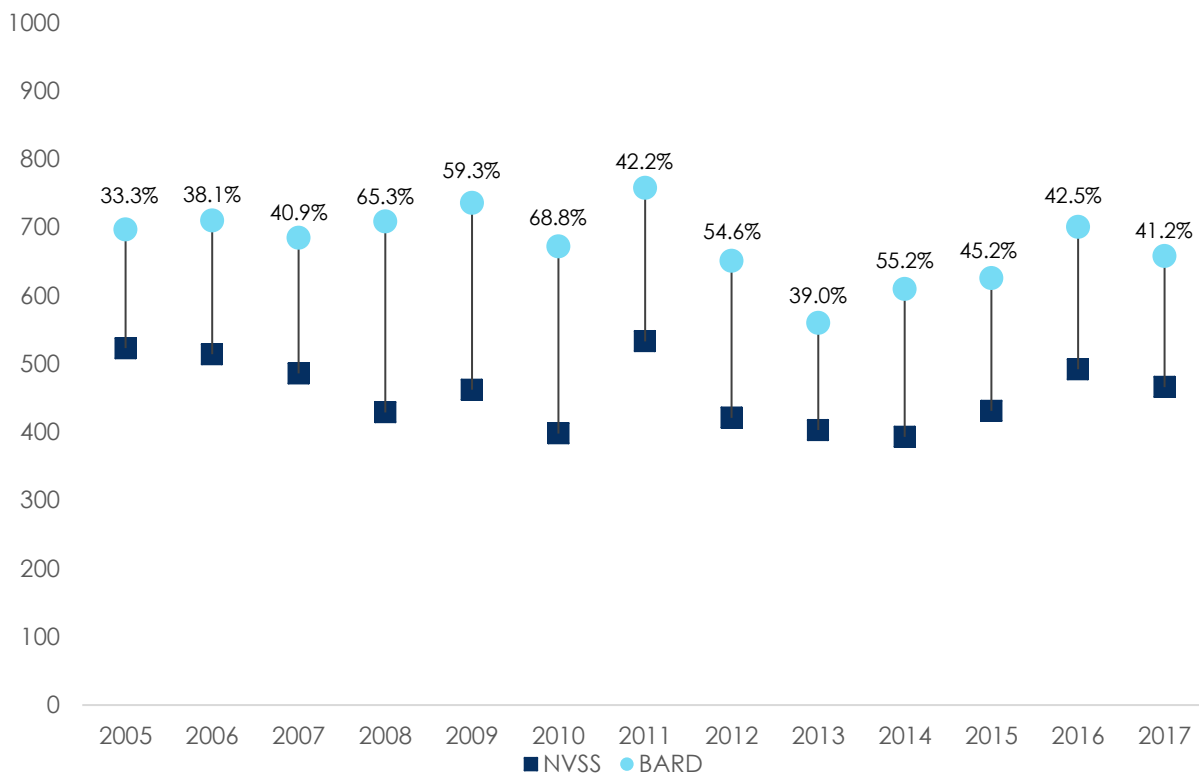


Figure 8: Boat-Related Fatalities, Percent Difference between BARD & NVSS, 2005-2017.

As Figure 8 illustrates, BARD estimates consistently captured higher levels of boating-related fatalities when compared to NVSS. This observation appears to support a key finding of the IEC report: “For fatal injuries, we find that the Coast Guard’s data on incidence appears reasonably accurate¹⁸.” However, **given the variation throughout this thirteen-year period, a**

¹⁶ Industrial Economics, Incorporated and Lisa A. Robinson. Estimating the Benefits of Reducing the Risk of Recreational Boating Accidents: Alternative Sources of Information on Fatalities, Injuries and Property Damages. Prepared for the US Coast Guard Office of Standards Evaluation and Development, September 12, 2011

¹⁷ Ibid.

¹⁸ Ibid., pg. ES-1

closer examination of the differences between the two systems may yield more specific direction regarding how the databases can be used in conjunction with one another. In addition, the conversion to ICD-10 codes in 2015 makes it difficult to compare data over time.

The Value of a Statistical Life (VSL) calculation was applied to fatality data to approximate the economic impact of boating-related fatalities in this report. Using the VSL of \$9.6 million per person for 2016¹⁹ and the number of fatalities in BARD for that same year (n=701), boating-related fatalities alone had an economic impact of over \$6.7 trillion.

The IEC report further concludes: *“For nonfatal injuries, our work, as well as previous research, suggest underreporting of incidence increases as severity decreases. Injuries severe enough to result in hospitalization are underreported by a factor of two. Less severe injuries may be underreported by larger amounts.”*²⁰ A list of national injury surveillance databases, inclusive of fatal and non-fatal data, was developed for meeting participants and is included in Appendix C. Non-fatal boating injury data were captured based on ICD-9 and ICD-10 codes to estimate a trend. It is important to note that ICD-10 codes were not in use at the time of publication of the referenced IEC report; however, the ICD-10 codes that crosswalk to the ICD-9 codes were used in order to include 2016 data. The ICD-9 codes used were E830-E838 for both the hospitalization and emergency department modules of the Health Care Utilization Project (HCUP) data.

Inpatient hospitalizations and emergency department discharge counts were added to determine a single number to represent injuries for each data year. These counts were compared to BARD in Figure 7. The captured data, however, appears to reflect continued underreporting in BARD when compared to the HCUP data represented in Figure 9. **The underreporting of these data warrants further detailed analysis to determine whether prevention efforts would be better served by supplementing BARD with data from national injury datasets for non-fatal boating-related injuries.** It is likely that variations in definitions and terms contribute to the disparity.

Utilizing hospitalization and emergency department discharge data would also allow for cost analyses to be conducted. The medical costs of boating-related injuries and fatalities are not currently captured in BARD. The public health community frequently reports on the burden of injury using cost of hospitalization and cost of emergency department visits. The cost of emergency department visits depends on a multitude of factors, including geographic region and severity of injury; however, using the average emergency room visit cost of \$1,389²¹ applied to the 10,021 visits to emergency departments in 2016, it is estimated that over \$13.9 million dollars was spent on boating-related injuries in one year in emergency department visits alone within the United States.

¹⁹ Moran MJ & Monje C. Memorandum to Secretarial Officers and Modal Administrators. United States Department of Transportation Office of the Secretary of Transportation. August 8, 2016. Available at: <https://www.transportation.gov/sites/dot.gov/files/docs/2016%20Revised%20Value%20of%20a%20Statistical%20Life%20Guidance.pdf>

²⁰ Ibid., pg. ES-2

²¹ Health Care Cost Institute, June 2019. Available at: <http://healthcostinstitute.org/new/entry/usa-today>



Figure 9. Boat Related Injuries, Percent Difference between BARD & HCUP Emergency Department Visits and Hospitalizations, 2005-2016.²²

During the in-person meeting, participants conducted an assessment of strengths, weaknesses, benefits, and dangers of the current surveillance situation after obtaining a baseline understanding of BARD and existing injury surveillance databases. Strengths of the current system included mandated reporting requirements for BARD, comprehensive fatality data in BARD and data infrastructure. Weaknesses included training inconsistencies, a lack of crosswalk between disciplines (i.e., public health, health care and boating) and data entry inconsistencies. The current “system” was recognized as a “good starting place” for improvements. Roundtable participants discussed what an ideal surveillance system (i.e., victory) would look like. An ideal surveillance system was noted as being centralized, making use of what already exists, containing data that allows for the design of meaningful interventions, and having consistent terms and standards. Participants’ responses have been summarized and included in Appendix G.

²² HCUP has modules for Emergency Department Discharges and Inpatient Hospitalizations based on ICD codes. ICD-9 codes were used in HCUP for data years 2006-2014. For this analysis, ICD-9 e-codes E830-E838 were used for 2006-2014. ICD-10 was used beginning in October 2015. For this reason, data are not available in HCUP for ED visits or inpatient hospitalizations in 2015. ICD-10 e-codes V90-V94 were used for 2016 data year. For all years, emergency department discharges were added to inpatient hospitalizations for the HCUP data value.

RECOMMENDATIONS FOR IMPROVING BOAT OCCUPANT INJURY SURVEILLANCE

In 2006, injury prevention professionals, Tom Christoffel and Susan Scavo Gallagher, outlined *Ten Steps of Injury Surveillance*²³, which can be used to structure an injury surveillance system. They are as follows:

- Define the objectives for the injury surveillance system.
- Form a data committee.
- Identify existing data sources.
- Determine the strengths and limitations of each data source.
- Conduct preliminary data analysis.
- Reevaluate objectives for the surveillance system based on steps 3-5.
- Consider linking information from existing data sources.
- Perform validation studies to evaluate the injury surveillance system.
- Develop a dissemination plan for sharing data.
- Tie surveillance to action and funding.

These steps form the framework of the recommendations which follow. The objective of the injury surveillance system in this instance is to improve a collective understanding of the burden of recreational boat occupant injuries in the United States and implement targeted prevention strategies. Step 2 of the Injury Surveillance Plan²⁴ calls for the formation of a data committee.

Roundtable participants recommend the creation of an Injury Surveillance Workgroup (ISW) outlined in Tier 2 of the proposed three-tier process for improving boating surveillance practices. **Since 2001, the Safe States Alliance²⁵ has convened multidisciplinary groups of experts to recommend improvements to important public health injury surveillance practices. Known as**

Injury Surveillance Workgroups or ISWs, these workgroups are comprised of experts from organizations from across the United States that research, implement, and/or influence injury surveillance efforts. ISW processes and reports provide practitioners with expert recommendations for improving injury surveillance, data analysis, and reporting.

The purpose of the ISW referenced in Tier 2 would be to make more specific recommendations for improving recreational boating-related injury surveillance by:

²³ Christoffel T & Gallagher SS. Injury Prevention and Public Health: Practical Knowledge, Skills and Strategies. Ch. 12 Injury Surveillance: A 10-Step Plan. 2006: Jones and Bartlett, Boston.

²⁴ Ibid.

²⁵ Injury Surveillance Workgroups. Available at: <https://www.safestates.org/page/ISW>

- Utilizing this report to guide and inform a “deeper dive” into key issues, opportunities, challenges, and recommendations identified by participants of the Recreational Boat Occupant Injury Surveillance Roundtable;
- Utilizing investigating specific injury surveillance issues and challenges facing state injury prevention and boating safety programs; and
- preparing consensus-based recommendations on these issues that can be tested with a cohort of pilot states.

The ISW should be representative of multiple agencies and disciplines to build upon the strengths of the multidisciplinary work completed in Tier 1 (Figure 10). **Furthermore, the role of the ISW is to further investigate the feasibility and development of the nine recommendations outlined below. The roundtable process has identified several initial findings based on these steps and, through the following recommendations, has outlined some directions for the ISW to investigate through preliminary data analyses (Step 5), data linkage projects (Step 7) and validation studies (Step 8) during the second tier of this process.** Results of Tier 2 work would inform Tier 3 to test surveillance recommendations with several pilot states, to develop a guidance/summary report on pilot test results, to develop steps for implementing recommendations in additional states, and to focus on continued enhancement of boating safety surveillance practices.

