

Improving Recreational Boating Surveillance: A manual for state boating law administrators and public health epidemiologists



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Executive Summary

Recreational boating activity leads to a significant number of fatal and non-fatal injuries annually across the United States. With funding from the United States Coast Guard (USCG), Safe States, and the National Association of State Boating Law Administrators (NASBLA), the Recreational Boat Occupant Injury Surveillance Project was created in 2018 to better understand the scope of non-fatal injuries that occur to all occupants of boats by bringing together public health expertise with boating safety professionals. The Project was comprised of three tiers, including

- 1) Conduct boat occupant injury surveillance roundtable;
- 2) Develop surveillance recommendations through an injury surveillance workgroup (ISW) process; and
- 3) Test surveillance recommendations with pilot states.

This report represents the work done as part of **Tier 3** and is intended to serve as a manual for state-level public health experts and boating law administrators (or their designee) to work in partnership to improve injury surveillance in their jurisdictions. Examples from the Washington State Recreational Boating Injury Surveillance Pilot Project (Washington State Pilot Project) are provided as illustrative of the process.

The **Introduction** provides an orientation to the project and a brief case for why partnerships between boating safety and public health professionals are necessary to improve recreational boating injury surveillance.

Section 1 outlines how each entity can identify partners

for this work.

Section 2 describes public health and boating data and the steps that may be needed to acquire and legally use data.

Section 3 outlines how boating safety and public health professionals can co-develop an analysis plan and includes methodological considerations for public health epidemiologists.

Section 4 recommends how to use data to information action and offers some guidance on expanding the scope of boating safety and public health collaborations.

Section 5 provides recommendations for federal partners that can uplift and foster the work described in this manual.

Introduction

The Recreational Boat Occupant Injury Surveillance Project

The Recreational Boat Occupant Injury Surveillance Project is a three-tiered approach to improve non-fatal injury surveillance practices nationally (Figure 1). The project is 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 Strategic Plan*. Descriptions for each of these lead organizations can be found in [Appendix A](#).

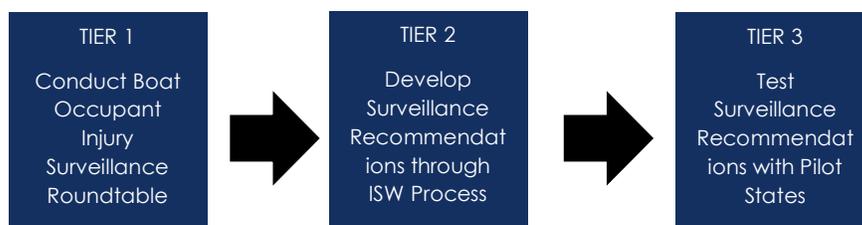


Figure 1: Three-Tier Process to Improve Boat Occupant Injury Surveillance Practices

Tier 1

Recreational boating safety and public health experts assembled to discuss current efforts to improve recreational boating-related injury data collection and analysis, examine data sources, identify key limitations, barriers, and opportunities for improvement, and

develop stronger relationships between public health and recreational boating safety professionals. The outcome of the Tier 1 process was to develop recommendations for the ISW to begin investigating in Tier 2. The nine Tier 1 recommendations for the ISW to investigate were:

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 access 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 full Tier 1 report can be accessed [here](#).

Tier 2

The Recreational Boat Occupant ISW was Tier 2 of a three-tiered approach to improve boat occupant injury surveillance practices nationally. The purpose of the ISW was to improve injury surveillance by examining important injury surveillance issues and challenges facing state injury prevention programs and preparing consensus-based recommendations on these issues. Participation in the ISW was voluntary and unpaid.

The nine recommendations developed in Tier 1 served as guideposts for the ISW in Tier 2. They were grouped into three categories: 1) Identifying and Understanding Available Data, 2) Bringing Data Together, and 3) Collaborations. To achieve progress on the overall recommendations set forth by the roundtable in Tier 1, the ISW outlined the following action steps for pilot states in Tier 3:

1. Injury epidemiologists or other experts meet with state boating law administrator (or their designee(s)).
2. Review seven analysis questions posed in this report to determine feasibility for individual states. It is anticipated that public health departments (or academic partners working on behalf of public health) would take the lead in performing the analyses listed after dialoguing with and gathering input from state boating law administrators
3. Move forward using definitions and descriptions outlined in this report.
4. Document challenges and successes for future iterations of injury surveillance recommendations for non-fatal boating incidents.

The full Tier 2 report can be accessed [here](#).

Tier 3

Tier 3 of this project was designed to test the surveillance recommendations that were developed in Tier 2. The Washington State Department of Health together with Washington State Parks and Recreation worked together during 2023 to test the Tier 2 recommendations for improving injury surveillance of nonfatal boating injuries using syndromic surveillance, emergency department visits data, hospital discharge data, and the USCG Boating Accident Reporting Database (BARD). This project will be referred to as the Washington State Pilot Project throughout this manual. The remainder of this report serves as a manual to other states in replicating this work. A list of individuals who worked on Tier 3 is provided in [Appendix B](#).

Importance of partnerships between BLA + PH for boating surveillance

The work done in all three tiers of this project illustrates the necessity of partnerships between boating law administrators and other boating professionals and public health professionals at the state level to improve recreational boating surveillance. As both the Tier 1 and Tier 2 reports outlined, both boating data and public health data alone do not fully capture fatal and non-fatal injuries due to recreational boating. As a result, there are gaps in our understanding of what can be done to reduce recreational boating injuries. Collaborations can develop a more robust data analysis plan which can lead to improvements in prevention programs and policies.

Databases used by public health experts, including injury and violence epidemiologists, could provide supplemental data to improve non-fatal injury surveillance specific to recreational boating. Public health expertise in surveillance, development and implementation of prevention programs, and evaluation could be useful to boating safety professionals working to prevent injuries and implement prevention programs (e.g., life jacket distribution and boating under the influence awareness programs). Information learned from including public health databases could yield improvements to the data variables captured by USCG in BARD and other databases. Additionally, there may be opportunities to improve boating law administrator or data collection training materials with this information. Please refer to the [Tier 1](#) and [Tier 2](#) reports for more detailed information on the value of public health and boating partnerships.

Boating Safety Professionals

For the purposes of this work, “boating safety professionals” refer to state boating law administrators, those persons in charge of collecting boating accident reports in accordance with USCG rules and regulations, and those persons who work to create and implement boating safety programs and policies. These professionals may work in Fish and Wildlife, State Park, and/or Public Safety Departments.

Public Health Professionals

“Public health professionals” refer to the state and local public health department officials who work with emergency department visit data, hospitalization data, and or syndromic surveillance data and can assist with navigating access to and analysis of these data.

Purpose of this Manual

This manual is designed to outline and facilitate work to:

- 1) Begin collaborations between boating safety professionals and public health professionals at a state level;
- 2) Outline recommended analyses of boating injury surveillance recommendations, updated from the Tier 2 report, and informed by Washington State Pilot Project.

This manual has four sections organized by the following process:

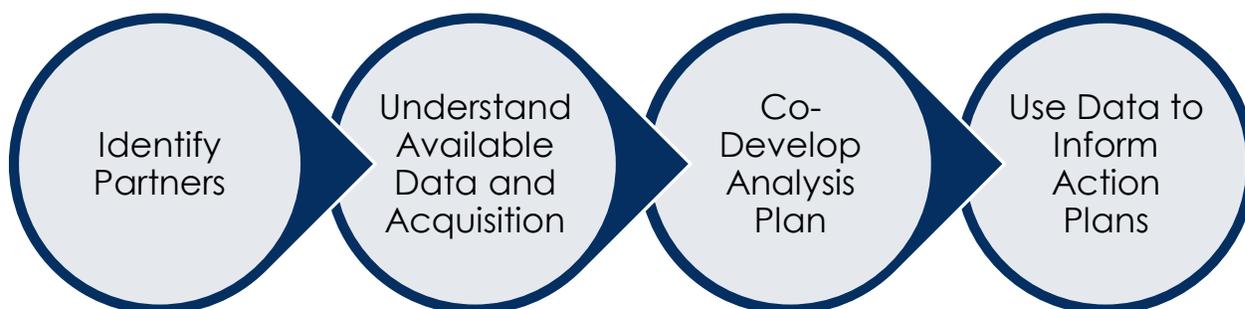


Figure 2: Four-step Process for Public Health and Boating Data Partnerships

1. **Identify Partners:** Tips and resources to help each group identify the other are provided.
2. **Understand Available Data and Acquisition Procedures:** This section outlines resources for each group to understand the other's data and procedures they may need to go through to legally access data.
3. **Co-Develop Analysis Plan:** This section outlines plans and questions that may help both groups develop analysis plans that will be most useful to them.
4. **Use Data to Inform Action Plans:** This section provides tips on how data gathered can be used to inform prevention work at local and state levels.

