

Legal Issues Associated with Diving Fatalities: Panel Discussion

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A panel of five attorneys — David G. Concannon, Stephen L. Hewitt, François Jaeck, Craig S. Jenni and Mark A. Hruska — discussed common legal issues associated with diving fatalities. The panel addressed the personal and financial costs associated with scuba diving fatalities, major factors leading to scuba fatality litigation, shortcomings of accident investigations and suggestions for improvement, how the lack of investigative information can be problematic in litigation, cooperation with first responders and medical examiners to facilitate effective incident investigation, the collection of data for research and education of the diving community, the impact of fatalities on liability insurance, changing legal standards in Europe, and methods for enhancing international training and diver education to reduce future fatalities. The panel discussed ways to improve information gathering, from the collection of evidence at an accident scene through the litigation process. A lack of solid information about the underlying causes of diving fatalities creates uncertainty, which leads to litigation, higher insurance premiums, massive costs and ultimately the continued loss of life. More and better data must be collected to determine exactly what is causing divers to die.

Introduction

A panel of five attorneys, representing several decades of experience investigating scuba fatalities and litigating dive accident cases, included David G. Concannon (Law Offices of David G. Concannon, LLC, Wayne, Pa.), Stephen L. Hewitt (Hewitt & Truszkowski, North Hollywood, Calif.), François Jaeck (DAN Europe, Blois Cedex, France), Craig S. Jenni (Dive and Marine Consultants International, Fort Lauderdale, Fla.) and Mark A. Hruska (Schwartz & Horwitz, PLC, Boca Raton, Fla.). The panel shared the members' collective experience and observations about the cause of diving fatalities, major factors leading to litigation and common legal issues associated with diving fatalities.

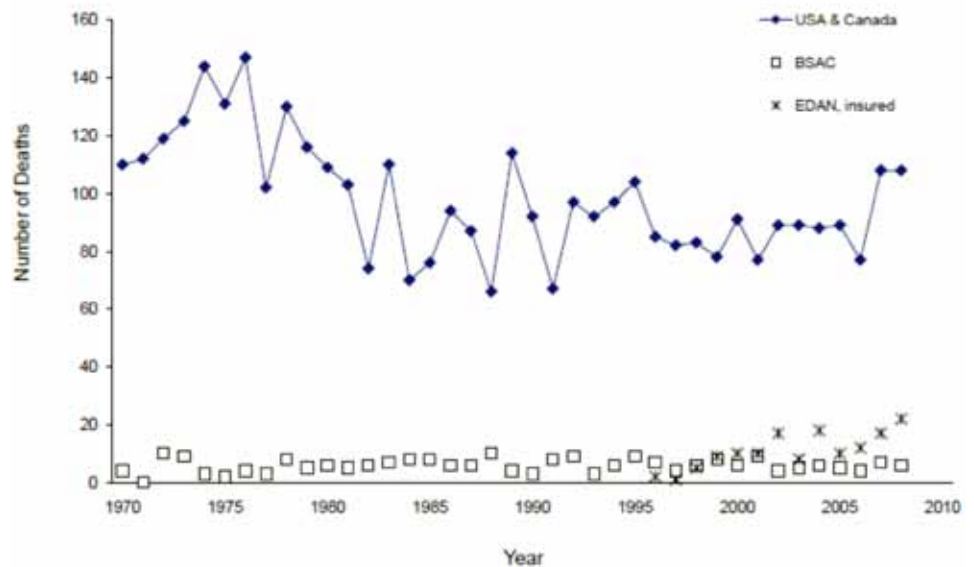
This paper summarizes the individual presentations and provides additional information to assist in identifying potential causes of scuba fatalities, but more information is needed to better address the associated legal and financial issues.

The Problem

Scuba diving fatalities have a toll that exceeds the unfortunate loss of human life; fatalities also have a major financial impact in the form of lost income, lost business, higher insurance premiums and massive litigation costs. Every year, approximately 125 divers die in North America, Europe and Asia (Denoble, Vann 2009). Of this number, between 50 and 60 scuba divers die in the United States (Denoble et al. 2008). Figure 1 shows the number of scuba fatalities is trending upward after remaining static for several years.