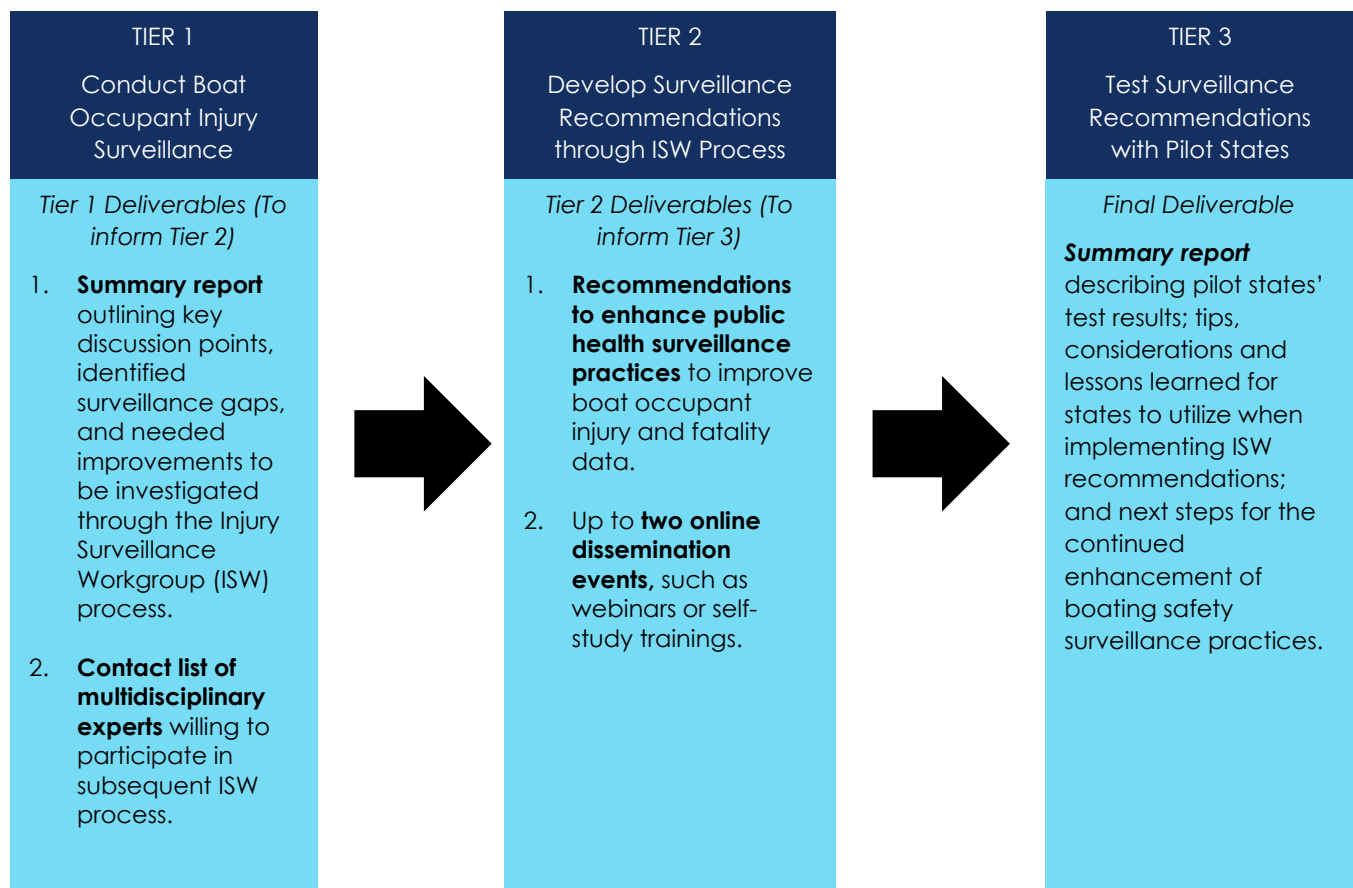


Figure 10: Three-Tier Process to Improve Boat Occupant Injury Surveillance Practices

Recommendation 1: Create, increase, and maintain multidisciplinary collaborations between public health, health care, and boating professionals

The roundtable project was one of the first to bring public health injury prevention and boating professionals together in a long-term effort to work toward a common goal: improving recreational boat occupant injury surveillance. Throughout the process, participants saw the benefits of such a collaboration and recommended that collaborations formed during this project be continued and extended to include others in the ISW process by:

- Building on this collaboration and collaborations between NTSB and NASBLA to facilitate additional federal interagency cooperation between **boating** (USCG), **public health** (CDC/NCIPC), **transportation and traffic safety** (National Highway Traffic and Safety Administration or NHTSA), **aviation** (Federal Aviation Administration or FAA), and **oceanic and atmospheric sciences** (National Oceanic and Atmospheric Administration or NOAA).
- Working with CDC/NCIPC-administered Core State Violence and Injury Prevention Program (Core SVIPP) to ensure awareness of boating surveillance as an important injury issue among state injury and violence prevention programs. NCIPC currently funds 23 state injury and violence prevention programs through Core SVIPP²⁶ to decrease injury and violence related morbidity and mortality and to increase sustainability of injury prevention programs and practices.
- Adding representation from boating professions to groups that influence the development and revision of ICD codes, through partnership with NCHS and CDC.
- Developing state-level drowning death review teams, which routinely collect, review, and analyze drowning-related data to create and inform prevention strategies.
- Assigning a medical professional or public health epidemiologist to each state's BLA to assist with interpreting ICD codes in emergency department and hospitalization data.
- Investigating connections to shared risk and protective factor (SRPF) approaches²⁷ and social determinants of health (SDoH)²⁸. A person's risk of boat-related injury is influenced by a variety of personal, social, economic influences, as illustrated in Sample Haddon's Matrix (Figure 6, page 10). Understanding how these determinants overlap is a key consideration for prevention strategies.

²⁶ NCIPC Core SVIPP Program. Available at: <https://www.cdc.gov/injury/stateprograms/index.html>

²⁷ Shared risk and protective factor approaches are comprehensive efforts to improve multiple population health outcomes by focusing on the shared, root causes of population health issues and strategically aligning diverse, multisector interventions to collectively address these issues.

²⁸ "Social Determinants of Health are conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks." Available at: <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>

- Participating in the development of a national water safety plan with CDC and Water Safety USA to further the mission of reducing drowning and promoting water safety in the United States.
- Giving injured people and family members of people who have died in a boating incident a seat at the table when discussing surveillance and prevention, including their representation in the ISW.
- Developing a system to coordinate with hospitals to support the regular notification of BLAs regarding incidents involving boats. To our knowledge, there is not an existing system in place for this.
- Hosting a regularly occurring data surveillance symposium (for public health, health care and boating safety professionals) or integrating boating into existing public health and/or injury prevention conferences, such as APHA and the Safe States Alliance's Annual Injury and Violence Prevention Conference.
- Establishing an ongoing national data workgroup to overcome data-related challenges and routinely review surveillance items long after the proposed ISW disbands. This workgroup would have representation from CDC, USCG, NASBLA, and the Safe States Alliance, and would also draw upon expertise from other organizations, such as the Council of State and Territorial Epidemiologists (CSTE), NHTSA, NTSB, the American Hospital Association (AHA), APHA, and Water Safety USA.
- Connecting boating to current priorities of federal agencies, including CDC/NCIPC. Currently, the topical priorities of NCIPC are child abuse and neglect, motor vehicle crashes, intimate partner and sexual violence, opioid overdose, and traumatic brain injury. Analyses which posit recreational boating injuries in comparison, contrast, and potential overlap with these priorities (e.g., traumatic brain injury and boating injury) may help move boating up the NCIPC priority list. Furthermore, connecting boating to overall drowning may increase prioritization as drowning is one of the leading causes of fatalities.

Recommendation 2: Create consistent terms and definitions across agencies

Inconsistent terms and definitions were a common theme discussed throughout the roundtable. While USCG and NASBLA are working to develop consistency, there remain inconsistent terms across all databases that pertain to boating (e.g., vital statistics, HCUP, etc.). Proposed approaches for improvement that should be investigated during the ISW process include:

- Using the term “incident” instead of “accident” to align with injury prevention and control practices. “Accident” has been removed from public health injury prevention discourse since 1997, when NHTSA stopped using it to describe motor vehicle crashes

and collisions.²⁹ Furthermore, seminal work in injury prevention has called for the term's removal from public discourse and professional lexicons, as injuries are both preventable and predictable.³⁰

- Using consistent terminology and providing training on terms across boating and public health sectors. (A tangible example would be to develop a “crosswalk” of definitions for use across BARD and injury surveillance datasets.)
- Clearly defining a “boating incident.” A “boating incident” as defined by the USCG is different from that of public health; unlike USCG’s definition, in public health, an incident includes any injury in which the boat was a risk factor, regardless of whether the boat caused or led to the injury. The definition of “boating incident” has widespread implications on funding and data surveillance. An example that was frequently discussed was that of drowning and boating. The USCG captures some swimming deaths from boats, depending on the boat’s operational status at the time of incident. Widening the definition of “boating incident” beyond the USCG definition would encourage multidisciplinary collaboration on this topic (see Recommendation 1).
- Changing the term “recreational” to “non-occupational” or “non-commercial,” as many boating practices are used as a way of life and or transportation (e.g., Alaskan Native populations).
- Including shared risk and protective factors (SRPFs) in datasets and prevention discussions. A SRPF approach acknowledges that the risk and protective factors related to boat-related injuries and fatalities are likely similar to the risk and protective factors of other injuries. By examining shared risk and protective factors along with other injuries, states can coordinate with other agencies and partners to leverage resources and scale prevention programs that address these risk and protective factors. For example, alcohol use is a shared risk factor of motor vehicle crashes and recreational boating. Therefore, a partnership between organizations focused on motor vehicle injuries and boating-related injuries that collectively addresses alcohol use while operating a vehicle or vessel may have more impact by working together than either organization would alone.
- Using “occupant” to include everyone in the vessel instead of “passenger” to promote data collection and development of prevention strategies that go beyond operators.

“Injuries are not just preventable, they’re predictable.”

Laura Rowen, Injury Prevention Coordinator, Michigan Department of Health and Human Services, citing a tenet of injury prevention²⁸

²⁹ More on removing “accident” from NHTSA discourse can be found here: <http://www.nhtsa.dot.gov/nhtsa/announce/NhtsaNow/Archive/1997/v3.11/>

³⁰ Houk VN. Injuries are not accidents. Public Health Rep. 1986;101(2):124.

- Determining what other jurisdictional issues or conflicts may impact injury reporting, as participants discussed variations in local practices within the states as to which agencies respond and report on boating incidents.