Within each of these steps, clear guidance is provided for both boating and public health professionals using these icons:



Boating Safety Professionals



Public Health Professionals

Summary checklists are provided at the end of each section with steps for each group to consider. A full-page summary checklist is provided in [Appendix C](#) for each group.

SECTION 1

IDENTIFY PARTNERS

State boating safety professionals work to reduce loss of life, injuries, and property damage that occur on waterways within their state by improving the knowledge, skills, and abilities of recreational boaters. State public health professionals have a wide scope of interests that intersect with boating including injury and violence prevention, drowning prevention, and epidemiology.

In many states, boating safety and public health professionals do not know each other. This section provides profession-specific guidance on how to bridge this gap.

Boating Safety Professionals



How To Identify Public Health Partners

Public health professionals are an underutilized asset for state boating law professionals. Public health professionals have a variety of datasets used to describe the burden of injury and death, including those due to boating incidents. These data are a valuable supplement to those data collected in BARD and have the potential to better inform boating safety programs as the Washington State Pilot Project discovered.

“The work done by [the public health epidemiologists] in our state was a game changer for us in learning more about injuries due to recreational boating.” ~Derek Van Dyke, Boating Education Coordinator, Washington State Boating Program

Public health epidemiologists with expertise in using injury data are often located within state health departments. There is no standard way that state health departments are organized, though many have an injury and violence prevention program and/or syndromic surveillance teams. Connecting with public health partners may take several outreach attempts. The flow chart in Figure 3 below can assist with this outreach.



Figure 3: Areas of Connection to Public Health Professionals

The script below can be used within an introductory email.

Hello,

My name is [name] and I am the [position] in the [agency] for [state]. Recently, a team of public health epidemiologists and boating safety coordinators in Washington State worked together to examine the burden of non-fatal injuries due to recreational boating. I am interested in learning if a similar collaboration could begin in our state. Who might you recommend that I connect with?

Thank you!

Public Health Professionals



How To Identify State Boating Law Administrators and Partners

State boating law administrators serve as the access point for access to boating accident report data for states. The National Association of State Boating Law Administrators maintains a [database of state boating law administrators by state](#). If public health professionals are making the initial outreach, it is recommended to contact the state boating law administrator on this list.

The script below can be used within an introductory email.

Hello,

My name is [name] and I am a [title] working with [health department]. Recently, a team of public health epidemiologists and boating safety coordinators in Washington State worked together to examine the burden of non-fatal injuries due to recreational boating. They used public health data to supplement what they learned from their boating accident reports and were able to use this information in strategic planning of boating safety education and prevention. I am interested in connecting to share what a collaboration between public health and boating could look like in our state.

Thank you!

All Partners



Once introductions have been made, there are several items that will be important to determine in planning a data project.

Funding

State health departments and programs within are typically grant-funded. This funding can impact what public health professionals, like epidemiologists, research. It will be important to ask about funding restrictions to determine if a data project like the ones outlined in this manual will need external funding.

The WA State team had pilot funding from USCG to complete the work. If funding is needed for this project, it is recommended that the public health team have a quote outlining the funding needs for this work.

External funding can come from boating education budgets or grant applications. Existing streams of injury-related funding may also be explored to complete related work. United States Coast Guard, the Centers for Disease Control (CDC) and other federal agencies have grant programs available on [grants.gov](https://www.grants.gov).

Timeline

The data projects outlined in this manual took approximately nine months (~540 hours) to carry out from introduction to final analysis. There were three main categories of work within the Washington Department of Health team: Analytic, administrative, and fiscal/contracts. In the analytic category, this project took approximately 180 total hours of the public health syndromic surveillance team to complete which included 25 hours of IT support, 50 hours working on deterministic linkage, 55 hours on analysis, 30 hours of meetings with team members, and 20 hours of data visualization and report drafting. The project used 180 hours of administrative support to facilitate clearance and data sharing agreements. Finally, the project used another 180 hours of time for fiscal and contracts support.

The results of such analyses can inform strategic planning work that the state boating program undertakes. Therefore, it will be important to ask if there are any annual planning processes that boating programs have where the data will be informative and time your initial outreach 9-12 months prior to your program planning.

Structure

Partners should recognize that organizational structures of boating and public health differ and discuss these differences so that everyone involved is aware of how decision-making is typically conducted. Boating programs can be housed in a variety of entities including fish and wildlife departments, parks and recreation departments, and law enforcement. Additionally, several other programs may have information pertaining to boating including marine boards, licensing departments, and other standalone entities pertaining to recreational boating.

Summary Checklist: Section 1

	STATE BOATING PROFESSIONALS 	PUBLIC HEALTH PROFESSIONALS 
 <p>Identify Partners</p>	<p>Contact state health officer and/or state epidemiologist to introduce boating program and ideas for data linkage.</p> <p>Provide a copy of this manual to public health.</p> <p>Discuss funding and timeline requirements for both public health and boating teams.</p>	<p>Contact state boating law administrator to introduce public health and ideas for data linkage.</p> <p>Provide a copy of this manual to state boating law administrator.</p> <p>Discuss funding and timeline requirements for both public health and boating teams.</p>

SECTION 2

UNDERSTAND AVAILABLE DATA AND HOW TO ACQUIRE IT

Collaborations between public health and boating safety professionals use both boating and public health data. Initial meetings of the group should take time to describe data that each group has available to them. The information below provides a high-level overview of both public health and boating datasets and what boating safety and public health professionals will need to do to obtain data in their state.

Public Health Datasets Description

Injury surveillance in public health typically begins with injury information and uses the International Classification of Disease (ICD) coding system to attribute location or detailed information about the type of incident. ICD was developed by the World Health Organization, and it is used in the clinical setting for insurance billing, and for research. The United States uses the ICD-10-CM codes. Hospitals are required to use the codes, and the coding is done by medical coders. The coding is done initially in the system as the physician enters notes. The coding department will verify codes before billing is done. Depending upon the size of the hospitals, it may all be the same department that performs billing and coding.

The codes in **Table 1** are those which can be used to examine injuries related to boating, as included in the code definition.

Table 1: ICD-10 CM Codes Related to Boating Incidents and Corresponding Definitions

ICD Code	Definition
V90.0	Drowning and submersion due to watercraft overturning
V90.1	Drowning and submersion due to watercraft sinking
V90.2	Drowning and submersion due to falling or jumping from burning watercraft
V90.3	Drowning and submersion due to falling or jumping from crushed watercraft

V90.8	Drowning and submersion due to other accident to watercraft
V91.0	Burn due to watercraft on fire
V91.1	Crushed between watercraft and other watercraft or other object due to collision
V91.2	Fall due to collision between watercraft and other watercraft or object
V91.3	Hit or struck by falling object due to accident to watercraft
V91.8	Other injury due to other accident to watercraft
V92.0	Drowning and submersion due to fall off watercraft
V92.1	Drowning and submersion due to being thrown overboard by motion or watercraft
V92.2	Drowning and submersion due to being washed overboard from watercraft
V93.0	Burn due to localized fire on board watercraft
V93.1	Other burn on board watercraft
V93.2	Heat exposure on board watercraft
V93.3	Fall on board watercraft
V93.4	Struck by falling object on board watercraft
V93.5	Explosion on board watercraft
V93.6	Machinery accident on board watercraft
V93.8	Other injury due to other accident on board watercraft
V94.0	Hitting object or bottom on body of water due to fall from watercraft
V94.1	Bather struck by watercraft
V94.2	Rider of nonpowered watercraft struck by other watercraft
V94.3	Injury to ride of (inflatable) watercraft being pulled behind other watercraft
V94.4	Injury to barefoot water-skier
V94.8	Other water transport accident

V94.9	Unspecified water transport accident
W16.7	Jumping or diving from boat striking water surface causing drowning and submersion
Y92.814	Boat as the place of occurrence of the external cause

Within each major ICD10 code V90-V94, "watercraft" can be further specified by codes to identify the specific type such as "merchant ship", "passenger ship", "fishing boat", "other powered watercraft", "sailboat", "canoe or kayak", "nonpowered inflatable craft", "water-skis", "other unpowered watercraft", "unspecified watercraft". In the W and Y codes, "boat" is used in place of "watercraft".

ICD codes are not without limitations. Completeness of coding varies by state, region, and hospital and the use of external cause of injury codes (e-codes) also varies by state, hospital, and individual. Coding is dependent on who is coding, the level of training they may have, and the purpose, which is often for insurance purposes. ICD coding is also often used to identify the actual injury and not necessarily the mechanism. For example, if there is an incident that causes a leg injury, the person coding is more likely to capture the type of injury as opposed to the fact that it happened while on a boat. Nevertheless, the data sources are an important aspect of injury surveillance.