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Figure 1: Diving deaths by year in North America, the United Kingdom and Europe (from Denoble, Vann 2009)



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But what exactly is causing divers to die? Without knowing the answer to this question, it is difficult to make progress toward reducing the number of diving fatalities and related costs. The problem is there is no systematic collection of data performed to determine exactly how or why scuba divers are dying. Instead, information is collected, with varying degrees of accuracy, from a variety of different sources. Lack of solid information about the underlying causes of diving accidents and fatalities creates uncertainty, and this is the principal factor leading to litigation, higher insurance premiums, massive litigation costs and ultimately the continued loss of life.

Shortcomings of Scuba Fatality Investigations

Chris Acott, the founder of the comprehensive and ongoing Diving Incident Monitoring Study (DIMS) in Australia, has observed: “An accident is often the product of unlikely coincidences or errors occurring at an inopportune time when there is no ‘system flexibility’” (Acott 2001, 2003). It is never just one event that causes a diver to die; instead, there is often a series of events, beginning before a diver ever enters the water, that leads to a fatal accident. Unfortunately, the series of events leading to an accident is rarely investigated completely, leading to a lack of critical information about what caused a particular accident.

Furthermore, the Pareto principle, also known as the “80-20 rule” or “the law of the vital few,” states that, for many events, roughly 80 percent of the effects come from 20 percent of the causes. Therefore, the proper investigation of diving-related deaths, and public dissemination of the most common health issues, dive practices and behaviors that result in or contribute to a fatal dive mishap (“the vital few”), are fundamental to improving dive safety. Without proper investigation of diving fatalities, these common problems cannot be identified or fixed.

Scuba fatality investigations attempt to determine the cause of death by identifying causative factors, primarily focusing on three areas: medical, equipment and procedural. Medical investigation looks at a diver's health and medical factors leading to the cause of death. Equipment investigation addresses potential hardware issues that may have contributed to a cause of death. Procedural investigation focuses on whether the diver followed his or her training, properly prepared themselves and their equipment before diving, or went diving in conditions beyond their training and experience level.

It is important to note that all three areas are typically examined in a scuba fatality investigation, with varying degrees of competence and thoroughness. Procedural problems appear to be more common than equipment problems, but they are often difficult to identify. Proper medical investigation depends on whether protocols for conducting a proper "diving autopsy" are followed, but often they are not. In the vast majority of cases, the primary causative factors are never identified, leading to uncertainty about the cause of death.

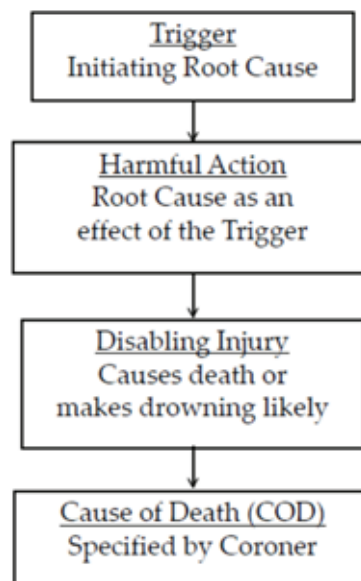
Furthermore, it is not uncommon for investigators to rule out one area, typically medical, and then point to another area as the most likely cause of death even though the investigator has no experience investigating this area and did not do so because they have excluded their area of expertise as a contributing factor. In such cases, a victim's wife may be told by a medical examiner, "Your husband was the picture of health, so it must have been his equipment," when, in fact, the medical examiner did not conduct a proper diving autopsy or was unaware that actual equipment problems account for less than 10 to 15 percent of all fatalities (Acott 2001; Vann et al. 2007).