Recommendation 3: Improve and expand data elements captured

The following list of improvements and expansions to BARD warrants further investigation by the ISW to determine the feasibility and specificity of making recommendations for updates to BARD at the next three-year update. They include:

- Listing all causes of injury in a boating incident report to align with ICD coding.
- Increasing toxicology screening for boating incidents. The ISW may want to consider consulting with law enforcement and NHTSA to determine best practices around this strategy.
- Adding detail about the circumstances preceding the injury using a Haddon Matrix as a guide.
- Reviewing the required BARD fields that are reported by all states and making recommendations to include more detail on prevention policy and programs.
- Drilling down to specific locations/events (i.e., utilizing GPS coordinate information).
- Increasing the collection of demographic data to include at minimum, race, ethnicity, age, gender, resident address, and zip code for all occupants of the vessel.
- Collecting exposure data via the National Recreational Boating Survey³¹ on an annual basis (vs. every five years).

Furthermore, injury datasets that rely on ICD codes could be improved by:

- Requiring all medical professionals to report external cause of injury codes no matter the facility.
- Refining the next version of ICD codes to specify roles for boating incidents (operator vs. occupant).

³¹ National Recreational Boating Survey. Available at: <https://uscgboating.org/statistics/national-recreational-boating-safety-survey.php>

Recommendation 4: Improve data collection processes and strategies within BARD

A number of improvements to data collection processes and strategies were discussed for BARD, as participants described state-to-state variations in data that are collected and entered into the system. Several training gaps were discussed across the continuum of data collection, analysis, and reporting, including: a lack of consistent training on how to conduct a scene investigation, alcohol investigation, and data entry for BARD; and the need to gather more qualitative data (e.g., narratives) about incidents. Improvements to data collection strategies that should be further investigated include:

- Providing data entry training for BARD.
- Ensuring appropriate data are collected by the appropriate entity/agency.
- Eliminating boat operator self-reporting in order to decrease biased/inaccurate responses and variation. Instead, all boating accident reports should be completed only by qualified investigators in every state.
- Improving data collection technology to include GIS coordinates, using systems for e-reporting rather than paper forms, and hyper-linking to definitions of terms within the reporting system.
- Determining whether injury information should remain in BARD, given the long history of significant underreporting of injuries in BARD by states (see Figure 9, page 23). An alternative avenue to pursue may include using emergency department and hospitalization data to supplement BARD on a routine basis.
- Developing expectations for sharing annual summaries and full datasets from BARD with boating safety, public health, drowning/injury prevention advocates, and researchers.
- Developing state media, policy and outreach priorities that are informed by data. Involve multiple stakeholders so that messages and priorities are coordinated.

Recommendation 5: Improve and expand data accessibility across all boat-related injury surveillance datasets

During the virtual meetings, roundtable participants stated that they did not know how to access many of the injury datasets that contained elements of boating injuries and concluded that this may be widespread across both public health and boating safety communities.

Currently, accessing recreational boat injury surveillance data is a difficult task using publicly available datasets. CDC's WISQARS is a go-to resource for publicly available injury data. At

the time of the roundtable process, it was not possible to obtain boat occupant injury surveillance data using WISQARS. Additionally, BARD does not currently make a cleaned dataset of **all data** submitted publicly available for research use. Each database contains valuable information that provides a portion of the picture of boating-related injuries; however, it is currently cumbersome to interpret each individual portion. Options that should be investigated by the ISW to make better use of existing public health and boating data include:

- Providing public access to raw BARD datasets (for as many retrospective years of data as possible) and encourage analysis of BARD by public health, injury prevention professionals, and researchers as an important data source on boating injuries and fatalities.
- Clearly categorize codes across and within boating-related injury datasets and making them publicly available for research.
- Creating dashboards of injury data available to the boating community.
- Obtaining access to boating-related injury data in WISQARS.
- Increasing access and update all datasets across disciplines and organizations.
- Sharing boating-related injury analyses done across disciplines and organizations.

Recommendation 6: Link and integrate existing boating-related injury data sources

Participants acknowledged the array of injury surveillance systems that currently exist and the importance of using existing data to more fully describe boat occupant-related injuries. Linked datasets have been used in other injury areas such as violence prevention (the National Violent Death Reporting System or NVDRS) and motor vehicle crashes (Crash Outcome Data Evaluation System or CODES). Participants recommended that the ISW examine data linkage opportunities within existing boat injury surveillance databases. Some options that should be investigated include:

- Piloting an effort to link data systems within states, including BARD with injury datasets such as vital statistics, hospitalization, emergency department, and trauma system data to build upon work done in Washington by Stempski and colleagues³².
- Developing a national surveillance system that merges multiple datasets, including circumstance and medical datasets.

³² Stempski S, Schiff M, Bennett E, Quan L. A case-control study of boat-related injuries and fatalities in Washington State. *Injury Prevention*, 2014; 0:1-6. Doi:10.1136/injuryprev-2013-041022.

- Integrating datasets to develop a complete picture of fatal and non-fatal recreational boating-related injuries.
- Developing a comprehensive boat occupant injury data portal based upon linked datasets for easy access.

Additionally, investigating opportunities for widening and involving other data sets were recommended, including the Youth Risk Behavior Surveillance System (YRBSS), the Behavioral Risk Factor Surveillance System (BRFSS), and the Occupational Safety and Health Administration (OSHA) Workplace Injury, Illness and Fatality Statistics. Other data integration projects that were proposed included introducing citations or offense history into BARD or another, linked surveillance system to more accurately predict prevention needs, as well as exploring the potential of introducing ICD-10 codes into BARD.

Linked data sources were also discussed as a means of tracking an individual over time across existing databases. This would allow for the development of a more complete picture of what occurred prior to the incident, during the incident, and after the incident (i.e., Haddon's Matrix). Further examination of factors across time could also allow for the development of predictive analytics related to boating-related injuries.

Recommendation 7: Utilize expanded data analyses and methodologies with existing data

Several barriers were cited by participants regarding the ability to routinely use data collected. These barriers included a lack of personnel and resources to conduct advanced analysis on data – including advanced cost burden metrics, such as years of potential life lost (YPLLs) and quality adjusted life years (QALYs) – and training on how to use existing data to develop prevention programs and policies.

Several methodologies – which have been used in other injury areas – were proposed for further exploration by the ISW, given their opportunities to provide a comprehensive understanding of recreational boat occupant-related injuries. These include:

- Using ICD-10 codes for state, national and international comparisons of data related to boating injuries.
- Improving calculations of the complete cost-burden of recreational boating injuries using economic evaluative metrics common to other injury areas (e.g., costs associated with injuries, property, quality-adjusted life years, years of potential life lost). The trajectory of a person injured in a boating incident was discussed, which should include the timeframe beyond the initial emergency department visit and/or hospitalization to include longer-term effects, such as infectious diseases that may occur as a result of the boating injury (e.g., from microorganisms in the water, pneumonia, etc.), ongoing physical therapy and occupational therapy visits, mental health and trauma implications, loss of productivity, disability, and the likelihood that the injury places the individual at increased risk of future health complications.

- Conducting agency and government policy surveillance³³ and policy evaluations. Examples of policy surveillance from Washington state were provided, which examined laws related to boating under the influence. An example of a policy surveillance project focused on state approaches to boating under the influence is available from the Network for Public Health Law.³⁴

Recommendation 8: Investigate sources of sustainable funding for recreational boating surveillance

The aforementioned challenges and recommendations will require sustained funding to be fully addressed. In some instances, one-time funding will be appropriate; however, sustained funding will be necessary for many activities. Given the multidisciplinary nature of boating-related injuries, the ISW should investigate the feasibility of establishing collaborative funding structures that involve a variety of federal agencies with a vested interest in these recommendations, including, but not limited to, CDC/NCIPC and USCG.

Recommendation 9: Work toward long-term social, political, and cultural change

Participants discussed that boating culture in the United States has a long way to go to get to a place where boating is treated like motor vehicle crashes, particularly in the areas of alcohol use and boating. Specific mention was made of the broad acceptability of drinking while boating and that drinking while boating is not treated with the same level of stigma as drinking while driving. Additionally, participants agreed that the political will for change should start with Congress, USCG, CDC, and other leaders and decision makers at federal and state levels. Pursuing the ISW creation and recommendations will create the first steps toward long-term cultural change.

"Honey, I'm sorry for what happened to you. But boating and drinking go hand in hand. I do it all the time and so does everybody else. That's never going to change."

State Legislator to Roundtable Participant and Boating Incident Survivor, Alex Otte, during a past constituent meeting.

³³ Policy surveillance is the "ongoing systematic collection, analysis, interpretation, and dissemination of information about a given body of public health law and policy." Chriqui, J. F., O'Connor, J. C., & Chaloupka, F. J. (2011). What gets measured gets changed: Evaluating law and policy for maximal impact. *The Journal of Law, Medicine & Ethics*, 39(Supplement 1), 6. doi:10.1111/j.1748-720X.2011.00559.x

³⁴ State Approaches to Boating Under the Influence. Available at: https://www.networkforphl.org/the_network_blog/2016/10/12/829/state_approaches_to_boating_under_the_influence

CONCLUSION

The recommendations made by the Recreational Boat Occupant Injury Surveillance Roundtable are aligned with previous recommendations made by a variety of sources, as well as the Ten Steps for Injury Surveillance³⁵. Boating-related injury data are captured in a variety of databases both in the boating community and the public health injury prevention community. Linking existing data could enhance surveillance and provide opportunities for additional insights into non-fatal boating-related injuries. Injury prevention programs and policies would greatly benefit from ongoing multidisciplinary collaborations between boating safety and public health professionals. The adoption of public health tools could heighten social and political awareness of the true societal costs of both fatal and non-fatal boating incidents.

³⁵ Christoffel T & Gallagher SS. Injury Prevention and Public Health: Practical Knowledge, Skills and Strategies. Ch. 12 Injury Surveillance: A 10-Step Plan. 2006: Jones and Bartlett, Boston.

APPENDICES

Appendix A: Foundational Publications

Four foundational publications were used to inform the roundtable recommendations. A description and key recommendations taken from them are included below.

Article 1: Industrial Economics, Incorporated for the U.S. Coast Guard, Office of Standards Evaluation and Development. Estimating the Benefits of Reducing Risk of Recreational Boating Accidents: Alternative Sources of Information on Fatalities, Injuries, and Property Damages. September 12, 2011.

Purpose: This report reviews previous research, evaluates alternative data sources of boat-related injury other than BARD, and explores implications of the alternative data for estimating the benefits of USCG regulations and policies. Key recommendations from this report include:

- Need for enhanced approaches to estimate non-fatal injuries – significant underreporting of these in BARD
- Improving ability to crosswalk injuries categorized by type of treatment with injuries categorized by severity
- Improving injury valuation (economic burden) techniques

Article 2: Lawrence BA, Miller TR, Maxim D. Recent Research on Recreational Boating Accidents and the Contribution of Boating Under the Influence. July 2006. Available at: https://www.uscgboating.org/library/bui-study/BUI_Study_Final.pdf

Purpose: The USCG sponsored this study to address the significant under-reporting of non-fatal boating incidents, to estimate the social costs of boating incidents, and estimate the contribution of alcohol use to the incidence and costs of boating incidents.

