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BRIEF REPORT

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Naloxone training and availability in the US commercial fishing industry

Jenna M. Bellantoni MHS[1] | Maria T. Bulzacchelli PhD[1] | Dan Orchard JD, MMA[2] | Heidi Bruggink Sulman PhD, MPH, MSW[2] | J. J. Bartlett MBA[2] | Jerry Dzugan MsEd[3]

[1]Krieger School of Arts & Sciences, Johns Hopkins University, Baltimore, Maryland, USA

[2]Fishing Partnership Support Services, New Bedford, Massachusetts, USA

[3]Alaska Marine Safety Education Association, Sitka, Alaska, USA

Correspondence
Maria T. Bulzacchelli, PhD, Krieger School of Arts & Sciences, Johns Hopkins University, 3505 North Charles St, Baltimore, MD 21218, USA.
Email: mbulzac1@jhu.edu

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Abstract

Introduction: Workers in physically demanding jobs with high injury rates, long hours, productivity pressures, and lack of job security, such as commercial fishing, are at higher risk for substance use and misuse. In the United States, the federal government is urging employers to consider having naloxone available to reverse the effects of an opioid overdose, especially in workplaces. This study examined naloxone training, naloxone availability, and level of concern over substance use in commercial fishing.

Methods: As part of a larger study of commercial fishing vessel captains, we asked participants how worried they are about various potential problems, including substance use by crew members, using a five-point scale. We also asked whether they had completed naloxone training and whether their vessel was equipped with naloxone.

Results: Of the 61 vessel captains who participated, 10 had naloxone training. Most were "not at all worried" about a crew member misusing alcohol ($n = 52$; 85.2%), a crew member using marijuana ($n = 50$; 82.0%), a crew member using other drugs ($n = 49$; 80.3%), or a crew member having a drug overdose ($n = 52$; 86.7%). Only five fishing vessels were equipped with naloxone.

Conclusion: Our results indicate that few fishing vessels are equipped with naloxone or have captains trained in its use. Fishing captains tend not to be worried about substance use in their crew. Given the higher rate of overdose deaths in the fishing industry compared to other industries, having more vessels equipped with naloxone and captains trained to administer it could save lives.

KEYWORDS
commercial fishing, naloxone, naloxone training, occupational safety, opioids, overdose

1 | INTRODUCTION

The opioid epidemic is far-reaching, but certain population groups have been hit particularly hard by it. Workers in physically demanding occupations with high injury rates, lack of job security, and lack of paid sick leave are at higher risk for substance use and misuse, including that of opioid pain relievers.[1] Commercial fishing workers fall into this category and likewise have a higher risk of opioid overdose compared with other occupations.[1,2] Many studies have suggested that opioids are commonly prescribed to patients with pain

from to musculoskeletal conditions, and at high dosages.[3–7] Further, long-term opioid use for chronic pain has been associated with increased risk for disability and overdose, including overdose-related death.[5,8–10]

Studies specifically investigating injuries in fishermen working in Denmark and the northeastern United States have reported high prevalence of musculoskeletal pain, suggesting that musculoskeletal injuries are likely a common occurrence within the commercial fishing industry. A cross-sectional study of Danish fishermen reported a prevalence of low back and shoulder pain of 80%, with prevalence of pain in other locations (hand, knee, hip, elbow, neck, upper back, and feet) ranging from 38% to 66%.[11] Similarly, in a study of musculoskeletal disorders in lobstermen working in the northeastern United States, 82% experienced pain in any bodily region (neck, shoulder, elbow, hand/wrist, back, or legs), 63% of which was caused by work.[12] Musculoskeletal disorders are also the leading cause of injury in Alaskan commercial fisheries from 2015 to 2019, a trend that has not changed over 30 years.[13]

Additionally, workers in the commercial fishing community may be economically vulnerable and experience barriers to receiving healthcare.[14] Commercial fishermen tend to be underinsured. Up to 46% of fishermen may not have health insurance for themselves or their families.[14] These barriers to care can hinder their access to pain management following workplace injuries, which could result in worsening of an injury and higher risk for substance use. According to data from the Massachusetts Department of Public Health, construction and extraction workers in that state have opioid overdose death rates six times higher than the rate for all workers, and farming, fishing, and forestry workers have opioid death rates five times higher than the rate for all workers.[1] To isolate the role of occupation in these elevated death rates, Fulmer et al. compared commercial fishermen to other workers living in the same Massachusetts fishing ports.[2] They found that opioid poisoning deaths were four times more likely to occur among commercial fishermen than the other workers, even though both groups share many other sociodemographic and cultural characteristics such as housing, education, lifestyle, and traditions.