Proper scuba fatality investigations are conducted using a root cause analysis to determine the four distinct events shown in Figure 2 (Denoble et al. 2008; Vann et al. 2008). The first event, the "trigger," is the earliest identifiable root cause that transformed an unremarkable dive into an emergency. The second event, the "disabling agent" or "harmful action" is an effect of the trigger that leads to the third event, the "disabling injury." The disabling injury caused death or rendered an incapacitated diver susceptible to drowning. The final event is the "cause of death" specified by the medical examiner, which might be the same as the disabling injury or drowning secondary to the disabling injury. It is not unusual for one or more of the four events to be unidentifiable.

The panel presented information derived from 947 recreational open-circuit scuba diving deaths from 1992 to 2003 (Denoble et al. 2008). Diving deaths were identified by active search of news reports, the Internet and a cooperative network of individuals and organizations developed by DAN over many years. Following notification of a death, DAN contacted official investigative agencies, medical examiners, hyperbaric chambers, witnesses and the decedents' families by telephone, mail or email. DAN reported: "These contacts could be helpful to a greater or lesser degree. Reports might include scant details or a full analysis of equipment, breathing gases and a description of a complete medicolegal autopsy" (Denoble et al. 2008). The causes of death, which DAN identified in only 814 of 947 cases, are shown in Figure 3.

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Figure 2: Root cause analysis for diving fatality investigations
(Denoble et al. 2008)

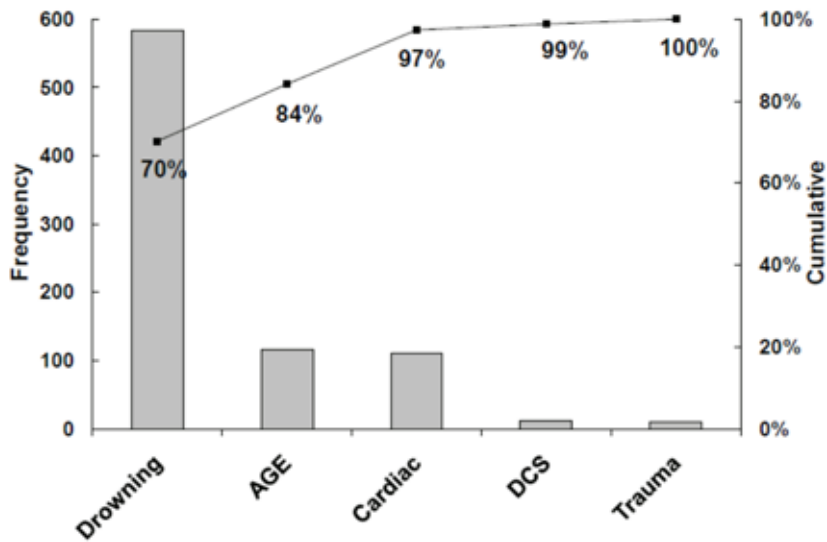


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The study had a number of admitted limitations. According to DAN, “Assessing associations and making causal inferences based on surveillance system data, such as that from diving fatalities, is uncertain because of inherent defects in data quality and completeness.” Indeed, the DAN study was notable for the way it collected data: DAN affirmatively sought data from a variety of sources. These are the methods used for data collection on which the DAN Annual Diving Reports are based (Vann et al. 2008). By contrast, international data sources such as those collected by BSAC and Project Stickybeak in Australia (with the cooperation of DAN Asia-Pacific) encourage individuals to submit information directly to the researchers, and they even go so far as to publish downloadable forms on the Internet to facilitate the collection of information (Cumming et al. 2011; Acott 1999, 2003). Consequently, the BSAC and Project Stickybeak studies seem to have more complete data of a higher quality, although for a smaller population of divers.

DAN identified the following additional limitations: (1) disabling injuries were identified for only 590 of the 947 decedents; (2) triggers and disabling agents were even more difficult to identify, and DAN was able to do so in only 346 and 342 cases respectively; (3) postmortem examination of divers has requirements beyond standard autopsy practice that was not always implemented by medical examiners; (4) the reference group for each disabling injury was all other disabling injuries; therefore, triggers and disabling agents associated with specific disabling injuries were not always identified completely, and their relative importance was necessarily conditional on death; and (5) surviving divers would be a better reference population (Denoble et al. 2008).