Key recommendations from this report include:

- Significant under-reporting on non-fatal injuries in BARD
- Establish reporting standards and training for those who enter data into BARD
- Provide a forum for states to share “best practices”
- Additional confirmatory analyses should be done to improve data quality
- Alcohol involvement is under-reported and statistically similar to that of motor vehicle crashes

Article 3: Stempski S, Schiff M, Bennett E, Quan L. A Case Control Study of Boat-Related Injuries and Fatalities in Washington State. *Inj Prev*, 2014; 20(4):232-7.

Purpose: Authors wanted to identify risk factors associated with boat-related injuries and deaths by performing a case-control study using the Washington Boat Accident Investigation Report Database and linking to Washington State Death Certificates and the Washington State Comprehensive Hospitalization Abstract Reporting System. Key recommendations from this article include:

- Use of case-control and data linkage methodologies to analyze boat-related injuries and fatalities
- Alcohol as a contributing factor

- Culture of boating and alcohol as accepted practice
- Established additional risk factors for boating-related injury and death

Article 4: Hargarten SW, Karlson T, Vernick JS, Aprahamian C. Motorboat Propeller Injuries in Wisconsin: Enumeration and Prevention. *J Trauma*, 1994; 37(2):187-190.

Purpose: Authors aimed to ascertain the nature and extent of motorboat propeller injuries in Wisconsin using a retrospective study of death and injuries from outboard motor propellers reporting to vital statistics and emergency departments. Key recommendations from this article include:

- Use of death certificates and emergency department data to examine motorboat propeller injuries in WI
- Comparison of data sources reporting deaths and injury due to outboard motor propellers including death certificates, BARD, emergency department data, Wisconsin Department of Natural Resources data
- Related injuries and health problems stemming from initial boat-related injury
- Involvement of manufacturers

Appendix B: Participants of the Recreational Boat Injury Surveillance Roundtable

Virtual Meeting 1: February 12, 2019

Dan Dao, TX Department of State Health Services, Injury Epidemiology and Surveillance
Alan Dellapenna, NC Division Public Health Injury and Violence Prevention
Pam Dillon, NASBLA
Sharon Gilmarin, Safe States Alliance
Tony Gomez, Seattle & King County Public Health
Deb Gona, NASBLA
Cody Jones, TX Parks and Wildlife Department, Law Enforcement Division
Barry Nobles, US Coast Guard
Alex Otte, NASBLA
Jamila Porter, Safe States Alliance
Neil Rainford, Centers for Disease Control & Prevention
Kristen Sanderson, LA Office of Public Health
Sarah Stempski, Seattle Children's Hospital
Kelli Toth, AK Injury Prevention Coordinator
Seth Wagner, FL Fish & Wildlife Conservation Commission
Betsy Woods, TN Wildlife Resources Agency Boating Division
Amy Schlotthauer, AES Consulting Firm (Facilitator)

Virtual Meeting 2: March 15, 2019

Elizabeth Bennett, Seattle Children's Hospital
Pam Dillon, NASBLA
Sharon Gilmarin, Safe States Alliance
Tony Gomez, Seattle & King County Public Health
Cody Jones, TX Parks and Wildlife Department, Law Enforcement Division
Barry Nobles, US Coast Guard
Alex Otte, NASBLA
Jamila Porter, Safe States Alliance
Laura Rowen, MI Department of Health & Human Services
Kristen Sanderson, LA Office of Public Health
Ron Sarver, NASBLA
Sarah Stempski, Seattle Children's Hospital
Susan Stocker, IA Department of Natural Resources
Kelli Toth, AK Injury Prevention Coordinator
Seth Wagner, FL Fish & Wildlife Conservation Commission
Betsy Woods, TN Wildlife Resources Agency Boating Division
Amy Schlotthauer, AES Consulting Firm (Facilitator)

Virtual Meeting 3: April 2, 2019

Elizabeth Bennett, Seattle Children's Hospital
Pam Dillon, NASBLA
Sharon Gilmarin, Safe States Alliance
Tony Gomez, Seattle & King County Public Health
Deb Gona, NASBLA

Cody Jones, TX Parks and Wildlife Department, Law Enforcement Division
Barry Nobles, US Coast Guard
Alex Otte, NASBLA
Jamila Porter, Safe States Alliance
Laura Rowen, MI Department of Health & Human Services
Ron Sarver, NASBLA
Tim Spice, TX Parks & Wildlife Department, Law Enforcement Division
Susan Stocker, IA Department of Natural Resources
Hillary Strayer, AK Native Tribal Health Consortium
Kelli Toth, AK Injury Prevention Coordinator
Seth Wagner, FL Fish & Wildlife Conservation Commission
Susan Weber, US Coast Guard
Betsy Woods, TN Wildlife Resources Agency Boating Division
Amy Schlotthauer, AES Consulting Firm (Facilitator)

Virtual Meeting 4: April 30, 2019

Elizabeth Bennett, Seattle Children's Hospital
Dan Dao, TX Department of State Health Services, Injury Epidemiology and Surveillance
Pam Dillon, NASBLA
Sharon Gilmartin, Safe States Alliance
Barry Nobles, US Coast Guard
Alex Otte, NASBLA
Jamila Porter, Safe States Alliance
Laura Rowen, MI Department of Health & Human Services
Kristen Sanderson, LA Office of Public Health
Ron Sarver, NASBLA
Tim Spice, TX Parks & Wildlife Department, Law Enforcement Division
Sarah Stempski, Seattle Children's Hospital
Kelli Toth, AK Injury Prevention Coordinator
Seth Wagner, FL Fish & Wildlife Conservation Commission
Susan Weber, US Coast Guard
Betsy Woods, TN Wildlife Resources Agency Boating Division
Amy Schlotthauer, AES Consulting Firm (Facilitator)

Roundtable Meeting in Atlanta, GA: July 11-12, 2019

Stacey Brown, VA Department of Game & Inland Fisheries
Mark Chanski, NASBLA
Pam Dillon, NASBLA
Sharon Gilmartin, Safe States Alliance
Tony Gomez, Seattle & King County Public Health
Deb Gona, NASBLA
Cody Jones, TX Parks and Wildlife Department, Law Enforcement Division
Barry Nobles, US Coast Guard
Alex Otte, NASBLA
Jamila Porter, Safe States Alliance
Laura Rowen, MI Department of Health & Human Services
Kristen Sanderson, LA Office of Public Health
Ron Sarver, NASBLA

Sarah Stempski, Seattle Children's Hospital

Hillary Strayer, AK Native Tribal Health Consortium

Kelli Toth, AK Injury Prevention Coordinator

Seth Wagner, FL Fish & Wildlife Conservation Commission

Susan Weber, US Coast Guard

Betsy Woods, TN Wildlife Resources Agency Boating Division

Amy Schlotthauer, AES Consulting Firm (Facilitator)

Appendix C: National Injury Datasets, Prepared for Recreational Boat Occupant Injury Surveillance Roundtable

Data Source	Description	Contents	Strengths	Limitations
WISQARS	<p>"CDC's WISQARS is an interactive, online database that provides fatal and nonfatal injury, violent death and cost of injury data from a variety of trusted sources. Researchers, the media, public health professionals, and the public can use it to learn more about the public health and economic burden associated with unintentional and violence-related injury in the United States. Available at: https://www.cdc.gov/injury/wisqars/index.html</p>	Fatal and Non-fatal Injury Data	<p>National Data</p> <p>Based on ICD-10 Codes</p>	<p>"WISQARS is not able to provide data on nonfatal boating injuries."³⁶ Boating transport injuries are not an exclusive category – lumped into "Other Transport"</p> <p>Drowning is encompassing of all types of drowning, outside of boating-related drowning</p>
CDC Wonder	<p>"CDC Wonder is an integrated information and communication system for public health that allows users access to a wide-ranging online data for epidemiologic research." Available at: https://wonder.cdc.gov/</p>	<p>Query System</p> <p>Death certificate data:</p> <p>Underlying Cause of Death</p> <p>Multiple Cause of Death</p>	<p>Uniformly coded with ICD-10 variables</p> <p>National database, can get state level data to compare, publicly available</p>	<p>Cause of death is ruled by medical examiner or coroner of jurisdiction which is highly variable within states and across states.</p> <p>Beyond ICD-10 codes and basic demographics, not a lot of context to data</p>
National Center for Health Statistics	<p>The National Center for Health Statistics provides National Vital Statistics public-use datasets on births and deaths, including multiple cause of death data categorized by ICD codes. Available at: https://www.cdc.gov/nchs/data/access/vitalstatsonline.htm</p>	<p>Downloadable files of multiple cause of death data by nation and state</p>	<p>Uniformly coded with ICD-10 variables</p> <p>National database, can get state level data to compare, publicly available</p>	<p>Cause of death is ruled by medical examiner or coroner of jurisdiction which is highly variable within states and across states.</p> <p>Beyond ICD-10 codes and basic demographics, not a lot of context to data</p>

³⁶ Personal Email Communication, National Center for Injury Prevention and Control, June 14, 2019.

Data Source	Description	Contents	Strengths	Limitations
National Trauma Data Bank Research Data Set	The National Trauma Data Bank is the “largest aggregation of United States trauma register data assembled. Registry data is compiled annually.” Available at: https://www.facs.org/quality-programs/trauma/tap/center-programs/ntdb/datasets	Trauma Center Data – all injuries that were taken to a trauma center	ICD-10 coded, rich dataset includes information on injury event, diagnosis, care, outcomes, and costs of treatment of injured patients	Data is often abstracted by facility program staff National research dataset is currently unavailable (June 2019). State level requests can be made at state health department
National Electronic Injury Surveillance System	“The National Electronic Injury Surveillance System is operated by the Consumer Product Safety Commission and collects data on consumer product-related injuries occurring in the United States.” Available at: https://www.cpsc.gov/cgibin/NEISSQuery/	National surveillance system of the Consumer Product Safety Commission tracking number and severity of consumer-product related injuries to persons treated in hospital emergency departments	National data set, injury information	Per the 2018 coding manual ³⁷ , boating injuries are not reportable (page 13).
Healthcare Cost and Utilization Project (HCUPnet)	“The Healthcare Cost and Utilization Project (HCUP) datasets are collated by the Agency for Healthcare Research and Quality. HCUPnet is a free online query system based on data from the HCUP and provides health care statistics and information for hospital inpatient, emergency department, and ambulatory settings.” Available at: https://hcupnet.ahrq.gov/#setup	Free online query system based on data from the Healthcare Cost and Utilization Project	Health care statistics and information for hospital inpatient, emergency department, and ambulatory settings	Basic level information provided

³⁷ 2018 Coding Manual is located here:

<https://www.cpsc.gov/cgibin/NEISSQuery/Data/Info%20Docs/2018%20NEISS%20Coding%20Manual.pdf>

Appendix D: In-Person Roundtable Meeting Agenda

Recreational Boat Occupant Injury Surveillance Roundtable Courtyard Marriott Atlanta Decatur July 11-12, 2019

AGENDA

Meeting Goal: This Roundtable meeting brings together injury and violence prevention professionals, public health professionals, and boating professionals to discuss recommendations for improving and standardizing surveillance of recreational boating-related injuries and deaths from multidisciplinary perspectives.