The three public health datasets for use in analyses related to recreational boating injury surveillance are:

1. Syndromic Surveillance Data
2. State Hospital Discharge Data
3. State Emergency Department Discharge Data
4. National/State Emergency Medical Services Information System

A description of these datasets and the utility of them was provided in the Tier 2 Report and is reprinted here for ease of use.

Syndromic Surveillance Data

Syndromic surveillance of electronic healthcare data from emergency department (ED) visits was originally developed to track early infectious disease outbreaks and bioterrorism attacks. Now, it is also used to monitor a wide variety of health conditions, including infectious diseases, chronic diseases, environmental health, natural disasters, mass gatherings, and injuries, including firearms, overdose, non-fatal occupational injuries, and motor vehicle crashes.¹

The [National Syndromic Surveillance Program \(NSSP\)](#) is a collaboration between local and state health departments, health care facilities, private sector partners, and the Centers for Disease Control and Prevention. Electronic patient encounter data from emergency departments, ambulatory health care centers, inpatient health care settings, laboratories, and urgent care centers are transmitted to the BioSense platform for public health agencies to

¹ Seil K, Marcum J, Lall R, Stayton C. Utility of a near real-time emergency department syndromic surveillance system to track injuries in New York City. *Injury Epidemiology*, 2015, 2:11

analyze. Data are available as early as 24 hours after a patient's visit. The coverage map and metrics related to NSSP participation are available at <https://www.cdc.gov/nssp/participation-coverage-map.html> (CDC, 2022).

To make use of the data within the NSSP, a community of data users known as the NSSP Community of Practice (CoP) create definitions. The CoP includes public health jurisdictions that contribute data to the BioSense platform as well as practitioners who use local syndromic surveillance, CDC programs, academic institutions, and other partners. Visit information within the NSSP includes free-text chief complaint, discharge diagnoses codes (ICD), and patient demographic information. This information is used to create a draft definition that is then validated by CoP members. Definitions are useful in determining what "counts" as a visit of interest and what does not when performing syndromic surveillance. More information can be found in the [NSSP Knowledge Repository](#).

The ISW in Tier 2 determined NSSP emergency department visits to be a useful data source to use in boating injury surveillance due to its near real-time availability, the ability to determine a visit definition through a rigorous process led by NSSP, and the potential of syndromic surveillance to provide surveillance beyond the initial injury period.² The ISW collaborated with Amanda Morse, formerly at the Washington State Department of Health, to develop a draft definition for boating incidents using syndromic surveillance data. This definition was further refined by a committee of individuals from NSSP, Safe States, USCG, NASBLA, and the ISW. Generally, the syndromic surveillance definition follows the following criteria:

- Visits are included if the discharge diagnosis field includes a water transport accident ICD code (V90-V94) or other related watercraft accidents (W16.7), even if the chief complaint is not specific to a recreational boating accident.
- Visits with any mention of boat, jet ski, or watercraft with a reference to an injury discharge diagnosis code or mention of an injury or accident in the chief complaint are included. Visits related to discharge diagnoses of recreational boating activities with any reference to an injury discharge diagnosis code or mention of an injury or accident in the chief complaint are also included.
- Negated visits include those where the chief complaint text indicated that the visit was in reference to a subsequent (i.e., W19XXD) or sequela (i.e., W228XS) injury code and if the chief complaint indicated that the accident occurred while transporting the boat or on a commercial boat. Fishing boats are included; however, injuries with any mention of fish hook were negated.
- **In summary**, recreational boating accidents include casualties that occurred on a boat but not in transporting the boat or on a commercial boat (i.e., ferry boat or cruise ship). They include recreational watercraft activities that involve being towed by boats including wakeboarding, waterskiing, and tubing. Personal watercraft are included (i.e., jet skis, including brand names like Seadoo™ and Waverunner™) as are kayaks, canoes, and rafts. Any subsequent encounters or sequela of injury are negated in this

² Lauper U, Chen J-H, Lin S. Window of Opportunity for New Disease Surveillance: Developing Keyword Lists for Monitoring Mental Health and Injury Through Syndromic Surveillance. *Disaster Med Public Health Preparedness*. 2017;11:173-178.

query. This means that visits to EDs that were not the first visit for this injury were not included (e.g., a person goes to the ED on the day of the incident and returns the following day for the same issue).

A [fact sheet](#) about the visit definition is publicly available within the NSSP Knowledge Repository.

State Hospitalization and ED Discharge Data

State level hospitalization and emergency department discharge data are a long-standing staple in injury surveillance as they offer final diagnoses. External cause of injury coding varies by state, but it is widely used across the country due partially to a Centers for Medicare and Medicaid Services rule tying participation to payment. Hospitalization and ED discharge data are primarily administrative as their intent is for use in billing. The agency in charge of housing these data vary by state, but often is within the state's department of health services. Injury and violence prevention professionals in states are good sources to connect to these data.

Table 2 below summarizes the key differences between Hospital/ED Discharge and Syndromic Surveillance data. Both are useful for different purposes and warrant further examination for recreational boating injuries.

Several peer reviewed analyses comparing the utility of both NSSP and Hospitalization/ED for surveillance efforts have been done and have demonstrated NSSP as an effective public health surveillance system for other areas of injury prevention, noting that sources typically align and the addition of NSSP data expands on the information and context known about the issue^{3 4}.

³ Rock PJ, Quesinberry D, Singleton MD, Slavova S. Emergency Medical Services and Syndromic Surveillance: A Comparison with Traditional Surveillance and Effects on Timeliness. *Public Health Reports*, 2021, 136(S1):72S-79S.

⁴ [Vivolo-Kantor AM, Smith H, Scholl L. Differences and similarities between emergency department syndromic surveillance and hospital discharge data for nonfatal drug overdose. *Ann Epidemiol*. 2021, 62:43-50.](#)

Table 2: Comparison of Hospital/ED Discharge and Syndromic Surveillance Data on Several Factors

Category	Hospital / ED Discharge	Syndromic Surveillance
TIMELINESS	1+ Year Lag	Near real-time (first visit message usually received within 24 hours)
DEFINITIONS	Final diagnoses offered via ICD-10 codes, which are standardized ("gold standard")	Driven by creation of definitions by experts based upon a combination of discharge diagnosis codes, and free-text fields such as the chief complaint, which is not standardized
HISTORY OF USE IN THE FIELD OF INJURY PREVENTION	Traditional data source	Emerging, though highly used, data source
STATE-LEVEL PARTICIPATION	E-coding varies by state, but widely used across the country, enabled by Centers for Medicare/Medicaid Services rule	Participation varies by state, gaining in popularity, largely driven by increases in federal funding
TYPE OF DATA	Visit or records based No free-text narratives May only limit to Primary Diagnosis and limited number of top diagnosis codes	Visit based, although allows for ongoing monitoring (implications for economics) Not recommended for using to count cases Contains free-text narratives Does not limit the number of applied diagnosis codes The Primary Diagnosis is not indicated among in Diagnoses
DATA SOURCES	Hospital discharge data include hospital admissions/discharges ED data include discharge from ED	Varies by state but NISSP can include hospital, ED, urgent care, primary care, specialty
LEVEL OF DATA	Opportunity for local, state, and national level data	Opportunity for local, state, and national level data

National Emergency Medical Services Information System (NEMSIS)

One key inclusion criterion of the BARD case definition is "treatment beyond first aid". Given this, NEMSIS, a national database documenting standardized emergency medical services transport, may be helpful to understand the burden of boating incidents on EMS systems. However, data use agreements currently prohibit linking NEMSIS data to other databases. Additional information about NEMSIS can be found on [their website](#).

The Washington State Pilot Project was able to work with the Washington (State) Emergency Medical Services Information System (WEMSIS) to pull some data related to EMS use and boating incidents.

Table 3 outlines select public health terminology that may be helpful for boating safety professionals. Public health partners can also assist in defining terms that are not familiar to boating safety professionals.

Term	Definition for Term from Source	Source
Diagnosis Codes	Diagnosis codes are a way to standardize the description of injury and death. The International Classification of Diseases (ICD) is typically used in public health datasets.	CDC
Epidemiology	"Epidemiology is the "study of distribution and determinants of health-related states among specified populations and the application of that study to the control of health problems.""	CDC
Surveillance	"Epidemiologic surveillance is the ongoing and systematic collection, analysis, and interpretation of health data in the process of describing and monitoring a health event. This information is used for planning, implementing, and evaluating public health interventions and programs."	CDC
Syndromic Surveillance	"Syndromic surveillance is a system that allows public health to keep in touch with the health of the community in real time. It can allow for rapid identification of possible outbreaks and problems, help public health keep track of ongoing issues, and provide situational awareness about the community."	Alaska Department of Health, Division of Public Health

Accessing Public Health Datasets

Accessing syndromic surveillance, hospital discharge data, and/or emergency department discharge data by persons outside of public health is not a routine practice as these data are considered patient health information and are protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).⁵ Given this, state boating law administrators should expect to discuss and sign confidentiality and other data use agreements that the state public health department has.