Figure 3: Causes of Death identified in 814 of 947 scuba fatalities, 1992-2003 (Denoble et al. 2011)



However, even studies incorporating data from surviving divers can have limitations. Acott (1999) identified in his study of equipment malfunction in 1,000 diving accidents a number of additional limitations associated with accident/fatality data: (1) often events are reconstructed from a jigsaw puzzle of information that lacks substantiation of events by the victim; (2) valuable information may be forgotten during the turmoil of the rescue and resuscitation so that the recorded events may be an oversimplification of what happened; (3) events are often changed to suit the perception of what happened and are seen in the light of “doing the right thing”; and (4) reports may be either subject to investigator bias and report “what must have happened” and not what did happen, or only legal issues may be addressed.

Despite their admitted shortcomings, the available scientific studies of diving accidents and fatalities provide an excellent resource and a starting point for further research and awareness action. Denoble et al. (2008) found from DAN’s 10-year study:

“[A]nalysis of diving fatality case data identified many triggers and disabling agents that are the focus of existing diving safety guidelines. What is new is recognition that a majority of fatalities were associated with a minority of triggers and disabling agents. This suggests that diving fatalities might be reduced by additional emphasis on the prevention of key triggers, disabling agents and intrinsic medical factors in accordance with the Pareto principle. The design and implementation of practical solutions for avoiding triggers and disabling agents is the province of training specialists.... Some diving fatalities are unavoidable, but the practically irreducible level appears yet to be achieved.”

Although triggers were identified in only one-third of cases (346 of 947), the most common triggers were identified as insufficient gas (41 percent), entrapment (20 percent) and equipment problems (15 percent). Similarly, disabling agents were identified in only one-third of cases (332 of 947); however, emergency ascent (55 percent), insufficient gas (27 percent), and buoyancy trouble (13 percent) were the most common disabling agents and, together, accounted for 95 percent of the 332 deaths.

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Disabling injuries were identified in 590 of 947 deaths. Of these, the three most common disabling injuries, asphyxia (33 percent), arterial gas embolism (AGE) (29 percent) and cardiac incidents (26 percent) contributed to 88 percent of deaths. Other disabling injuries were ascribed to trauma (5 percent), decompression sickness (DCS) (2.5 percent), unexplained loss of consciousness (LOC) (2.5 percent) and inappropriate gas (2 percent).

DAN’s experience collecting information to fulfill its mission of improving dive safety is similar to that which attorneys experience in solving legal issues associated with scuba diving fatalities. In the United States, medical examiners conducting improper autopsies on dive accident victims are the norm rather than the exception. This leads to misinformation about the cause of death. Emergency service personnel usually devote more investigative resources to routine automobile accidents than they do to investigating diving fatalities. To be fair, first responders usually are not trained in how to properly investigate a scuba diving fatality; indeed, most first responders are not even certified scuba divers. However, it is not uncommon to see that routine investigative techniques are not followed, witnesses are not interviewed, dive computers are not downloaded and equipment is not properly examined. Consequently, the triggers, disabling agents and disabling injuries that lead to scuba fatalities are left to lawyers to uncover.

Identifying the most common health issues, dive practices and behaviors that result in, or contribute to, a fatal dive mishap is fundamental to improving dive safety, accurately calculating insurance risks, improving dive training and solving legal issues related to diving fatalities. Without improving the collection of information and the identification of root causes of diving fatalities, none of these goals are likely to be met anytime soon.

Uncertainty Leads to Litigation

Very few cases are cut and dry, where fault and responsibility are clear. Consequently, the legal panel members universally expressed their belief that uncertainty about what causes divers to die, how events may have unfolded underwater and the inability to accept responsibility for making mistakes are the major factors that cause a dive accident to develop into a dive lawsuit. Simply put, uncertainty leads to litigation.