Deliverable: Following the completion of the two-day meeting, a summary report will be created to:

- Include recommendations for improving and standardizing surveillance of recreational boating-related injuries;
- Outline key discussion points, identify surveillance gaps, and needed improvements to be investigated through a future Injury Surveillance Workgroup (ISW) process; and
- Provide a contact list of multidisciplinary experts willing to participate in a subsequent ISW process.

Meeting Participants

- Stacey Brown, VA Department of Game & Inland Fisheries
- Mark Chanski, NASBLA
- Pam Dillon, NASBLA
- Sharon Gilmartin, Safe States Alliance
- Tony Gomez, Seattle & King County Public Health
- Deb Gona, NASBLA
- Cody Jones, TX Parks and Wildlife Department, Law Enforcement Division
- Barry Nobles, US Coast Guard
- Alex Otte, NASBLA
- Jamila Porter, Safe States Alliance
- Laura Rowen, MI Department of Health & Human Services
- Kristen Sanderson, LA Office of Public Health
- Ron Sarver, NASBLA
- Sarah Stempski, Seattle Children's Hospital
- Hillary Strayer, AK Native Tribal Health Consortium
- Kelli Toth, AK Injury Prevention Coordinator
- Seth Wagner, FL Fish & Wildlife Conservation Commission
- Susan Weber, US Coast Guard
- Betsy Woods, TN Wildlife Resources Agency Boating Division

Meeting Facilitator: Amy Schlotthauer, AES Consulting Firm

Day 1: Thursday, July 11

TIME	TOPIC	LEAD
8:00 – 8:30 AM	Participant Check-in / Informal Networking. Coffee will be on at 8:00.	Group
8:30 – 8:45 AM	Meeting Kick-Off: Introductions	Group
8:45 – 9:15 AM	Engagement Activity: Liberating Structures Nine Whys – Purpose The first step of structure injury surveillance is defining purpose. ³⁸ Participants will go through a small group activity to discuss purpose from a professional and personal lens.	Group
9:15 – 9:55 AM	Welcome Remarks: Purpose of the Project The lead project organizations will provide brief comments to welcome participants, explain how we got here, and provide goals from their lens. Alex Otte will provide personal story of her experience as a boating occupant with injury to remind participants of the humans behind the data.	Coast Guard: Barry Nobles, Susan Weber NASBLA: Pam Dillon, Kelli Toth Safe States: Jamila Porter Alex Otte
9:55 – 11:45 AM	Data – What do we currently know? This session will cover: Terminology Existing Databases <ul style="list-style-type: none"> • BARD and other boating specific data and data tools • Using Injury Surveillance databases for boating data Upcoming changes/modifications to existing Databases	Susan Weber Deb Gona (TBD) Barry Nobles Ron Sarver Amy Schlotthauer
11:45 AM – 12:30 PM	Share Data Success Stories from a Public Health Approach Participants will share brief stories of their experience: 1. Using data in unique ways to address injury surveillance in boating 2. Using data to develop a prevention program, or modified an existing program, based on what you were seeing in the data	Kelli Toth Hillary Strayer Group

³⁸ Christoffel T & Gallagher SS. Injury Prevention and Public Health: Practical Knowledge, Skills and Strategies. Ch. 12 Injury Surveillance: A 10-Step Plan. 2006: Jones and Bartlett, Boston.

	<p>3. A multidisciplinary collaboration to address recreational boating occupant safety (data, prevention, evaluation)</p> <p>4. An evaluation of a prevention program in your state that showed decreasing injuries or deaths</p>	
12:30 – 1:45 PM	Break for Lunch*	Group
1:45 – 5:00 PM	<p>Consensus Building Workshop: WHAT ARE THE SURVEILLANCE GAPS IN RECREATIONAL BOATING OCCUPANT INJURIES?</p> <p>The Consensus Building Workshop is a highly interactive discussion that begins with individual assessment, leads to small group discussions and ends with large group discussion to further illustrate and clarify responses to the question above. The workshop ensures each participant contributes and has ownership over the end product.</p>	Amy Schlotthauer Group
5:00 – 5:30 PM	Wrap Up Day 1	Group

Day 2: Friday, July 12

TIME	TOPIC	LEAD
8:00 – 8:30 AM	Coffee at 8:00. Participants Gather / Informal Networking	Group
8:30 – 9:15 AM	<p>Liberating Structures Impromptu Networking Activity:</p> <p>What challenge lingers from yesterday?</p> <p>This engagement activity will allow participants to reflect on the full day one in small groups and bring forward observations to the full group.</p>	Amy Schlotthauer
9:15 – 10:00 AM	<p>Consensus Building Workshop Results Review</p> <p>During this time, participants will build off their small group discussion from the previous activity and bring forward observations to the full group to discuss to ensure that there are no glaring omissions from the results of the workshop.</p>	Amy Schlotthauer

10:00 – 11:30 AM	Data Set Discussion Articles Review This time will be used to review outcomes from data sets and articles that were used as pre-readings and during virtual meetings to compare them to the outcomes of the workshop to ensure that the workshop outcomes resonate with current literature findings and findings of complementary projects.	Amy Schlotthauer
11:30 AM – 12:00 PM	Wrap-up Next Steps Dismissal Procedures for commenting on the draft of the recommendation report (deliverable) will be shared with participants, as well as next steps.	Group

Appendix E: Coast Guard Boating Accident Report Form CG-3865

DEPARTMENT OF HOMELAND SECURITY U.S. Coast Guard RECREATIONAL BOATING ACCIDENT REPORT			OMB Control Number: 1625-0003 Expires: 07/31/2022
INSTRUCTIONS: Use "Report required because" section below to determine if a report is required for your accident. If required, please have each vessel owner or operator involved in the accident submit a report to their state reporting authority. Each boat operator/owner involved in an accident should submit a separate report. For each question below, please provide answers if applicable and if known; otherwise leave blank.			
Privacy Act Notice			
Authority: 46 U.S.C. 6102 and 33 CFR 173 & 174 authorize the collection of information on boating accidents. Purpose: The Coast Guard uses this information for statistical purposes, chiefly to inform the public, to measure the Program's efforts, and to regulate issues relating to boating safety. Routine Uses: The Coast Guard shares this information within the agency, and if state and federal law permit it, to the public.			
REPORT SUBMISSION			
Report required because (select all that apply): <input type="checkbox"/> At least one person in this accident died: If so, how many? <input type="text"/> <input type="checkbox"/> At least one injured person in this accident required or was in need of treatment beyond first aid: If so, how many? <input type="text"/> <input type="checkbox"/> At least one person in this accident disappeared and has not yet been recovered: If so, how many? <input type="text"/> <input type="checkbox"/> All boat and other property damage (e.g., fishing/hunting gear) caused by this accident totaled (or likely totaled) \$2,000 or more: Approximate value of damage to your boat: \$ <input type="text"/> Approximate value of damage to your other property: \$ <input type="text"/> <input type="checkbox"/> Your or another boat in this accident was (or likely was) a total loss		To be submitted within: 48 hours (if injury, disappearance or death) 10 days (if boat/property damage only) To be submitted to: (Local State Reporting Authority) <input type="text"/> Phone: <input type="text"/> <small>You may submit any comments concerning the accuracy of the burden estimate or any suggestions for reducing the burden to: Commandant (CG-BSX-21), U.S. Coast Guard, Washington, DC 20593-0001 or Office of Management and Budget, Paperwork Reduction Project (1625-0003), Washington, DC 20503. Questions relating to the collection of this data should be sent to the Coast Guard.</small>	
Report submitted by (select all that apply): <input type="checkbox"/> Boat Operator (required if possible) <input type="checkbox"/> Boat Owner (if operator unable, or same as operator) <input type="checkbox"/> Other (describe): <input type="text"/>		For State Agency Use Only	
First Name <input type="text"/> Last Name <input type="text"/> Phone <input type="text"/>		First Name <input type="text"/> Last Name <input type="text"/> Phone: <input type="text"/> Primary Cause of Accident <input type="text"/>	
ACCIDENT SUMMARY			
WHEN Date: <input type="text"/> Time: <input type="text"/> am <input type="checkbox"/> pm <input type="checkbox"/> <small>(mm/dd/yyyy) (select one)</small>		ACCIDENT DESCRIPTION: Briefly describe this accident (attach extra pages if necessary) <input type="text"/> 	
WHERE Body of Water Name <input type="text"/>			
Location (on water) description <input type="text"/>			
Nearest city/town <input type="text"/>			
County: <input type="text"/> State: <input type="text"/>		DAMAGE TO YOUR BOAT: Briefly summarize any damage to your boat <input type="text"/> 	
YOUR BOAT – PEOPLE			
# people on board (including operator): <input type="text"/>		DAMAGE TO YOUR OTHER PROPERTY: (NOT BOAT) Briefly summarize any damage to your other property (not boat) <input type="text"/> 	
# people being towed (e.g., on tubes, skis): <input type="text"/>			
# people wearing lifejackets (on board or towed): <input type="text"/>			
OTHER BOATS INVOLVED IN ACCIDENT			
# of other boats involved: <input type="text"/>			