There are new efforts to educate employers about preventing overdose deaths. Naloxone, the opioid overdose reversal drug also known as Narcan or Evzio, is an integral part of these efforts.[15] The National Institute for Occupational Safety and Health (NIOSH) has recently published guidance for establishing a workplace naloxone use program in response to the opioid crisis.[16] Implementing such programs may be specifically challenging in the commercial fishing environment, however, given the lack of a traditional "workplace" on which much of the guidance is based. In the commercial fishing industry, some safety training courses recently started including training on using naloxone to reverse the effects of an opioid overdose. The aim of this study was to assess commercial fishing vessel captains' concerns over substance use among their crew, the proportion of captains who were trained in administering naloxone, and the proportion of commercial fishing vessels equipped with naloxone.

2 | METHODS

This analysis is part of a larger study on the use of mobile apps for commercial fishing safety, which was approved by the appropriate Institutional Review Board. Participants were a convenience sample of commercial fishing vessel captains operating out of ports in the United States, primarily in the northeastern region. To be eligible, vessel captains had to own a smartphone, fish with a crew, speak English, and be actively fishing during the study period. Participant recruitment and data collection were conducted from July 2018 to October 2020. Participants were recruited either in-person on the docks or remotely through advertisements in trade publications and social media, and via email blasts from fishing industry associations. Participants were then screened for eligibility and completed an informed consent process to be enrolled in the study.

Participants completed a baseline questionnaire that was either researcher-administered in person or self-administered online. They were asked about their fishing experience, types of training they had completed, types of equipment they carried on their vessel, and their level of concern about various problems that can arise while fishing. We compared the frequency of naloxone training with the frequency of first aid, cardiopulmonary resuscitation (CPR), and drill conductor training. We compared the frequency of vessels equipped with naloxone with the frequency of vessels equipped with several other types of safety equipment. Level of concern was measured by asking "how worried are you about…" for each potential hazard and recording participants' responses on a five-point scale: not at all worried, slightly worried, moderately worried, very worried, or extremely worried. We compared their level of worry about four substance-use-related problems with four problems related to vessel disasters or falls overboard.

3 | RESULTS

A total of 61 participants completed the baseline questionnaire. As shown in Table 1, the majority of participants fished in the northeastern United States (82.0%) and were male (93.4%).

TABLE 1 Participant's demographic and fishing experience characteristics ($N = 61$).

Participant characteristics	
Demographic	
Male, *n* (%)	57 (93.4)
Age, mean (SD)	47.3 (14.4)
Fishing experience	
Fish out of northeastern United States, *n* (%)	50 (82.0)
Years of experience on commercial fishing vessels, mean (SD)	26.5 (13.5)
Years of experience as a commercial fishing vessel captain, mean (SD)	19.5 (13.9)

FIGURE 1 Trainings completed by fishing vessel captains ($N = 61$).