Furthermore, the greatest number of diving fatalities occurs in older divers; in other words, the primary bread-winners of the family (Denoble et al. 2008). These fatalities can be financially devastating to surviving family members. Consequently, families of injured divers often sue to recover lost income, loss of consortium and money for pain and suffering that the family members incur due to the loss of a loved one. When the cause of death is uncertain and families are financially devastated by the loss, litigation is a virtual certainty, regardless of who may be at fault.

Research shows that drowning is listed as the cause of death in 70 percent of scuba diving fatalities (Denoble, Caruso et al. 2008; Denoble, Pollock et al. 2008). However, drowning often means that a diver simply died while underwater. There are no standard diagnostic criteria for drowning. Drowning is a diagnosis of exclusion and, in many cases, no effort is made at the time of an accident or during the initial investigation to exclude other causes of death or to determine why a diver drowned. Caruso (2011) pointed out that drowning “is a very unrewarding finding if you just stop there.”

Craig Jenni observed: “When we, or family members of a decedent, see drowning on an autopsy report, there is a presumption and misconception among the

general population that a dive professional should have somehow intervened, much like a lifeguard would at a pool. That creates a burden of responsibility from a defense perspective to establish why exactly this person drowned as opposed to a simple drowning that could have been prevented such as at a pool with a lifeguard.” Furthermore, a great deal of litigation that we have seen recently is simply because family members, loved ones, are angry. It is a normal emotional response to the loss of their loved one. They want to hold someone else accountable.

This desire to hold someone accountable causes prolonged litigation, particularly where scant information is available to show what happened to cause a diver’s death. Lawsuits are fought over the events leading to a cause of death. Unfortunately, judges and juries — not doctors, divers, lawyers, researchers or family members — often decide what caused fatalities, and they do so with the assistance of lawyers and experts who are paid to advocate a particular side of a case.

Consequently, what Caruso described as “a very unrewarding finding” of drowning from a medical perspective can be a very rewarding finding from a financial perspective for law firms and experts involved in dive accident litigation but for virtually nobody else. Millions of dollars are spent each year to determine why divers die underwater. Just one lawsuit can involve the expenditure of hundreds of thousands of dollars to determine what caused one diver’s death. This money could be better spent to conduct research, education and prevention to save the lives of many divers and, ultimately, to reduce the wide variety of costs associated with scuba fatalities.

Lack of Information is Problematic in Conducting Legal Proceedings

Stephen Hewitt described the failure to collect and safeguard evidence at the scene of an accident as one of the principal problems associated with scuba fatalities. Without evidence, a party bringing or facing allegations of fault will be unable to prove or defend their case. For example, a diver may have suffered from decompression sickness after a dive, but why? Was it due to a dive instructor’s failure to supervise the diver, or because the diver panicked and made a rapid ascent to the surface? Data stored in a dive computer could hold the answer, but if the data is not retrieved and maintained the answer could be lost.

The legal consequences of failing to collect and safeguard information identifying the cause of a diving fatality can be dramatic. In the United States, failure to preserve, identify and produce critical information such as dive computer data can result in sanctions for spoliation of evidence, including monetary sanctions and termination of litigation in favor of the party requesting the lost information. In Europe the burden of proof rests on the diving professional to prove he or she was not at fault in causing a fatality; automatic liability is assumed on the part of the professional when selling package travel. In other words, the dive professional is guilty until proven innocent.

Francois Jaeck (2011) provided a summary of a legal regime in Europe that affects more than 500 million people. In June 1990, the Council of Europe enacted a directive on package travel reversing the burden of proof between a professional and a consumer. Previously, the injured diver had the responsibility of proving that the dive professional was responsible for causing their injuries. Now, however, automatic liability of the professional is assumed when selling package travel. To date, more than 27 countries have amended their domestic legislation to comply with the directive. The European regulation has drastically changed the rules by stating that tourism actors can be declared responsible even if they have

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not committed any fault. If the professional cannot demonstrate the real cause of the accident and that this cause is attributable to the diver, the professional automatically will be held responsible. In Europe it is no longer a demonstration of fault or negligence that determines the outcome of the trial in a scuba case but the demonstration of the cause of the accident. Consequently, dive professionals have placed a much greater emphasis on the immediate collection of evidence to escape automatic liability in the event of a future legal proceeding.