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Reset

For each question below, please provide answers IF APPLICABLE AND IF KNOWN, otherwise leave blank.											
YOUR BOAT											
BOAT IDENTIFICATION											
Your Boat Name: _____						Manufacturer: _____					
Model Name: _____						Model Year: _____					
Registration #: _____						Documentation #: _____					
Hull Identification # (HIN): _____						Rented: <input type="checkbox"/> Yes <input type="checkbox"/> No					
SIZE ESTIMATES											
Length: _____ ft.		Depth from transom (stern) to keel (bottommost point): _____ ft. _____ in.				Beam width at widest point: _____ ft.					
HULL MATERIAL											
Type of Hull Material (select one)											
<input type="checkbox"/> Fiberglass		<input type="checkbox"/> Wood		<input type="checkbox"/> Rubber/vinyl/canvas		<input type="checkbox"/> Other (describe): _____					
<input type="checkbox"/> Aluminum		<input type="checkbox"/> Steel		<input type="checkbox"/> Plastic							
BOAT TYPE											
Boat Type (select one)						Available Propulsion (select all that apply)					
<input type="checkbox"/> Cabin motorboat	<input type="checkbox"/> Inflatable boat	<input type="checkbox"/> Personal watercraft (PWC) (e.g., Wave Runner™, Jet Ski™, Sea-Doo™)		<input type="checkbox"/> Paddlecraft:		<input type="checkbox"/> Propeller		<input type="checkbox"/> Air thrust			
<input type="checkbox"/> Open motorboat	<input type="checkbox"/> Houseboat			<input type="checkbox"/> Canoe		<input type="checkbox"/> Sail		<input type="checkbox"/> Other (describe): _____			
<input type="checkbox"/> Auxiliary sail	<input type="checkbox"/> Sail (only)	<input type="checkbox"/> Air boat		<input type="checkbox"/> Kayak		<input type="checkbox"/> Standup Paddleboard		<input type="checkbox"/> Manual			
<input type="checkbox"/> Pontoon boat	<input type="checkbox"/> Rowboat	<input type="checkbox"/> Other (describe): _____				<input type="checkbox"/> Water jet					
ENGINE											
# Engines: _____		Engine type and horsepower (select one)				Fuel type (select all that apply)					
Manufacturer: _____		<input type="checkbox"/> Outboard		<input type="checkbox"/> Sterndrive		<input type="checkbox"/> Inboard		<input type="checkbox"/> Pod drive		<input type="checkbox"/> Gas <input type="checkbox"/> Electric	
Total horsepower: _____ hp		<input type="checkbox"/> No engine		<input type="checkbox"/> Other: _____		<input type="checkbox"/> Diesel		<input type="checkbox"/> Other: _____			
SAFETY MEASURES											
Organizations that have conducted a vessel safety check (VSC) on board your boat within the past year (including carriage of safety equipment, e.g., lifejackets, anchor and line, fire extinguishers):											
US Coast Guard Auxiliary: VSC Decal? <input type="checkbox"/> Yes <input type="checkbox"/> No		US Power Squadrons: VSC Decal? <input type="checkbox"/> Yes <input type="checkbox"/> No		Federal Agency (Name): _____							
				State Agency (Name): _____							
				Other Agency (Name): _____							
# Life jackets on board: _____		# Fire extinguishers on board: _____		Type of fire extinguishers (e.g., ABC): _____							
		# Fire extinguishers used: _____									
ACCIDENT DETAILS – EXTERNAL CONDITIONS											
WEATHER											
Overall weather was (select one)				It was (select one)		Visibility was (select one)		Wind was (select one)			
<input type="checkbox"/> Clear		<input type="checkbox"/> Raining		<input type="checkbox"/> Day		<input type="checkbox"/> Good		<input type="checkbox"/> 0 mph (none)			
<input type="checkbox"/> Cloudy		<input type="checkbox"/> Snowing		<input type="checkbox"/> Night		<input type="checkbox"/> Fair		<input type="checkbox"/> Over 0, up to 12 mph (light)			
<input type="checkbox"/> Foggy		<input type="checkbox"/> Hazy				<input type="checkbox"/> Poor		<input type="checkbox"/> Over 12, up to 25 mph (moderate)			
<input type="checkbox"/> Other (describe): _____				Approximate air temperature: _____ °F				<input type="checkbox"/> Over 25, up to 55 mph (strong)			
								<input type="checkbox"/> Over 55 mph (stormy)			
WATER											
Overall water conditions (select one):						Other water conditions:					
<input type="checkbox"/> Up to 6 in. waves (calm)						Approximate water temperature: _____ °F					
<input type="checkbox"/> Over 6 in., up to 2 ft. waves (choppy)						Strong current? <input type="checkbox"/> Yes <input type="checkbox"/> No					
<input type="checkbox"/> Over 2 ft., up to 6 ft. waves (rough)						Hazardous waters? (e.g., rapid tidal flow, currents) <input type="checkbox"/> Yes <input type="checkbox"/> No					
<input type="checkbox"/> Over 6 ft. waves (very rough)						Congested waters? <input type="checkbox"/> Yes <input type="checkbox"/> No					

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
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Reset

For each question below, please provide answers IF APPLICABLE AND IF KNOWN, otherwise leave blank.			
ACCIDENT DETAILS – ACTIVITIES AND OPERATIONS ON YOUR BOAT			
OPERATOR/PASSENGER ACTIVITIES			
Operator/passenger activities on your boat at time of accident:			
Activities were (select one)		Operator/Passenger activities (select all that apply)	
<input type="checkbox"/> Recreational	<input type="checkbox"/> Fishing	<input type="checkbox"/> Tubing	<input type="checkbox"/> Starting engine
<input type="checkbox"/> Commercial	<input type="checkbox"/> Hunting	<input type="checkbox"/> Water Skiing	<input type="checkbox"/> Making repairs
	<input type="checkbox"/> White water activity (e.g., rafting)	<input type="checkbox"/> Relaxing	<input type="checkbox"/> Other (list):
BOAT OPERATIONS			
Your boat operations at time of accident (select all that apply)			
<input type="checkbox"/> Cruising (underway under power)	<input type="checkbox"/> Drifting	<input type="checkbox"/> Racing	<input type="checkbox"/> Towing another vessel
<input type="checkbox"/> Changing direction	<input type="checkbox"/> At anchor	<input type="checkbox"/> Rowing/paddling	<input type="checkbox"/> Launching
<input type="checkbox"/> Changing speed	<input type="checkbox"/> Being towed	<input type="checkbox"/> Docking/undocking	<input type="checkbox"/> Tied to dock/mooring
<input type="checkbox"/> Sailing	<input type="checkbox"/> Other (list):		
ACCIDENT DETAILS – CONTRIBUTING FACTORS ON YOUR BOAT			
CONTRIBUTING FACTORS			
Indicate factors on your boat which may have contributed to this accident (select all that apply)			
<input type="checkbox"/> Alcohol use	<input type="checkbox"/> Improper lookout	<input type="checkbox"/> Dam/lock	<input type="checkbox"/> Starting in gear
<input type="checkbox"/> Drug use	<input type="checkbox"/> Operator inattention	<input type="checkbox"/> Force of wake/wave	<input type="checkbox"/> Sharp turn
<input type="checkbox"/> Excessive speed	<input type="checkbox"/> Operator inexperience	<input type="checkbox"/> Hazardous waters	<input type="checkbox"/> Restricted vision (e.g., fog)
<input type="checkbox"/> Improper anchoring	<input type="checkbox"/> Language barrier	<input type="checkbox"/> Heavy weather	<input type="checkbox"/> Mission/inadequate aids to navigation (e.g., buoy, daymarker)
<input type="checkbox"/> Improper loading	<input type="checkbox"/> Navigation rules violation	<input type="checkbox"/> Ignition of fuel or vapor	<input type="checkbox"/> Inadequate on-board navigation lights
<input type="checkbox"/> Overloading	<input type="checkbox"/> Failure to vent	<input type="checkbox"/> Hull failure	<input type="checkbox"/> People on gunwale, bow or transom
<input type="checkbox"/> Other (describe):			
ACCIDENT DETAILS – YOUR BOAT			
MACHINERY/EQUIPMENT FAILURE			
Failure of the following machinery/equipment on your boat contributed to this accident (select all that apply)			
<input type="checkbox"/> Engine	<input type="checkbox"/> Onboard lights	<input type="checkbox"/> Shift	<input type="checkbox"/> Sound equipment (e.g., horn, whistle)
<input type="checkbox"/> Electrical system	<input type="checkbox"/> Seats	<input type="checkbox"/> Radio	<input type="checkbox"/> Auxiliary equipment
<input type="checkbox"/> Fuel system	<input type="checkbox"/> Steering	<input type="checkbox"/> Fire extinguisher	<input type="checkbox"/> Other (list):
<input type="checkbox"/> Sail/mast	<input type="checkbox"/> Throttle	<input type="checkbox"/> Ventilation	
<input type="checkbox"/> Onboard navigation aids (e.g., GPS)			
ACCIDENT DETAILS – EVENTS ON YOUR BOAT			
ACCIDENT EVENTS			
Types of events occurring to/on your boat during accident (select all that apply)			
<input type="checkbox"/> Collision with recreational boat	<input type="checkbox"/> Flooding/swamping	<input type="checkbox"/> Person fell overboard	
<input type="checkbox"/> Collision with commercial boat (e.g., tug, barge)	<input type="checkbox"/> Fire/explosion – fuel	<input type="checkbox"/> Person fell on/within boat	
<input type="checkbox"/> Collision with fixed object (e.g., dock, bridge)	<input type="checkbox"/> Fire/explosion – non-fuel	<input type="checkbox"/> Sudden medical condition	
<input type="checkbox"/> Collision with submerged object (e.g., stump, cable)	<input type="checkbox"/> Carbon monoxide exposure	<input type="checkbox"/> Person struck by boat	
<input type="checkbox"/> Collision with floating object (e.g., log, buoy)	<input type="checkbox"/> Mishap of skier, tuber, wake boarder, etc.	<input type="checkbox"/> Person struck by propeller or propulsion unit	
<input type="checkbox"/> Capsizing	<input type="checkbox"/> Person left boat voluntarily	<input type="checkbox"/> Person electrocuted	
<input type="checkbox"/> Grounding	<input type="checkbox"/> Person ejected from boat (caused by collision or maneuver)		
<input type="checkbox"/> Sinking	<input type="checkbox"/> Other (describe):		

For each question below, please provide answers IF APPLICABLE AND IF KNOWN, otherwise leave blank.									
ACCIDENT DETAILS –YOUR BOAT- INJURED PEOPLE RECEIVING OR IN NEED OF TREATMENT BEYOND FIRST AID									
Report only injured people on, struck by, or being towed by your boat, receiving or in need of treatment beyond first aid. Do not report injured people on, struck by, or being towed by another boat or no boat (e.g., swimmers, people on a dock). If more than one injured person to report, attach additional copies of this page. If none, SKIP INJURED PEOPLE section.									
INJURED PERSON									
First Name			MI		Last Name				
Street									
City			State			Zip			
Phone			Date of Birth (mm/dd/yyyy)			Age			
INJURY DETAILS									
Injury caused when person (select all that apply)					Nature of most serious injury (select one)				
<input type="checkbox"/> Struck the (e.g., boat, water):					<input type="checkbox"/> Scrape/bruise				
<input type="checkbox"/> Was struck by a (e.g., boat, propeller):					<input type="checkbox"/> Cut				
<input type="checkbox"/> Was exposed to carbon monoxide poisoning					<input type="checkbox"/> Sprain/strain				
<input type="checkbox"/> Received an electric shock					<input type="checkbox"/> Concussion/brain injury				
<input type="checkbox"/> Other (describe):					<input type="checkbox"/> Spinal cord injury				
<input type="checkbox"/> Person was wearing lifejacket?					<input type="checkbox"/> Broken/fractured bone				
<input type="checkbox"/> Person received treatment beyond first aid?					<input type="checkbox"/> Body part of most serious injury (e.g., head, trunk, leg):				
<input type="checkbox"/> Person was admitted to a hospital?					<input type="checkbox"/> Other (describe):				
ACCIDENT DETAILS – YOUR BOAT – DEATHS/DISAPPEARANCES									
Only report deaths/disappearances of people on, struck by, or being towed by your boat. If more than one death/disappearance to report, attach additional copies of this page. If none, SKIP DEATHS/DISAPPEARANCES section.									
PERSON WHO DIED/DISAPPEARED									
First Name			MI		Last Name				
Street									
City			State			Zip			
Phone			Date of Birth (mm/dd/yyyy)			Age			
DETAILS OF DEATH/DISAPPEARANCE									
Injury caused when person (select all that apply)					Nature of death/disappearance (select one)				
<input type="checkbox"/> Struck the (e.g., boat, water):					<input type="checkbox"/> Death – by drowning				
<input type="checkbox"/> Was struck by a (e.g., boat, propeller):					<input type="checkbox"/> Death – other likely cause (describe)				
<input type="checkbox"/> Was exposed to carbon monoxide poisoning					<input type="checkbox"/> Disappeared and not yet recovered				
<input type="checkbox"/> Received an electric shock					<input type="checkbox"/> Person was wearing lifejacket?				
<input type="checkbox"/> Other (describe):					<input type="checkbox"/> Yes <input type="checkbox"/> No				