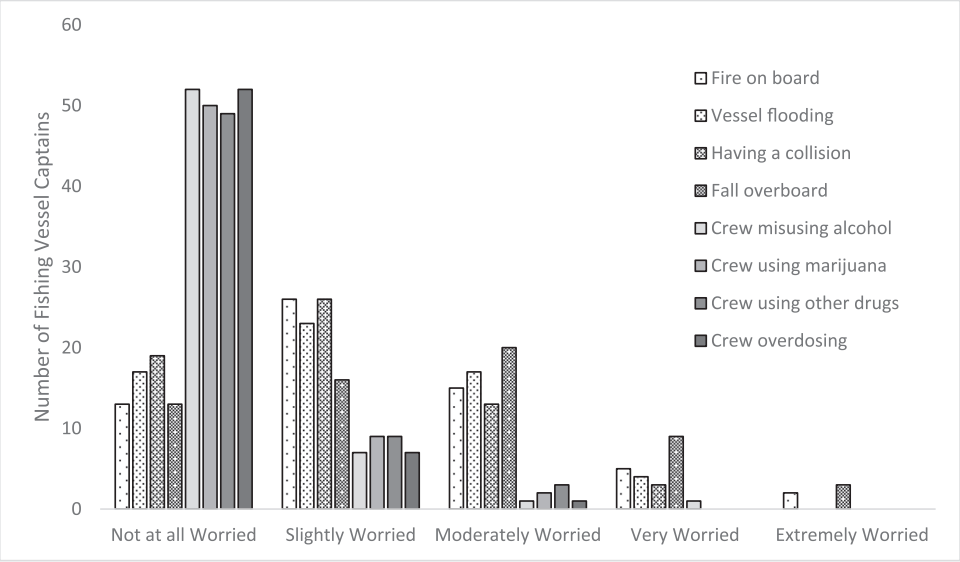

FIGURE 2 Fishing vessel captains' level of worry about possible hazards ($N = 61$).

Participants averaged 47.3 years of age, with an average of 26.5 years of experience on commercial fishing vessels and 19.5 years of experience as commercial fishing vessel captain. As shown in Figure 1, of these 61 participants, 10 (16.4%) reported having been trained in how to administer naloxone, compared to 59 (96.7%) who had first aid training, 56 (91.8%) who had CPR training, and 39 (63.9%) who completed drill conductor training. When asked how worried they were about problems that can happen when fishing, the vast majority reported being "not at all worried" about a crew member misusing alcohol ($n = 52$; 85.2%), a crew member using marijuana ($n = 50$; 82.0%), a crew member using other drugs ($n = 49$; 80.3%), or a crew member having a drug overdose ($n = 52$; 85.2%), as shown in Figure 2. Only three captains (4.9%) reported being more than "slightly worried" about any of the four substance-use-related problems. By contrast, 16 captains (26.2%) were more than "slightly worried" about having a collision, 22 (36.1%) were more than "slightly worried" about a fire on board, and 32 (52.5%) were more than "slightly worried" about a fall overboard.

When asked what items their vessels were equipped with, most captains reported being equipped with a fire extinguisher ($n = 60$; 98.4%), a first aid kit ($n = 58$; 95.1%), flares ($n = 58$; 95.1%), life jackets or personal flotation devices ($n = 54$; 88.5%), immersion suits or survival suits ($n = 52$; 85.2%), an Emergency Position Indicating Radio Beacon (EPIRB) ($n = 44$; 72.1%), or a life raft or survival raft ($n = 43$; 70.5%), as shown in Figure 3. By contrast, few vessels were equipped with personal locator beacons ($n = 15$; 24.6%) or naloxone ($n = 5$; 8.2%).

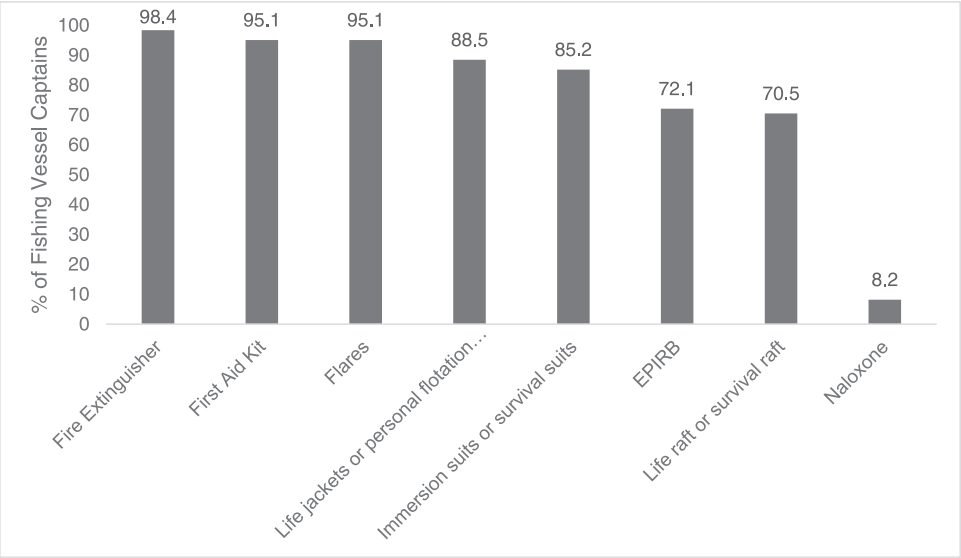

FIGURE 3 Equipment on board vessel ($N = 61$).