David Concannon provided examples of cases in which dive computer data could have or did provide the definitive answer to what caused a scuba fatality. In one case, more than \$1 million was spent in legal fees and costs to litigate a diving fatality lawsuit where the answer to what happened to a solo diver was stored in the dive computer, but the data was irretrievably lost by the victim's widow. The case lasted more than four years before the equipment manufacturer, a training agency, instructors and a dive boat owner were finally exonerated, but nobody knows what caused the diver to drown. However, in another incident involving similar equipment, dive computer data conclusively demonstrated that diver error caused a diver to drown, and no case was ever filed.

The failure to obtain data stored in dive computers is especially problematic (Concannon 2007). Downloadable dive computers have been on the market for almost 15 years. The information stored in these computers has essential applications, including the ability to support research that promotes diver safety, prevents or helps us to understand the causative factors in dive accidents, and helps to prevent or resolve litigation. Yet, unbelievably, divers do not routinely review or preserve dive computer data after an accident or serious incident, even though their basic training teaches them to record and/or download dive data. Now, the failure to obtain and preserve dive computer data can have dramatic consequences in diving fatality litigation.

In December 2006, the federal court system throughout the United States adopted new rules governing the collection of electronically stored information and its admissibility at trial (Concannon 2007). The new rules, which also have been adopted in a majority of state court systems, apply to dive computer data. They require the preservation of electronically stored information, disclosure of its existence to opponents in litigation without a request, collection and production of this data during the litigation process, and they provide for the imposition of sanctions for the failure to do so. These sanctions can be severe, from the imposition of fines ranging from a few thousand to millions of dollars, a finding that the party failing to produce data has “spoiled” evidence, or an outright dismissal of a lawsuit in favor of the party deprived of the data and an award of damages. Despite these nearly four-year-old changes in the law, investigators, victims' families and dive professionals routinely fail to obtain and/or preserve data stored in dive computers. This perpetuates uncertainty, prolongs litigation and increases costs for everyone involved.

Lawsuits are fought over the identification of triggers, disabling agents and disabling injuries. Like bats that live in the darkness of caves, lawyers thrive in the gray areas. Uncertainty means prolonged litigation, which is expensive and distracting and ultimately can lead to unsatisfying results for all involved.

Methods for Enhancing Training and Diver Education to Reduce Future Fatalities

There was considerable discussion about methods for enhancing training and diver education to reduce future scuba diving fatalities. Who, exactly, is supposed to be

doing the training, and what can be done about divers not following their training once they leave their instructors' supervision?

It is worth remembering that scuba diving is an inherently risky sport. The human body is not designed to function underwater, and the risk of injury is present in all physical activities. All divers are taught the risks of scuba diving in their initial and any advanced-level training they may take. All divers must understand and accept the risks of scuba diving before they ever enter the water and be prepared to overcome any adverse events that may befall them once they enter the water. All divers are taught to "plan your dive, and dive your plan," not to dive beyond their training and experience levels, and that overconfidence kills.

Scuba diving is also a relatively safe sport. As Denoble, Pollock et al.'s (2008) study pointed out:

"In a survey of 444 subjects, for example, scuba diving was ranked as more risky than snow skiing but less risky than bungee jumping, rock climbing, motorcycle racing, hang gliding, cliff jumping and sky diving. In fact, the actual likelihood of injury in open-water recreational diving seems to be 100 times less than the likelihood of injury in snow skiing (Pedersen 1997)."

Consequently, all of the panelists felt that there isn't really a "problem" of divers dying underwater, because some fatalities are inevitable in a sport involving some degree of risk and with millions of dives being performed every year. However, there is a very real problem of divers not following their training or diving within their experience levels, and this is the underlying cause of a majority of accidents. Additionally, medical issues such as cardiovascular events and obesity are an important part of the problem (Denoble et al. 2008), and divers bear primary responsibility for assessing their individual health and fitness to dive.