For each question below, please provide answers IF APPLICABLE AND IF KNOWN, otherwise leave blank.										
ACCIDENT DETAILS – YOUR BOAT OPERATOR										
OPERATOR INSTRUCTION					OPERATOR SAFETY MEASURES					
Boating safety instruction completed (select all that apply)					On board, prior to accident, was operator wearing:					
<input type="checkbox"/>	None				A lifejacket?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<input type="checkbox"/>	State course				An engine cut-off switch (Lanyard or wireless device) if equipped?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<input type="checkbox"/>	USCG Auxiliary course				On board, prior to accident, was operator using:		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<input type="checkbox"/>	US Power Squadrons course									
<input type="checkbox"/>	Internet (name of sponsoring organization)				Alcohol?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<input type="checkbox"/>	Other (describe)				Drugs?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
					Operator arrested for Boating Under the Influence?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
					Weather reports consulted prior to accident?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
OPERATOR EXPERIENCE										
Experience operating this type of boat (select one)										
<input type="checkbox"/>	0 to 10 hours		<input type="checkbox"/>	Over 10, up to 100 hours		<input type="checkbox"/>	Over 100, up to 500 hours		<input type="checkbox"/>	Over 500 hours
ACCIDENT DETAILS – OTHER KEY PEOPLE										
Only report other key people not already documented as injured, died, disappeared or operator/owner of your boat. If more than two other key people to report, attach additional copies of this page.										
NAME/ADDRESS										
This other key person was a(n) (select all that apply)										
<input type="checkbox"/>	Other boat operator		<input type="checkbox"/>	Other boat owner		<input type="checkbox"/>	Owner of other damaged property		<input type="checkbox"/>	Passenger on your boat
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	Witness
First Name			MI		Last Name					
Street										
City			State		Zip		Phone			
Other boat name (if any)					Other boat registration # (if any)					
NAME/ADDRESS										
This other key person was a(n) (select all that apply)										
<input type="checkbox"/>	Other boat operator		<input type="checkbox"/>	Other boat owner		<input type="checkbox"/>	Owner of other damaged property		<input type="checkbox"/>	Passenger on your boat
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	Witness
First Name			MI		Last Name					
Street										
City			State		Zip		Phone			
Other boat name (if any)					Other boat registration # (if any)					

For each question below, please provide answers IF APPLICABLE AND IF KNOWN, otherwise leave blank.						
YOUR BOAT OPERATOR						
NAME/ADDRESS						
First Name		MI		Last Name		
Street						
City		State		Zip		
AGE/GENDER/PHONE						
Date of Birth (mm/dd/yyyy)		Age		Gender	Male	Female
				Phone		
YOUR BOAT OWNER						
If same as <i>your boat operator</i> SKIP rest of YOUR BOAT OWNER section.						
NAME/ADDRESS/PHONE						
First Name		MI		Last Name		
Street						
City		State		Zip		Phone
PERSON SUBMITTING THIS REPORT						
If same as <i>your boat operator</i> OR <i>owner</i> , SKIP rest of PERSON SUBMITTING THIS REPORT section.						
NAME/ADDRESS/PHONE/ROLE						
First Name		MI		Last Name		
Street						
City		State		Zip		Phone
I was a(n) (select one)						
<input type="checkbox"/>	Other person on board <i>this</i> boat					
<input type="checkbox"/>	Accident witness <i>not</i> on board <i>this</i> boat					
<input type="checkbox"/>	Other (describe):					
SIGNATURE OF PERSON SUBMITTING THIS REPORT						
Your signature					Date (mm/dd/yyyy)	
<p>An Agency may not conduct or sponsor and a person is not required to respond to an information collection, unless it displays a currently valid OMB Control Number.</p> <p>The Coast Guard estimates that the average burden for this report form is 30 minutes. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (CG-BSX-21), U.S. Coast Guard, Washington, DC 20593-0001 or Office of Management and Budget, Paperwork Reduction Project (1625-0003), Washington, DC 20503.</p>						

Appendix F: Detail of ICD-10 E-Codes for Watercraft Related Injuries (V90-V94)

(V90.0) Drowning and submersion due to watercraft overturning

- (V90.00) Drowning and submersion due to merchant ship overturning
- (V90.01) Drowning and submersion due to passenger ship overturning
- (V90.02) Drowning and submersion due to fishing boat overturning
- (V90.03) Drowning and submersion due to other powered watercraft overturning
- (V90.04) Drowning and submersion due to sailboat overturning
- (V90.05) Drowning and submersion due to canoe or kayak overturning
- (V90.06) Drowning and submersion due to (nonpowered) inflatable craft overturning
- (V90.08) Drowning and submersion due to other unpowered watercraft overturning
- (V90.09) Drowning and submersion due to unspecified watercraft overturning

(V90.1) Drowning and submersion due to watercraft sinking

- (V90.10) Drowning and submersion due to merchant ship sinking
- (V90.11) Drowning and submersion due to passenger ship sinking
- (V90.12) Drowning and submersion due to fishing boat sinking
- (V90.13) Drowning and submersion due to other powered watercraft sinking
- (V90.14) Drowning and submersion due to sailboat sinking
- (V90.15) Drowning and submersion due to canoe or kayak sinking
- (V90.16) Drowning and submersion due to (nonpowered) inflatable craft sinking
- (V90.18) Drowning and submersion due to other unpowered watercraft sinking
- (V90.19) Drowning and submersion due to unspecified watercraft sinking

(V90.2) Drowning and submersion due to falling or jumping from burning watercraft

- (V90.20) Drowning and submersion due to falling or jumping from burning merchant ship
- (V90.21) Drowning and submersion due to falling or jumping from burning passenger ship
- (V90.22) Drowning and submersion due to falling or jumping from burning fishing boat
- (V90.23) Drowning and submersion due to falling or jumping from other burning powered watercraft
- (V90.24) Drowning and submersion due to falling or jumping from burning sailboat
- (V90.25) Drowning and submersion due to falling or jumping from burning canoe or kayak
- (V90.26) Drowning and submersion due to falling or jumping from burning (nonpowered) inflatable craft
- (V90.27) Drowning and submersion due to falling or jumping from burning water-skis
- (V90.28) Drowning and submersion due to falling or jumping from other burning unpowered watercraft

- (V90.29) Drowning and submersion due to falling or jumping from unspecified burning watercraft

(V90.3) Drowning and submersion due to falling or jumping from crushed watercraft

- (V90.30) Drowning and submersion due to falling or jumping from crushed merchant ship
- (V90.31) Drowning and submersion due to falling or jumping from crushed passenger ship
- (V90.32) Drowning and submersion due to falling or jumping from crushed fishing boat
- (V90.33) Drowning and submersion due to falling or jumping from other crushed powered watercraft
- (V90.34) Drowning and submersion due to falling or jumping from crushed sailboat
- (V90.35) Drowning and submersion due to falling or jumping from crushed canoe or kayak

(V90.36) Drowning and submersion due to falling or jumping from crushed (nonpowered) inflatable craft

(V90.37) Drowning and submersion due to falling or jumping from crushed water-skis

(V90.38) Drowning and submersion due to falling or jumping from other crushed unpowered watercraft

(V90.39) Drowning and submersion due to falling or jumping from crushed unspecified watercraft

(V90.8) Drowning and submersion due to other accident to watercraft

(V90.80) Drowning and submersion due to other accident to merchant ship

(V90.81) Drowning and submersion due to other accident to passenger ship

(V90.82) Drowning and submersion due to other accident to fishing boat

(V90.83) Drowning and submersion due to other accident to other powered watercraft

(V90.84) Drowning and submersion due to other accident to sailboat

(V90.85) Drowning and submersion due to other accident to canoe or kayak

(V90.86) Drowning and submersion due to other accident to (nonpowered) inflatable craft

(V90.87) Drowning and submersion due to other accident to water-skis

(V90.88) Drowning and submersion due to other accident to other unpowered watercraft

(V90.89) Drowning and submersion due to other accident to unspecified watercraft

(V91.0) Burn due to watercraft on fire

(V91.00) Burn due to merchant ship on fire

(V91.01) Burn due to passenger ship on fire

(V91.02) Burn due to fishing boat on fire

(V91.03) Burn due to other powered watercraft on fire

(V91.04) Burn due to sailboat on fire

(V91.05) Burn due to canoe or kayak on fire

(V91.06) Burn due to (nonpowered) inflatable craft on fire

(V91.07) Burn due to water-skis on fire

(V91.08) Burn due to other unpowered watercraft on fire

(V91.09) Burn due to unspecified watercraft on fire

(V91.1) Crushed between watercraft and other watercraft or other object due to collision

(V91.10) Crushed between merchant ship and other watercraft or other object due to collision

(V91.11) Crushed between passenger ship and other watercraft or other object due to collision

(V91.12) Crushed between fishing boat and other watercraft or other object due to collision

(V91.13) Crushed between other powered watercraft and other watercraft or other object due to collision

(V91.14) Crushed between sailboat and other watercraft or other object due to collision

(V91.15) Crushed between canoe or kayak and other watercraft or other object due to collision

(V91.16) Crushed between (nonpowered) inflatable craft and other watercraft or other object due to collision

(V91.18) Crushed between other unpowered watercraft and other watercraft or other object due to collision

(V91.19) Crushed between unspecified watercraft and other watercraft or other object due to collision

(V91.2) Fall due to collision between watercraft and other watercraft or other object

(V91.20) Fall due to collision between merchant ship and other watercraft or other object

(V91.21) Fall due to collision between passenger ship and other watercraft or other object

- (V91.22) Fall due to collision between fishing boat and other watercraft or other object
- (V91.23) Fall due to collision between other powered watercraft and other watercraft or other object
- (V91.24) Fall due to collision between sailboat and other watercraft or other object
- (V91.25) Fall due to collision between canoe or kayak and other watercraft or other object
- (V91.26) Fall due to collision between (nonpowered) inflatable craft and other watercraft or other object
- (V91.29) Fall due to collision between unspecified watercraft and other watercraft or other object