Each state may have different procedures and stipulations for the use of data. It is essential to discuss what the confidentiality requirements are and what information sharing is allowed to happen within such an agreement. Here are some helpful questions to guide this discussion:

5

<https://www.cdc.gov/phlp/publications/topic/hipaa.html#:~:text=The%20Health%20Insurance%20Portability%20and,the%20patient's%20consent%20or%20knowledge.>

1. What confidentiality and/or data sharing agreements will need to be signed between the state boating office and public health departments?
2. Who needs to sign off from each department?
3. Is review required by the Legal Department?
4. What data sharing restrictions are in place (e.g., can small numbers (1-5) be shared or are they subject to suppression)?
5. Who can view the results of the analysis?
6. What can the final data be used for?
7. Are there clearance processes for obtaining or using data, and if so, how long do they typically take?

The Washington State Pilot Project confidentiality agreements made use of templates that the state health department had. Despite this, executing the confidentiality agreement was time intensive. Initially state boating coordinators signed the agreement and therefore were able to see all the data. However, sharing this data department-wide within the boating program would need an additional agreement as many of the analyses resulted in small numbers.

To speed up the process of executing data sharing agreements with public health, it is recommended to:

1. **Begin data sharing conversations before or at the start of the project.** Exploratory projects can be difficult to gain answers as you may be "uncertain what you will find". Discussing responses to the questions below can help the project go more smoothly!
2. **What do you want these data for?** The use of data for research, public dissemination, internal program planning and/or other uses may direct what level of data sharing and confidentiality agreements are needed.
 - i. **What data system do you need to access?** Multiple datasets may need additional people involved depending on who maintains the needed dataset.
 - ii. **What format of data do you need?** Some data format considerations include: Line-level records, aggregated with small numbers, or aggregated with suppressed small counts
3. Have a pre-defined list questions and data elements included in the project.
4. For the Information Recipient agency, identify the: 1) Business Contact (individual most engaged with the project), 2) IT Security Contact, and 3) Privacy Contact (individual that manages records/contracts).

Boating Datasets Description

Boating accident reports are collected by each state through various methodologies and data storage systems. Each state then submits incidents into the USCG Boating Accident Report Database (BARD). Additional context and description of BARD is provided in [Appendix D](#). While there are many required variables for this federal database, states can add variables above and beyond the federal standard to their state report forms and databases. A copy of USCG Form CG-3865 is included in [Appendix E](#). This form reflects the federal data variables. State boating accident report forms typically can be found on the boating agency's website or by contacting the state boating law administrator to determine what additional variables are collected at the state level, and through what process. It will be important to have initial discussions with state boating professionals to determine what databases are available. The following outlines the **federal** data requirements for the BARD system.

Definition of a Reportable Event (Inclusion Criteria)

Current Federal regulations (33 Code of Federal Regulations [CFR] 173.55) require the operator of any recreational vessel to file a Boating Accident Report (BAR) with the state reporting authority when, as a result of an occurrence that involves the vessel or its equipment:

1. A person dies; or
2. A person is injured and requires medical treatment beyond first aid; or
3. Damage to vessels and other property totals \$2,000 or more or there is complete loss of the vessel; or
4. A person disappears from the vessel under circumstances that indicate death or injury.
5. There is a complete loss of any vessel

Examples of "**reportable**" boating accidents are listed in the front of the annual USCG Recreational Boating Statistics and reprinted here for ease of access:

- Grounding, capsizing, sinking, or flooding/swamping
- Falls in or overboard a vessel
- Persons ejected from a vessel
- Fire or explosions that occur while underway and while anchored, moored, or docked if the fire resulted from the vessel or vessel equipment
- Water-skiing or other mishap involving a towable device
- Collision with another vessel or object
- Striking a submerged object
- A person struck by a vessel, propeller, propulsion unit, or steering machinery.
- Carbon monoxide exposure.
- Electrocution due to stray current related to a vessel.
- Casualties while swimming from a vessel that is not anchored, moored, or docked
- Casualties where natural causes served as a contributing factor in the death of an individual but the determined cause of death was drowning.

- Casualties from natural phenomena such as interaction with marine life (e.g., carp causes casualty to person) and interaction with nature (e.g., mountain side falls onto vessel causing casualties).
- Casualties where a person falls off an anchored vessel
- Casualties that result when a person departs an anchored, disabled vessel to make repairs, such as unfouling an anchor or cleaning out the intake of a jet-propelled vessel.

Exclusion Criteria

Examples of “**non-reportable**” boating accidents are also listed in the front of the annual USCG Recreational Boating Statistics and are reprinted here for ease of access:

- A person dies, is injured, or is missing as a result of self-inflicted wounds, alcohol poisoning, gunshot wounds, or the ingestion of drugs, controlled substances, or poison.
- A person dies, is injured, or is missing as a result of assault by another person or persons while aboard a vessel.
- A person dies or is injured from natural causes while aboard a vessel where the vessel did not contribute to the casualty.
- A person dies, is injured or is missing as a result of jumping, diving, or swimming for pleasure from an anchored, moored, or docked vessel.
- A person dies, is injured or is missing as a result of swimming to retrieve an object or a vessel that is adrift from its mooring or dock, having departed from a place of inherent safety, such as the shore or pier.
- Property damage occurs or a person dies, is injured or is missing while preparing a vessel for launching or retrieving and the vessel is not on the water and capable/ready for its intended use.
- Property damage occurs to a docked or moored vessel or a person dies, is injured, or is missing from such a vessel as a result of storms, or unusual tidal or sea conditions; or when a vessel gets underway in those conditions in an attempt to rescue persons or vessels.
- Property damage occurs to a docked or moored vessel due to lack of maintenance on the vessel or the structure to which it was moored.
- Property damage occurs to a docked or moored vessel due to theft or vandalism
- Property damage occurs to, a person dies or is injured on, or a person is missing from a non-propelled residential platform or other watercraft used primarily as a residence that is not underway.
- Casualties that result from falls from or on docked vessels or vessels that are moored to a permanent structure.
- Casualties that result from a person climbing aboard an anchored vessel from the water or swimming near an anchored vessel (unless the casualty was related to carbon monoxide exposure or stray electric current).
- Fire or explosions on anchored, docked, or moored boats where the cause of the fire was *not* attributed to the vessel or vessel equipment.
- Casualty or damage that results when the vehicle used for trailering the vessel fails.
- Casualties or damage that occur during accidents that only involve watercraft that have not been deemed a vessel.

- Casualties or damage that occur when the only vessel(s) involved are being used solely for governmental, commercial, or criminal activity.
- Casualties or damage that occur when the only vessel(s) involved are not required to be numbered and are being used exclusively for racing (exclusion in 33 CFR 173.13(a)).
- Casualties or damage that occur when the only vessel(s) involved are foreign vessels and thus not subject to U.S. Federal reporting requirements.

The aforementioned “reportable” and “non-reportable” criteria are for the USCG’s statistics report. States may have additional inclusion criteria that are beyond the federal data mandates. It is best to review state-level additions with state boating law administrators. **Table 4** details select terms and definitions used by the Coast Guard.

Table 4: Select Boating Terms and Definitions, United States Coast Guard Sources

Term	Definition for Term from Source	Source
Vessel	<p>The Coast Guard's first step is to determine whether the particular watercraft in question is a "vessel". The process begins with the definition of the word vessel found in 1 USC 3, which is: "The word "vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water."</p> <p>The following have been determined to be vessels by the Coast Guard: Airboat, auxiliary sailboat, cabin motorboat, canoe, houseboat, inflatable boat, kayak, open motorboat, personal watercraft, pontoon, raft, rowboat, sailboat, stand-up paddleboard, gold dredges, argo-amphibious ATV, kiteboard, float tubes, efoils, jetboards.</p>	1 USC 3
Boating incident	A boating incident occurs when a recreational vessel that involved at least one of the following: death/disappearance, injury that required medical treatment beyond first aid, damages that equaled or exceeded \$2,000, or a total loss of vessel.	33 CFR 173.55

Accessing Boating Data

State boating law administrators should expect to spend time educating public health partners on how boating accident reports are collected in their state. This discussion should include:

1. How data are collected including scene investigations, who collects the information, forms used, if data are uploaded to a database
2. What database(s) (e.g., BARD, state-level boating databases) store the incident report information
3. How records get into the databases
4. How records are stored

5. What format data can be exported to
6. What identifying information (name, date of birth, time of visit) is available in boating data

Public health professionals will need to work with BLAs (or their designee) to download BAR/BARD data for public health use. Unlike public health data which often have complex confidentiality agreements for use, boating data access is simpler and may not necessitate any data use agreements. The state BLA will be able to provide any state-level data use stipulations. The Washington State Pilot Project did not have any data use agreements needed on the boating side.