4 | DISCUSSION

We asked commercial fishing captains about the safety trainings they had completed, the equipment they carry on their vessels, and their level of worry about various potential problems. Almost all participants had completed first aid and CPR training. Fewer had drill conductor training and fewer still had naloxone training, though it is possible that another crew member on their vessel had these credentials. Almost all participants' vessels were equipped with a fire extinguisher, first-aid kit, and flares. A smaller but sizeable proportion of vessels were equipped with immersion suits and EPIRBs. Few vessels carried naloxone. Captains tended to report higher levels of worry about fire, flooding, collision, and falls overboard than a crew member using alcohol, marijuana, other drugs, or overdosing.

There are several possible reasons captains might report lower levels of worry about substance use than other problems. First, vessel disasters—to which fire, flooding, and collision are all related—and falls overboard are the leading causes of commercial fishing-related fatalities. While rates of opioid overdose death are several times higher in commercial fishing than other occupations, they are still quite low overall. Also, when answering questions related to their crew, captains may have had specific crew members in mind. Their crew may be composed of family members, friends, or long-time employees, which could lead them to answer questions differently than if thinking about a theoretical crew or crew members of other vessels. The type of fishing may also affect key trip details (i.e., boat size, crew size, length of trip), which could further affect responses. Our sample included many lobstermen who likely would have had a smaller boat and crew. These captains may have more familiarity with crew members and be more aware of happenings on the boat, compared to a larger operation. Shorter trips related to lobster fishing may also give less opportunity for substance use or misuse, so captains may be less worried about it while at sea.

It is also possible that captains are underreporting their worry about substance use because of the stigma attached to it. There is evidence from qualitative studies that captains—especially on the larger offshore fishing vessels—are aware of ongoing substance use and are frustrated because they do not want crew misusing alcohol or other drugs, but they also may believe that if they strictly enforced the rules, it would be challenging to find a crew at all.[17] Considering frequent reports of chronic pain and inadequate pain management, crew members might function better while on pain medication or other opioids, and captains may choose to overlook substance use among their crew if they are functioning well and working productively.[17] It is unclear how this would affect a captain's reported worry, but it is possible that they simply do not want to acknowledge the problem. Additionally, captains may not report worrying about drug use to not draw more attention to the problem, due to concerns about excessive government regulation, mandatory drug testing, or negative perceptions of the industry.[17] These factors, while not unique to the commercial fishing industry, could have a role in the lower levels of worry reported by captains in our study.

Whatever the reasons for the levels of worry reported by the captains in our study, efforts to increase awareness of the problem of opioid use and overdose among commercial fishing workers are needed. Given the higher rate of overdose deaths in the commercial fishing industry and the fact that commercial fishing work is done in remote locations, far from any emergency services, having more captains trained to administer naloxone and more vessels equipped with naloxone could save lives. Given that captains are generally not worried about substance use or overdose on their vessels, they are unlikely to seek out naloxone training or expend a lot of effort or money to equip their vessels with naloxone.[18] Therefore, including naloxone training with other safety trainings, as has been started recently, is a promising approach not only for their own crews, but for other vessels' crews around which they fish and work dockside. Providing naloxone to commercial fishing captains at low or no cost might increase the availability of naloxone on fishing vessels.

AUTHOR CONTRIBUTIONS

Maria T. Bulzacchelli and Jerry Dzugan participated in the conception and design of the work. Jenna M. Bellantoni and Maria T. Bulzacchelli participated in the acquisition and analysis of data. J. J. Bartlett, Jenna M. Bellantoni, Maria T. Bulzacchelli, Jerry Dzugan, Dan Orchard, and Heidi Bruggink Sulman participated in the interpretation of data for the work, drafting or critically revising the manuscript for important intellectual content, and gave final approval of the version to be published; and Maria T. Bulzacchelli agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

John Meyer declares that he has no conflict of interest in the review and publication decision regarding this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS APPROVAL AND INFORMED CONSENT

This study was approved by the Johns Hopkins University Homewood Institutional Review Board, study number PR00015355 HIRB00011417. All participants gave verbal informed consent.

ORCID

Jenna M. Bellantoni http://orcid.org/0000-0003-3531-7553
Maria T. Bulzacchelli http://orcid.org/0000-0003-3092-3394

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