Mark Hruska and the other panelists observed that in 25 years of litigating hundreds of diving accident cases, 85-90 percent of these cases were simply the result of diver error. This range is consistent with the results of several scientific studies (O'Connor 2007; Acott 2001, 2005; Helmreich 2000; Alnutt 1987). For example, in a review of 1,000 recreational diving mishaps performed in Australasia, Acott (2005) determined that 87 percent were caused by human error; inexperience and insufficient training accounted for 14 percent and 8 percent respectively of the contributing factor to the mishap. Similarly, in studies of other high-reliability industries (e.g., aviation, nuclear-power generation, offshore oil production and medicine), the cause of approximately 80 percent of mishaps is generally regarded as human error (O'Connor 2007; Helmreich 2000).

As for experience levels, Vann et al. (2005) reported that "[th]e number of dives in the previous 12 months was related to the occurrence of death." There were more occasional than regular divers among fatalities. This study included various statistics for 89 of 109 recreational diving fatalities from 2003. A majority of the divers had only open-water or advanced open-water certifications. Furthermore, information about the number of dives performed by the diver in the 12 months prior to the incident was available in 54 cases. Of this number, nearly 45 percent of divers had no dives or had not dived in the previous 12 months; another 28 percent of divers had less than 20 dives in the past 12 months. Only 28 percent of divers could be classified as regular divers, or those having made more than 20 dives in the previous 12 months. There were at least 10 "novice divers," or those with 20 or fewer lifetime dives. From these figures, one can surmise that most divers have the training they need to safely perform most recreational scuba dives.

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However, they may not have enough recent experience to fall back on when an otherwise routine recreational scuba dive escalates into a critical incident.

Unfortunately, DAN's data on experience levels can change dramatically from year to year given the small sample size and inconsistent reporting of data. For example, in DAN's 2006 data, only 56 divers out of 75 fatalities in the United States and Canada were known to be certified divers, but the certification level was known in only half of these cases (Vann et al. 2008). Similarly, the number of years since a diver's initial certification was known in only 38 cases (51 percent). Thirty-nine percent of those with known history had been certified 10 years or more, and 19 percent one year or less. Consequently, evaluation of experience level as a specific risk factor in diving is not possible based on sparse data that is not examined over a multiyear period.

A lack of solid information about diver-experience levels in fatalities from year to year is unfortunate, given that careful examination of this risk factor in other activities has yielded significant information about the cause of fatal accidents and solutions for reducing such accidents. For example, a thorough study of 2,501 general aviation accidents over a 17-year period (1983 to 2000) determined that the majority of all fatal accidents (57 percent) took place when the pilots had between 50 and 350 flight hours (Craig 2001). This period in which fatal accidents were most likely to occur — which begins immediately after a pilot obtains a private pilot's license and leaves an instructor's supervision, and continues through obtaining an instrument rating and experience flying in various conditions — was dubbed "the killing zone." This is the period in which a pilot is confident of his flying ability even though his actual flying experience is low.

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Craig (2001), noting that similar findings were reported in a 1974 National Transportation Safety Board (NTSB) report, pointed to "a pilot's inexperience mixed with a dose of overconfidence as a fatal mix." Interestingly, from a training perspective, the total number of fatalities inside "the killing zone" dropped by nearly 41 percent after the NTSB reduced the minimum flight-time requirement for a private pilot to obtain his or her instrument rating from 200 hours to 125 hours. The NTSB did so after it determined that the greatest cause of fatal accidents was pilots flying into bad weather while they were "building time" to qualify for their instrument rating at 200 flight hours after obtaining their private pilot's license at just 50 to 60 flight hours (Craig 2001).