States may have different ways to obtain their boating data. At minimum, states can obtain their data from BARD. Their BARD point of contact can either submit a helpdesk ticket to the BARD vendor to obtain a Microsoft Access download, or can extract the data into Excel using BARD's query wizard. Specific information used in the Washington State Pilot Project is provided below.

Washington State BARD data was able to be pulled (by WA Parks & Recreation) in the form of Microsoft Access (.mdb) files with near complete information within key linkage fields. The data manager at WA Parks and Recreation was able to convert the Access Database into split .csv files representing the unique tables of the database (with the bolded tables below being utilized in the linkage project):

WA_ACCIDENT_REPORT.csv

WA_INJURY_REPORT.csv

WA_OCCUPANT.csv

WA_VESSEL_REPORT.csv

WA_WITNESS.csv

WA_FATALITY_REPORT.csv

WA_NON_VESSEL_PROPERTY_OWNER.csv

BARD data was stored within Microsoft Access (.mdb) files which RHINO epidemiologists were not able to feasibly access using R. The [RODBC](#) R package appeared to be the most feasible method to work with .mdb files however it required 32-bit versions of R (compared to the standard 64-bit version used at WA DOH), which would have required special IT permission and support to install. It is recommended to provide .csv or .xlsx files to public health staff for analysis if possible.

If boating programs are not familiar with how to download BARD data, the validated BARD user for the state boating program can contact the BARD help desk. Contact information for the BARD help desk is on the BARD website.

States may have their own state or local data collected outside of the BARD system. In these instances, it will be important to also include these in a data review.

If a state:

- 1) Has a state-level boating database, and/or

2) Has collected any additional state-specific information pertaining to recreational boating (not present nationally in BARD), then

boating safety and public health professionals should have discussions to decide whether to use state data vs state subset of BARD data.

Summary Checklist: Section 2

	STATE BOATING PROFESSIONALS 	PUBLIC HEALTH PROFESSIONALS 
 <p>Understand Available Data and Acquisition</p>	<p>Determine if the boating program needs any data sharing agreements to provide boating data to public health partners.</p> <p>Ask public health partners what data sharing agreements boating team members need to sign.</p> <p>Complete process of signing data sharing agreements.</p> <p>Present information on the process of collecting and reporting on boating incident report data to public health partners.</p> <p>Download boating data for public health partners and discuss process to share files.</p>	<p>Determine if the boating program needs any data sharing agreements to provide boating data to public health partners.</p> <p>Share what data sharing agreements boating team members need to sign. Include discussion of any publication or presentations that team members may be interested in pursuing.</p> <p>Complete process of signing data sharing agreements.</p> <p>Present information on the public health data available for use to boating safety partners.</p> <p>Acquire boating data from partners and take time to learn about how the systems work. Strengths and limitations are important context to have that can easily be overlooked.</p>

SECTION 3

CO-DEVELOP AN ANALYSIS PLAN

An analysis plan is simply a detailed list of what questions the group has for the data. It is helpful if the BLA and their team develop a list of questions in conjunction with public health partners to ensure the best methodologies are used. Co-developing the analysis plan also can directly inform actions for the prevention of recreational boating injuries. The analysis questions that started the Washington State Pilot Project are in Table 5 below:

Table 5: Beginning Analysis Questions

Question No.	Analysis Question	Analysis Type	Methodological Notes	Dataset(s) Needed	Report Output
1	<i>How many visits meet the definition for calendar year 2021?</i>	Quantitative	Definitions vary by data set: <ul style="list-style-type: none"> • NSSP should use the approved CoP data definition. • Hospitalizations and ED Visits use the list of ICD codes in this report. • Document the inclusion/exclusion criteria that the state boating law administrator uses for state accident reports. 	NSSP ED Visits Hospitalizations State Boating Accident Reports	For each dataset, report the number of visits that meet the definition.
2	<i>What additional information could we learn about non-fatal injury incidents that are not identified in state boating accident reports?</i>	Descriptive	Data linkages <ul style="list-style-type: none"> • Matching on identifiers if possible. • Probabilistic matching may be necessary 	A. State boating accident reports + NSSP B. State boating accident reports + ED	For each linkage performed: Document the linkage methodology used. How many matches? How many did not match? What is different about the matched/non-matched (qualitative)? Did the number of matches meet expected values? (Could approximate by looking at number of Treatment Beyond First Aid/Admitted to Hospital in BARD for high/low estimates of this.)

3	<i>How many and what type of non-fatal incidents are identified in NSSP that do not have a corresponding state boating accident report that both meet and do not meet the BARD case definition?</i>	Descriptive	<p>Data Linkages</p> <ul style="list-style-type: none"> • Matching on identifiers if possible. <p>Probabilistic matching may be necessary</p>	<p>A. NSSP + State boating accident reports</p> <p>B. ED + State boating accident reports</p>	<p>For each linkage performed: Document the linkage methodology used.</p> <p>How many matches? How many did not match? What is different about the matched/non-matched (qualitative)?</p>
4	<i>What recommendations could be disseminated to boating safety and public health professionals to improve state boating accident reports?</i>	Comparison of above analyses	Each state participating in Tier 3 will develop recommendations, and the group of states will discuss this throughout the project.	Output of Questions 1-3	<p>What recommendations, if any, do you have based on the outcome of the above analyses? What additional questions do you have?</p>
5	<i>How many EMS visits are categorized as related to boating?</i>	Descriptive	<p>The Cause of Injury field now utilizes ICD-10 CM based coding in the e.Injury.01 - Cause of Injury field:</p> <p>NEMISDataDictionary.pdf</p>	NEMIS (or state-based EMS dataset)	Report the number of cases in the state.

6	<i>How does this number from Analysis 5 compare to the state boating accident report data for this state?</i>	Comparison		State boating accident reports NEMSIS	Report the number of state boating accident reports where EMS transport was used. What factors may attribute to mismatch of outputs from analyses 5 and 6?
7	<i>What is the utility in using the Boating Incident Framework in local jurisdictions as an approach to injury surveillance in water environments?</i>	Descriptive		All	Given your experiences conducting the analyses outlined, what recommendations do you have for using the databases for continued surveillance? Is there a need in recreating the data linkage (on some sort of consistent schedule) or is having access to the disparate data sources side-by-side sufficient to inform action?

After the initial data output was reviewed, the Washington State Pilot Project Team identified several sub-populations of interest including:

1. Personal Watercraft (e.g., Jetski™, Wave Runner™) Incidents
2. Travel patterns (incident county compared to resident county)
3. Timing between incident and being seen in an emergency department
4. Use of alcohol and other substances

It is useful to discuss how the boating professionals currently use data and what gaps in data they have noticed. Some challenges in using the BARD data noted by the Washington State epidemiologists include:

- Individuals within a boating incident could be assigned multiple status "Injured", "Occupant", "Operator" --> with multiple PERSON_IDs.
- Variables of interest were present for only a few statuses of people. **Example: Substance use variables were only present for Operators and Deceased.**

The Haddon Matrix for Boating, created by boating and public health professionals during Tier 1 of the project, can be useful for developing questions that could lead to analysis plans. This information is summarized in Table 6 below.

Table 6: The Haddon Matrix for Recreational Boating Injuries

PHASES	Factor: Host / Occupant	Factor: Vector / Vessel	Factor: Environment – Physical	Factor: Environment – Social
<p>Pre-Event (Before the incident occurs)</p>	<p><i>All Occupants:</i></p> <ul style="list-style-type: none"> • Alcohol / drug use • Life jacket use • Restraint use • Lookout / awareness of surroundings <p><i>Operator:</i></p> <ul style="list-style-type: none"> • Vision • Experience /ability • Knowledge <p><i>Occupant:</i></p> <ul style="list-style-type: none"> • Seating or Standing position 	<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 life jacket wear • Boater education • Enforcement and adjudication of boating laws • Social life jacket safety norms • Public attitudes on boating and boating education • Economics
<p>Event (During the incident)</p>	<ul style="list-style-type: none"> • Spread out energy in time and space with lookout persons • Take action to dock 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"> • Gunwales and railings • 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
<p>Post-Event (After the incident)</p>	<ul style="list-style-type: none"> • Victim's overall health 	<ul style="list-style-type: none"> • Gas tanks designed to minimize fires • Emergency communication and distress signal devices 	<ul style="list-style-type: none"> • 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

Methodology Considerations for Public Health Epidemiologists

⊕ In most cases, public health epidemiologists will be conducting the data linkage and analyses. This section is for these professionals. The Washington State Pilot Project Team epidemiologists Tyler Bonnell and Lauren Draftz provided the following methodology notes based on their experiences.