(V91.3) Hit or struck by falling object due to accident to watercraft

- (V91.30) Hit or struck by falling object due to accident to merchant ship
- (V91.31) Hit or struck by falling object due to accident to passenger ship
- (V91.32) Hit or struck by falling object due to accident to fishing boat
- (V91.33) Hit or struck by falling object due to accident to other powered watercraft
- (V91.34) Hit or struck by falling object due to accident to sailboat
- (V91.35) Hit or struck by falling object due to accident to canoe or kayak
- (V91.36) Hit or struck by falling object due to accident to (nonpowered) inflatable craft
- (V91.37) Hit or struck by falling object due to accident to water-skis
- (V91.38) Hit or struck by falling object due to accident to other unpowered watercraft
- (V91.39) Hit or struck by falling object due to accident to unspecified watercraft

(V91.8) Other injury due to other accident to watercraft

- (V91.80) Other injury due to other accident to merchant ship
- (V91.81) Other injury due to other accident to passenger ship
- (V91.82) Other injury due to other accident to fishing boat
- (V91.83) Other injury due to other accident to other powered watercraft
- (V91.84) Other injury due to other accident to sailboat
- (V91.85) Other injury due to other accident to canoe or kayak
- (V91.86) Other injury due to other accident to (nonpowered) inflatable craft
- (V91.87) Other injury due to other accident to water-skis
- (V91.88) Other injury due to other accident to other unpowered watercraft
- (V91.89) Other injury due to other accident to unspecified watercraft

(V92.0) Drowning and submersion due to fall off watercraft

- (V92.00) Drowning and submersion due to fall off merchant ship
- (V92.01) Drowning and submersion due to fall off passenger ship
- (V92.02) Drowning and submersion due to fall off fishing boat
- (V92.03) Drowning and submersion due to fall off other powered watercraft
- (V92.04) Drowning and submersion due to fall off sailboat
- (V92.05) Drowning and submersion due to fall off canoe or kayak
- (V92.06) Drowning and submersion due to fall off (nonpowered) inflatable craft
- (V92.07) Drowning and submersion due to fall off water-skis
- (V92.08) Drowning and submersion due to fall off other unpowered watercraft
- (V92.09) Drowning and submersion due to fall off unspecified watercraft

(V92.1) Drowning and submersion due to being thrown overboard by motion of watercraft

- (V92.10) Drowning and submersion due to being thrown overboard by motion of merchant ship
- (V92.11) Drowning and submersion due to being thrown overboard by motion of passenger ship
- (V92.12) Drowning and submersion due to being thrown overboard by motion of fishing boat

(V92.13) Drowning and submersion due to being thrown overboard by motion of other powered watercraft

(V92.14) Drowning and submersion due to being thrown overboard by motion of sailboat

(V92.15) Drowning and submersion due to being thrown overboard by motion of canoe or kayak

(V92.16) Drowning and submersion due to being thrown overboard by motion of (nonpowered) inflatable craft

(V92.19) Drowning and submersion due to being thrown overboard by motion of unspecified watercraft

(V92.2) Drowning and submersion due to being washed overboard from watercraft

(V92.20) Drowning and submersion due to being washed overboard from merchant ship

(V92.21) Drowning and submersion due to being washed overboard from passenger ship

(V92.22) Drowning and submersion due to being washed overboard from fishing boat

(V92.23) Drowning and submersion due to being washed overboard from other powered watercraft

(V92.24) Drowning and submersion due to being washed overboard from sailboat

(V92.25) Drowning and submersion due to being washed overboard from canoe or kayak

(V92.26) Drowning and submersion due to being washed overboard from (nonpowered) inflatable craft

(V92.27) Drowning and submersion due to being washed overboard from water-skis

(V92.28) Drowning and submersion due to being washed overboard from other unpowered watercraft

(V92.29) Drowning and submersion due to being washed overboard from unspecified watercraft

(V93.0) Burn due to localized fire on board watercraft

(V93.00) Burn due to localized fire on board merchant vessel

(V93.01) Burn due to localized fire on board passenger vessel

(V93.02) Burn due to localized fire on board fishing boat

(V93.03) Burn due to localized fire on board other powered watercraft

(V93.04) Burn due to localized fire on board sailboat

(V93.09) Burn due to localized fire on board unspecified watercraft

(V93.1) Other burn on board watercraft

(V93.10) Other burn on board merchant vessel

(V93.11) Other burn on board passenger vessel

(V93.12) Other burn on board fishing boat

(V93.13) Other burn on board other powered watercraft

(V93.14) Other burn on board sailboat

(V93.19) Other burn on board unspecified watercraft

(V93.2) Heat exposure on board watercraft

(V93.20) Heat exposure on board merchant ship

(V93.21) Heat exposure on board passenger ship

(V93.22) Heat exposure on board fishing boat

(V93.23) Heat exposure on board other powered watercraft

(V93.24) Heat exposure on board sailboat

(V93.29) Heat exposure on board unspecified watercraft

(V93.3) Fall on board watercraft

(V93.30) Fall on board merchant ship

(V93.31) Fall on board passenger ship

- (V93.32) Fall on board fishing boat
- (V93.33) Fall on board other powered watercraft
- (V93.34) Fall on board sailboat
- (V93.35) Fall on board canoe or kayak
- (V93.36) Fall on board (nonpowered) inflatable craft
- (V93.38) Fall on board other unpowered watercraft
- (V93.39) Fall on board unspecified watercraft

(V93.4) Struck by falling object on board watercraft

- (V93.40) Struck by falling object on merchant ship
- (V93.41) Struck by falling object on passenger ship
- (V93.42) Struck by falling object on fishing boat
- (V93.43) Struck by falling object on other powered watercraft
- (V93.44) Struck by falling object on sailboat
- (V93.48) Struck by falling object on other unpowered watercraft
- (V93.49) Struck by falling object on unspecified watercraft

(V93.5) Explosion on board watercraft

- (V93.50) Explosion on board merchant ship
- (V93.51) Explosion on board passenger ship
- (V93.52) Explosion on board fishing boat
- (V93.53) Explosion on board other powered watercraft
- (V93.54) Explosion on board sailboat
- (V93.59) Explosion on board unspecified watercraft

(V93.6) Machinery accident on board watercraft

- (V93.60) Machinery accident on board merchant ship
- (V93.61) Machinery accident on board passenger ship
- (V93.62) Machinery accident on board fishing boat
- (V93.63) Machinery accident on board other powered watercraft
- (V93.64) Machinery accident on board sailboat
- (V93.69) Machinery accident on board unspecified watercraft

(V93.8) Other injury due to other accident on board watercraft

- (V93.80) Other injury due to other accident on board merchant ship
- (V93.81) Other injury due to other accident on board passenger ship
- (V93.82) Other injury due to other accident on board fishing boat
- (V93.83) Other injury due to other accident on board other powered watercraft
- (V93.84) Other injury due to other accident on board sailboat
- (V93.85) Other injury due to other accident on board canoe or kayak
- (V93.86) Other injury due to other accident on board (nonpowered) inflatable craft
- (V93.87) Other injury due to other accident on board water-skis
- (V93.88) Other injury due to other accident on board other unpowered watercraft
- (V93.89) Other injury due to other accident on board unspecified watercraft

(V94.0) Hitting object or bottom of body of water due to fall from watercraft

- (V94.0XXA) Hitting object or bottom of body of water due to fall from watercraft, initial encounter
- (V94.0XXD) Hitting object or bottom of body of water due to fall from watercraft, subsequent encounter

(V94.0XXS) Hitting object or bottom of body of water due to fall from watercraft, sequela

(V94.1) Bather struck by watercraft

(V94.11) Bather struck by powered watercraft

(V94.12) Bather struck by nonpowered watercraft

(V94.2) Rider of nonpowered watercraft struck by other watercraft

(V94.21) Rider of nonpowered watercraft struck by other nonpowered watercraft

(V94.22) Rider of nonpowered watercraft struck by powered watercraft

(V94.3) Injury to rider of (inflatable) watercraft being pulled behind other watercraft

(V94.31) Injury to rider of (inflatable) recreational watercraft being pulled behind other watercraft

(V94.32) Injury to rider of non-recreational watercraft being pulled behind other watercraft

(V94.4) Injury to barefoot water-skier

(V94.4XXA) Injury to barefoot water-skier, initial encounter

(V94.4XXD) Injury to barefoot water-skier, subsequent encounter

(V94.4XXS) Injury to barefoot water-skier, sequela

(V94.8) Other water transport accident

(V94.81) Water transport accident involving military watercraft

(V94.89) Other water transport accident

(V94.9) Unspecified water transport accident

(V94.9XXA) Unspecified water transport accident, initial encounter

(V94.9XXD) Unspecified water transport accident, subsequent encounter

(V94.9XXS) Unspecified water transport accident, sequela

Appendix G: Participant Input Obtained During the In-Person Roundtable Meeting

Strengths, Weaknesses, Dangers and Benefits of the Current “System” of Boat Occupant Injury Surveillance

Strengths of the Current System

- Mandated reporting in BARD
- Level of detail in BARD
- Comprehensive fatality data
- Group – passion
- Cooperation
- Partnerships
- Data Expertise of Susan Weber
- Vessel ID
- Minimal National Standard exists
- Data infrastructure exists

Weaknesses of the Current System

- Limited access
- Inconsistency of training
- Lack in detail – circumstance and role
- Lag Time
- Toxicology missing
- Inconsistencies across states
- Case definition is inconsistent
- Lack of crosswalk across disciplines
- Data entry inconsistencies
- Lack of Enforcement
- License

Dangers of Changing the Current System

- What if we leave something out or don't capture everything?
- Including EVERYTHING could lead to Information overload
- More data could cause knee-jerk regulations
- Job change
- Many worried about changing the culture of boating (e.g., alcohol and boating)

Benefits of the Current System

- BARD provides information on vessel and context
- ICD provides information on medical injury
- Solid nationwide resources exist
- BARD and ICD include all States & territories
- Current “system” is a good starting place
- ICD codes specific to water exist

Descriptions of the Ideal Surveillance System (i.e., Victory) for Boating-Related Injuries

What would VICTORY look like?

- There would be a sole source.
- Data would be housed in a central location.
- Data would allow for the design of meaningful interventions.
- System would capture circumstantial info – leads to prevention.
- We would know what is happening in real-world.
- We would have more information on target audience.
- We would take advantage of all of the data that are already available.
- We would have comprehensive economic burden defined with data.
- Evaluation.
- We would be confident we captured all injuries.
- There would be a culture change – society – USCG – internal about boating as a public health issue.
- There would be consistency – data, term, standards.
- There would be a spot at the table for those impacted by boating injuries to provide human context.
- Current regulation is based on the 70s and 80s – an ideal system would allow us to update these regulations with data.

National Association of State Boating Law Administrators (NASBLA)

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Lexington, KY 40513

www.nasbla.org

Safe States Alliance

5456 Peachtree Blvd #244

Atlanta, Georgia 30341

www.safestates.org



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