Extract Direct Identifiers for Pulled RHINO Visits

In Washington State, EMR updates are entered and then sent via HL7 message to the Health Information Exchange known as OneHealthPort, which then routes EMR update messages to the Washington State Department of Health/RHINO for ingestion. It is important to note that every healthcare encounter has multiple messages as updates occur and new information is entered into the EMR by healthcare providers.

RHINO performs validation checks and removes direct identifiers and transmits message-level data to CDC NSSP. CDC NSSP collapses message-level information into visits, then locally compiles the message-level data into visit-level data. To conduct deterministic linkages based on direct patient identifiers, RHINO epidemiologists access the local ingestion database, link message-level information (with direct identifiers) to ESSENCE visits of interest (a many to one linkage) using C_BioSense_ID, and then conduct a de-duplication step wherein only the most recent messages (with direct identifiers) are extracted. This ensures only the most recent clinical information available is used.

Pull BARD Data

The Washington State subset of BARD Data was pulled by WA Parks & Recreation. Initially, this data was extracted as Excel (.xlsx) files directly from BARD, however that resulted in substantial missingness across key data linkage fields – including injured/occupant name and key demographic variables (age, birth_date, sex, resident county). While manual abstraction of names linked to the boating incident from the “ACCIDENT_DESCRIPTION” field was initially considered, this approach was ultimately not pursued due for the potential problems it could cause with deterministic linkage (sometimes there were multiple spellings of a single name even within the same record).

Washington State BARD data was able to be pulled (by WA Parks & Recreation) in the form of Microsoft Access (.mdb) files with near complete information within key linkage fields. RHINO Epidemiologists had little experience working with Access (.mdb) files and looked for methods to import these files into R. The data manager at WA Parks and Recreation was able to convert the Access Database into split .csv files representing the unique tables of the database (with the bolded tables below being utilized in the linkage project):

WA_ACCIDENT_REPORT.csv

WA_INJURY_REPORT.csv

WA_OCCUPANT.csv

WA_VESSEL_REPORT.csv

WA_WITNESS.csv**WA_FATALITY_REPORT.csv****WA_NON_VESSEL_PROPERTY_OWNER.csv**

Although information on Injured individuals were the primary focus of this analysis, information on Occupants and Witnesses were also included in the data linkage project as it is possible, they may not seem Injured during the initial incident but later seek healthcare for a boating-related injury. Injured/Occupant/Witness names were extracted and then underwent a de-duplication process wherein if an individual was identified as Injured and as an Occupant in an incident, then they would only be classified once as Injured. Event-level information (from WA_ACCIDENT_REPORT) was also included to provide contextual details of the incident such as weather conditions, traffic, alcohol/substance use, accident narrative, and primary/secondary/tertiary causes of the incident.

Deterministic Linkage RHINO-BARD Data

Multiple rounds of linkage testing were conducted and evaluated to assess the RHINO-BARD linkage yield.

The final deterministic approach for this project sought to match RHINO and BARD data using Soundex codes of an individual/patient's first and last name (generated using R's [phonics](#) package). Soundex codes reflect the phonetic pronunciation of names and therefore allow for matching of names with similar pronunciation (with only minor misspellings).

This methodology was chosen because there were minor name spelling errors/discrepancies existed within the data sets, which would have resulted in more plausible matches being ruled out (if a direct match on names was utilized).

This methodology resulted in the highest linkage yield with the lowest amount of false matches (44 total potential matches, 39 verified matches, 5 false positive matches).

The relatively low number of records allowed for a more "open" or sensitive linkage approach with a follow up manual review to minimize observed false positives and potential losses in specificity throughout the process.

After the linkage was conducted, all potential linked matches (between RHINO and BARD records) were manually reviewed by a RHINO Epidemiologist to exclude potential false positive matches that may have occurred. Potential linkage matches were confirmed by an examination of shared fields, including:

- Date/Time of Incident or healthcare encounter (RHINO & BARD),
- Patient Name and DOB (RHINO & BARD),
- Healthcare encounter Chief Complaint, Admit Reason, and Triage Notes (RHINO),
- Accident Description (BARD) - this was compared to the healthcare encounter fields to compare the documented nature of injury.

Potential linked matches were arranged by the time difference between the reported BARD incident and the visit date/time of the RHINO healthcare encounter. Examining negative time differences (i.e., RHINO healthcare encounter preceded the BARD incident) as well as

extremely large time differences (those greater than 48 hours) served as an initial flag for manual reviewers of potential false positive matches.

Attempt 1: First & Last Name Linkage via Direct Spelling Match of Names

Attempt 2: First & Last Name, DOB Linkage via Direct Spelling Match of Names

Final Approach: First & Last Name (Soundex)

Number of individuals linked: 35

Number of visits linked: 39 (5 false positive visits excluded upon manual review). Note: The number of visits is greater than the number of individuals as patients may have multiple healthcare encounters for the same type of injury (e.g., transferred from one hospital to another hospital with a higher level of care).

Other Considerations

- 1) Think about and manage the units of analysis when bringing together disparate data sources:

BARD - data can be presented at the accident, vessel, or individual level.

RHINO (syndromic surveillance) - data can be presented at the visit level.

WEMIS - data can be presented at the EMS response level.

- 2) Discuss potential linkage approaches early:

RHINO serves as ESSENCE administrators for Washington State, and has the technical capability to leverage patient identifiers for critical linkage projects like this one, **however this may not be the case for ESSENCE users in other jurisdictions, making this approach not feasible.**

RHINO staff is also relatively new to conducting probabilistic linkages (using packages like R's [fastLink](#)). While probabilistic linkage may be ideal for some jurisdictions, for this project we opted to prioritize a deterministic linkage due to the availability of direct identifiers.

- 3) Consider a less-restrictive linkage:

Upon examining the quantity of recreational boating injuries in BARD which indicated treatment beyond first aid, we anticipated it would be feasible to manually review all our possible linked records. Therefore, our linkage methodology focused on maximizing the capture of potentially linked records (to increase sensitivity), while relying on our manual review to remove false positive matches (to increase specificity).

Summary Checklist: Section 3

	STATE BOATING PROFESSIONALS 	PUBLIC HEALTH PROFESSIONALS 
 <p style="text-align: center;">Co-Develop Analysis Plan</p>	<p>Meet with internal boating team to brainstorm lists of questions, gaps in knowledge about non-fatal injuries due to recreational boating incidents. The Haddon Matrix in this manual may help with this process.</p> <p>Meet with public health team to share brainstorm list and develop analysis plan.</p> <p>Meet regularly with public health team to review analysis output and answer questions to refine data.</p>	<p>Meet with boating team to brainstorm lists of questions, gaps in knowledge about non-fatal injuries due to recreational boating incidents. The Haddon Matrix in this manual may help with this process.</p> <p>Meet with public health team to develop analysis plan to address questions from boating team.</p> <p>Conduct data linkage and data analyses.</p> <p>Meet regularly boating team to review analysis output and answer questions to refine data.</p>

SECTION 4

USE DATA TO INFORM ACTION PLANS

The objective for collecting data should not be to collect data alone; rather, the reason data are collected is that they be used to inform action. The data analyses described above, and completed in the Washington State Pilot Project, can be useful in determining the who, what, why, where and when of prevention programs that are often managed out of boating safety divisions. The data process outlined in this manual may help modify existing programs and create new programs that are needed based on injuries are occurring in different situations and environments. Additionally, public health often has numerous drowning prevention programs that could inform and be informed by what is learned about boating injuries. A multidisciplinary team approach could ensure prevention dollars are being used strategically.

The Washington State Boating Team is anticipating using the results from this project in the following ways:

- Using data pertaining to the identification of “hotspots,” many of which are impacted by tourism and due to that, would benefit from a different approach for effective marketing/education;
- Assessing how this information can inform our boat rental educational messaging;
- Adjusting current messaging to ensure that it accurately reflects the nomadic nature of boating;

and

- Evaluating how to best share this data with marine law enforcement partners to influence use of resources.

Create Dissemination Guidelines

As discussed in Section 1, the data use and/or confidentiality agreements may limit the degree to which data that is produced from a linkage project can be widely disseminated. The Washington State Pilot Project team found it useful to develop a set of dissemination

guidelines that the group would adhere to in disseminating insights and data about the project. Items that may be useful to discuss are:

1. What dissemination channels will be used? Consider workshops, conferences, or other avenues of dissemination.
2. Who will generate abstracts for conference submissions?
3. Who will conduct the presentations for what audiences?
4. Whether a master slide deck will need be created for the group to use for presentations at conferences and workshops. This master slide deck would go through necessary approval processes outlined by all partners.

Expanding the Scope

Boating professionals and the boating incident reporting databases have a narrow scope that is defined by federal law. Public health professionals can help convey the public health approach to prevention and help boating safety professionals understand the link between boating events that meet the USCG definition for inclusion and non-boating events that occur in the same environments.

It may be useful to frame surveillance which is inclusive of both boating requirements and public health approaches:

- **Boating Incident:** Those incidents which maintain the USCG definition for inclusion in the annual statistics (e.g., a person drowns after a jet ski collision).
- **Boating Adjacent:** Includes those incidents that meet the USCG definition as well as some non-reportable events whereby the vessel is involved, but the incident is considered outside the scope of the National Recreational Boating Safety Program's purview (e.g., a person drowns while swimming near an anchored boat).
- **No Boating Involvement:** Other water-related injuries in open water environments in which a boat was not involved (e.g., a person drowns while swimming at a recreational swim area of a lake).

A public health approach to boating incidents would include the incidents as defined for inclusion in the USCG's annual statistics, as well as be inclusive of "boating adjacent" incidents that may not meet the criteria for entry into BARD but would help in discussing prevention issues with multidisciplinary groups. At present, there is not a single-collection point for analyzing events that are deemed non-reportable for BARD. Further discussions with drowning prevention and other stakeholders may be helpful.

Summary Checklist: Section 4

	STATE BOATING PROFESSIONALS 	PUBLIC HEALTH PROFESSIONALS 
 <p>Use Data to Inform Action Plans</p>	<p>Meet with public health team to understand final data output.</p> <p>Strategize with internal boating team and public health how to use what is learned to modify and/or create programs and policies for boating safety.</p> <p>Determine feasibility of ongoing collaboration between the teams.</p>	<p>Meet with boating team to provide final data output.</p> <p>Strategize with boating team on how to use what is learned to modify and/or create programs and policies for boating safety.</p> <p>Determine if there are other public health programs that may be interested in the data output (i.e., drowning prevention).</p> <p>Determine feasibility of ongoing collaboration between the teams.</p>

SECTION 5

Federal Partners

While the bulk of this manual is aimed at state boating and state public health professionals, federal partners can assist in promoting the work described and facilitating access to data and funding to further improve recreational boating injury surveillance. Recommendations for federal partners include:

- Continue developing cross-organization relationships between public health and boating to allow for continued data sharing and evaluation of prevention programs. Projects such as those outlined in this manual help narrow gaps in understanding of non-fatal injuries associated with recreational boating injuries.
- Promote funding of cross-organization relationships to advance the recommendations outlined in this report.
- Incorporate learnings from projects into strategic plans and training materials within USCG, CDC, NASBLA and others.
- Standardize data collection and analysis processes, including updating and modifying federal datasets. Learnings specific to BARD from this project led to the following insights:
 - Individuals within a boating incident could be assigned multiple status "Injured", "Occupant", "Operator" --> with multiple PERSON_IDs. Restructuring format of the data so that each person involved (regardless of status) in an incident is captured once with one unique person id per row and multiple columns indicating the individual's status on the boat. This approach follows [tidy data principles](#).
 - Variables of interest were present for only a few statuses of people. **Example: Substance use variables were only present for Operators and Deceased.** To expand non-fatal injury surveillance and harmonize data elements, it is recommended to collect this information on ALL individuals. If this is not feasible due to resource demands, then a single variable could still be implemented and N/A could be applied to persons who are not Operators or Deceased.

- Work with drowning prevention professionals to collaborate on ways to improve safety in and around water environments.

Conclusion

Partnerships between the boating and public health communities maximize the expertise that both groups bring to the table. One critical way to improve non-fatal injury surveillance of boating incidents is for partnerships at the state level and begin to analyze data from multiple sources, link data and collaborate on designing, implementing, and evaluating prevention policies and programs. The Washington State Pilot Project Team demonstrated the feasibility and value of this approach.

Appendix A: Sponsors Information

The **National Association of State Boating Law Administrators (NASBLA)** is a national nonprofit, 501(c)3 organization that works to develop public policy for recreational boating safety. NASBLA represents the recreational boating authorities of all 50 states and the U.S. territories. NASBLA is a professional community leading recreational boating safety through innovation and collaboration for excellence in policy development, national standards, and best practices.

The goals of NASBLA are:

- **Diversified Funding:** Create a diversified funding portfolio to ensure the association's sustainability and broaden revenue streams for future initiatives.
- **Eliminate Barriers for Boaters:** Reduce barriers to safe and enjoyable boating to increase public participation.
- **Expanded Training:** Expand training and professional development opportunities to better serve a diversity of needs.
- **Proactive Legislative Program:** Advocate and build support for state and national policy positions to advance innovative solutions for safety and security challenges.
- **State Program Performance and Efficiency:** Promote excellence in state boating program administration to increase efficiency and effectiveness.



For more information about NASBLA, visit their [website](#).

The Safe States Alliance is a national non-profit organization and professional association whose mission is to strengthen the practice of injury and violence prevention. To advance this mission, Safe States Alliance engages in activities that include:

- Increasing awareness of injury and violence throughout the lifespan as a public health problem;
- Enhancing the capacity of public health agencies and their partners to ensure effective injury and violence prevention programs by disseminating best practices, setting standards for surveillance, conducting program assessments, and facilitating peer-to-peer technical assistance;
- Providing educational opportunities, training, and professional development for those within the injury and violence prevention field;
- Collaborating with national organizations and federal agencies to achieve shared goals;
- Advocating for public health policies to advance injury and violence prevention;
- Convening leaders and serving as the voice of injury and violence prevention programs within state health departments; and



- Representing the diverse professionals within the injury and violence prevention field.

For more information about the Safe States Alliance, visit their [website](#).

The United States Coast Guard (USCG) Boating Safety Division is dedicated to reducing loss of life, injuries, and property damage that occur on United States waterways by improving the knowledge, skills, and abilities of recreational boaters.



Produced under a grant from the Sport Fish Restoration and Boating Trust Fund, administered by the U.S. Coast Guard.

For more information about USCG Boating Safety Division, visit their [website](#).

Appendix B: List of Individuals Involved in Tier 3

Washington State Pilot Project

Washington State Boating Program

Rob Sendak, Boating Law Administrator

Alyssa Smith, Recreational Boating Education Specialist

Derek Van Dyke, Boating Safety Coordinator

William Wallace, Management Analyst

Washington State Department of Health

Tyler Bonnell, MPH, Epidemiologist

Cole Deming, Senior Application Development Specialist

Lauren Draftz, MPH, Epidemiologist

Cynthia A. Karlsson, MPH, MS, CHES, Senior Epidemiologist

Kacey Potis, MPH, CPH, Epidemiologist

Adam Rovang, MS, Epidemiologist

Katrena Shaw, M.L.S

Federal Partners

Jonathan Hsieh, Management and Program Analyst/Grant Technical Manager, United States Coast Guard

Susan Weber, Statistician, United States Coast Guard

Grant/subgrant Recipients

Kaci Christopher, National Association of State Boating Law Administrators

Ron Sarver, National Association of State Boating Law Administrators

Amy Bailey, Safe States Alliance

Sharon Gilmartin, Safe States Alliance

Additionally, the project working group would like to thank the following individuals & organizations for their efforts in making water recreation safer in Washington (State) and collecting the necessary data to conduct this project:

- *The healthcare workers who dutifully cared for patients injured within recreational boating incidents.*

- The marine law enforcement staff of Washington (State), EMS, and other first responders who assisted in responding to recreational boating incidents.
- The Washington State Parks & Recreation Commission Boating and US Coast Guard staff who assisted in the data collection, education, and interpretation of boating incident data.
- The Washington State Department of Health staff who assisted in the collection, linkage, analysis, and interpretation of boating incident EMS and healthcare encounter data.

Appendix C: Summary Checklists for Boating Safety and Public Health Professionals

Summary Checklist for Boating Safety Professionals

 <p>Identify Partners</p>	<p>Contact state health officer and/or state epidemiologist to introduce boating program and ideas for data linkage.</p> <p>Provide a copy of this manual to public health.</p> <p>Discuss funding and timeline requirements for both public health and boating teams.</p>
 <p>Understand Available Data and Acquisition</p>	<p>Determine if the boating program needs any data sharing agreements to provide boating data to public health partners.</p> <p>Ask public health partners what data sharing agreements boating team members need to sign.</p> <p>Complete process of signing data sharing agreements.</p> <p>Present information on the process of collecting and reporting on boating incident report data to public health partners.</p> <p>Download boating data for public health partners and discuss process to share files.</p>
 <p>Co-Develop Analysis Plan</p>	<p>Meet with internal boating team to brainstorm lists of questions, gaps in knowledge about non-fatal injuries due to recreational boating incidents. The Haddon Matrix in this manual may help with this process.</p> <p>Meet with public health team to share brainstorm list and develop analysis plan.</p> <p>Meet regularly with public health team to review analysis output and answer questions to refine data.</p>
 <p>Use Data to Inform Action Plans</p>	<p>Meet with public health team to understand final data output.</p> <p>Strategize with internal boating team and public health how to use what is learned to modify and/or create programs and policies for boating safety.</p> <p>Determine feasibility of ongoing collaboration between the teams.</p>

Summary Checklist for Public Health Professionals

 <p>Identify Partners</p>	<p>Contact state boating law administrator to introduce public health and ideas for data linkage.</p> <p>Provide a copy of this manual to state boating law administrator.</p> <p>Discuss funding and timeline requirements for both public health and boating teams.</p>
 <p>Understand Available Data and Acquisition</p>	<p>Determine if the boating program needs any data sharing agreements to provide boating data to public health partners.</p> <p>Share what data sharing agreements boating team members need to sign. Include discussion of any publication or presentations that team members may be interested in pursuing.</p> <p>Complete process of signing data sharing agreements.</p> <p>Present information on the public health data available for use to boating safety partners.</p> <p>Acquire boating data from partners and take time to learn about how the systems work. Strengths and limitations are important context to have that can easily be overlooked.</p>
 <p>Co-Develop Analysis Plan</p>	<p>Meet with boating team to brainstorm lists of questions, gaps in knowledge about non-fatal injuries due to recreational boating incidents. The Haddon Matrix in this manual may help with this process.</p> <p>Meet with public health team to develop analysis plan to address questions from boating team.</p> <p>Conduct data linkage and data analyses.</p> <p>Meet regularly boating team to review analysis output and answer questions to refine data.</p>
 <p>Use Data to Inform Action Plans</p>	<p>Meet with boating team to provide final data output.</p> <p>Strategize with boating team on how to use what is learned to modify and/or create programs and policies for boating safety.</p> <p>Determine if there are other public health programs that may be interested in the data output (i.e., drowning prevention).</p> <p>Determine feasibility of ongoing collaboration between the teams.</p>

Appendix D: Overview of BARD Reprinted from Tier 1 Report

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. 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.

The Coast Guard Recreational Boating Accident Report Form (CG-3865) ([Appendix E](#)) 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.⁶ Finally, the USCG releases a public version of the database upon request. This public database does not contain personally-identifiable information or

⁶ Available at: <https://bard.knightpoint.systems/PublicInterface/Report1.aspx>

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.

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. One large strength of BARD is the incident location information which, when linked with public health data, can provide a timeline of resident location, incident location, and healthcare location. 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.

Appendix E: USCG Boating Accident Report Form CG-3865

DEPARTMENT OF HOMELAND SECURITY U.S. Coast Guard			OMB Control Number: 1625-0003
RECREATIONAL BOATING ACCIDENT REPORT			Expires: 07/31/2022
<p>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.</p> <p style="text-align: center;">Privacy Act Notice</p> <p>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.</p>			
REPORT SUBMISSION			
<p>Report required because (select all that apply):</p> <p><input type="checkbox"/> At least one person in this accident <i>died</i>: If so, how many? _____</p> <p><input type="checkbox"/> At least one injured person in this accident <i>required or was in need of treatment beyond first aid</i>: If so, how many? _____</p> <p><input type="checkbox"/> At least one person in this accident <i>disappeared</i> and has not yet been recovered: If so, how many? _____</p> <p><input type="checkbox"/> All boat and other property damage (e.g., fishing/hunting gear) caused by this accident <i>totaled (or likely totaled) \$2,000 or more</i>:</p> <p style="margin-left: 40px;">Approximate value of damage to <i>your</i> boat: \$ _____</p> <p style="margin-left: 40px;">Approximate value of damage to <i>your</i> other property: \$ _____</p> <p><input type="checkbox"/> Your or another <i>boat</i> in this accident was (or likely was) a <i>total loss</i></p> <p>Report submitted by (select all that apply):</p> <p><input type="checkbox"/> Boat Operator (required if possible)</p> <p><input type="checkbox"/> Boat Owner (if operator unable, or same as operator)</p> <p><input type="checkbox"/> Other (describe): _____</p>		<p>To be submitted within:</p> <p>48 hours (if injury, disappearance or death)</p> <p>10 days (if boat/property damage only)</p> <p>To be submitted to: (Local State Reporting Authority)</p> <p>_____</p> <p>Phone: _____</p> <p><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></p>	
		For State Agency Use Only	
		First Name	Last Name
		_____	_____
		Phone: _____	
First Name	Last Name	Phone	Primary Cause of Accident
_____	_____	_____	_____
ACCIDENT SUMMARY			
<p>WHEN</p> <p>Date: _____ Time: _____ am <input type="checkbox"/> pm <input type="checkbox"/> (mm/dd/yyyy) (select one)</p>		<p>ACCIDENT DESCRIPTION: Briefly describe this accident (attach extra pages if necessary)</p> <p>_____</p>	
<p>WHERE</p> <p>Body of Water Name</p> <p>_____</p>			
<p>Location (on water) description</p> <p>_____</p>			
<p>Nearest city/town</p> <p>_____</p>			
<p>County: _____ State: _____</p>		<p>DAMAGE TO YOUR BOAT: Briefly summarize any damage to your boat</p> <p>_____</p>	
<p>YOUR BOAT – PEOPLE</p>			
<p># people on board (including operator): _____</p>			
<p># people being towed (e.g., on tubes, skis): _____</p>			
<p># people wearing lifejackets (on board or towed): _____</p>		<p>DAMAGE TO YOUR OTHER PROPERTY: (NOT BOAT)</p> <p>Briefly summarize any damage to your other property (not boat)</p> <p>_____</p>	
<p>OTHER BOATS INVOLVED IN ACCIDENT</p>			
<p># of other boats involved: _____</p>			

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"/> 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				Federal Agency (Name): _____									
US Power Squadrons: VSC Decal? <input type="checkbox"/> Yes <input type="checkbox"/> No				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							

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					
<i>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.</i>					
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"/>	Yes	No	Body part of most serious injury (e.g., head, trunk, leg):		
<input type="checkbox"/>	Yes	No			
<input type="checkbox"/>	Person received treatment beyond first aid?		Other (describe):		
<input type="checkbox"/>	Yes	No			
<input type="checkbox"/>	Person was admitted to a hospital?				
<input type="checkbox"/>	Yes	No			
ACCIDENT DETAILS – YOUR BOAT – DEATHS/DISAPPEARANCES					
<i>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.</i>					
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):		Death – by drowning		
<input type="checkbox"/>	Was struck by a (e.g., boat, propeller):				
<input type="checkbox"/>	Was exposed to carbon monoxide poisoning		Death – other likely cause (describe):		
<input type="checkbox"/>	Received an electric shock				
<input type="checkbox"/>	Other (describe):		Disappeared and not yet recovered		
			Person was wearing lifejacket?		
			Yes	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 <i>(select all that apply)</i>		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 <i>(Lanyard or wireless device) if equipped?</i>	<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"/> US Power Squadrons course		Alcohol?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Internet <i>(name of sponsoring organization)</i>		Drugs?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other <i>(describe)</i>		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 <i>(select one)</i>			
<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) <i>(select all that apply)</i>			
<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"/> Witness
First Name	MI	Last Name	
Street			
City	State	Zip	Phone
Other boat name <i>(if any)</i>		Other boat registration # <i>(if any)</i>	
NAME/ADDRESS			
This other key person was a(n) <i>(select all that apply)</i>			
<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"/> Witness
First Name	MI	Last Name	
Street			
City	State	Zip	Phone
Other boat name <i>(if any)</i>		Other boat registration # <i>(if any)</i>	

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	<input type="checkbox"/> Male	<input type="checkbox"/> 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: Acronyms Used

BARD: Boating Accident Report Database

BUI: Boating Under the Influence

CDC: Centers for Disease Control and Prevention

CFR: Code of Federal Regulations

CSTE: Council for State and Territorial Epidemiologists

ESSENCE: Electronic Surveillance System for the Early Notification of Community-based Epidemics

HIPAA: Health Insurance Portability and Accountability Act

HL7: Health Level 7

ICD: International Classification of Diseases

ISW: Injury Surveillance Workgroup

NASBLA: National Association of State Boating Law Administrators

NEMSIS: National Emergency Medical Services Information System

NSSP: National Syndromic Surveillance Program

RHINO: Rapid Health Information NetwOrk

SAR: Search and Rescue

USCG: United States Coast Guard

WEMSIS: Washington (State) Emergency Medical Services Information System