There was some discussion of whether training agencies and resorts should require recertification or refresher courses before allowing a diver to make a particular dive. There was no consensus on this issue; in fact, there was sharp disagreement. Ultimately, every member of the panel agreed that it is the diver's responsibility to make sure they are capable of making a particular dive on any given day. It is the diver's responsibility to ensure that they plan their dive and dive their plan. In planning for a dive, divers must consider their training and recent level of experience and then conduct their dives accordingly. If these basic rules are not followed, we are likely to continue seeing 85 to 90 percent of fatalities that are simply the result of diver error.

Suggestions for Improvement

The panelists identified several areas where improvement could be made to reduce the number of diving fatalities and their related costs.

First, it is essential that more useful information is collected through more thorough data-collection methods and that this information is analyzed to determine the root

cause of diver fatalities and near fatalities. Some examples of fairly thorough diving fatality studies include the British Sub-Aqua Club's paper (Cumming et al. 2011), DAN's series of Annual Diving Reports on diving accidents and fatalities, and the Diving Incident Monitoring Study (DIMS; Acott 2003). Any diver interested in learning more about the cause of scuba diving fatalities can obtain these studies on the Internet, as well as dozens of other scientific studies on diving, by visiting the DAN website (www.DAN.org) or the Rubicon Research Repository (<http://archive.rubicon-foundation.org>).

Second, stakeholders must increase cooperation with first responders and medical examiners to facilitate effective incident investigation, the collection and preservation of data, and accurate reporting. Similarly, first responders and medical examiners must seek out and/or accept this cooperation when offered.

Craig Jenni observed that one problem facing investigators is a lack of resources remarking that "because there is such a low incidence of diving fatalities and their investigations, from a primary investigation perspective, those who are statutorily authorized to do the investigation — medical examiner's office, law enforcement — do not have the resources to be able to do the type of investigations that we are talking about here for the most part." One way to correct this problem is for members of the diving community to reach out to federal, state and local authorities and offer their expertise when and where appropriate.

The following suggestions were made to overcome the problems associated with inadequate data collection and/or inadequate resources:

- Scuba equipment manufacturers could assist in accident investigations where equipment problems are thought to be a contributing factor.
- Stakeholders could develop and distribute protocols for effective accident investigations and medical examinations, which could be distributed by DAN or published on its website.
- DAN and workshop participants could educate those involved in accidents and accident investigations about the need to collect and preserve dive computer data and other relevant information.
- Stakeholders could disseminate appropriate data to interested parties (DAN, researchers, equipment manufacturers, training agencies, families and the public) so problems can be identified and addressed more effectively.

Discussion Summary

At the conclusion of the legal panel presentation, discussion questions ranged from how dive professionals and divers can protect themselves from lawsuits, to how to ensure that medical information is made available to researchers in light of strict privacy laws.

One of the most interesting questions involved an effort to quantify what percentage of diving fatalities each year turn into actual lawsuits. The panelists had a variety of answers, depending on their client base and geographic location. Mark Hruska commented that nearly every recreational scuba diving fatality in Florida becomes a lawsuit, an interesting remark given that Florida leads the United States in the number of scuba diving fatalities each year (Vann et al. 2008). Steve Hewitt remarked that lawsuits appeared to be more common in cases where there is a huge economic impact due to the diver's age and earning capacity, where the diver is between the age of 40 and 60, and where the cause of death is unclear. Given

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DAN's recent statistics (Vann et al. 2008) that 82 percent of females and 72 percent of males were 40 years or older, with a median age of 43 and 50 respectively, there appears to be fertile ground for more lawsuits.

Another question involved how often a failure of the buddy system is the target of litigation. The collective answer was not much, although the trend of suing dive buddies is on the upswing (Coleman 2008). Most of these cases involve a failure to rescue the deceased diver or situations where the deceased diver's family is looking for an additional source of insurance to collect from. This question, however, illuminated another problem: A large number of fatalities occur in solo diving situations or in situations where buddy separation occurs, thereby complicating the investigative process (Caruso et al. 2003; Vann et al. 2008).

Finally, a remark was offered that some divers seem to think it is their constitutional right to go diving, regardless of their health and other limitations, and there was little that could be done to keep some people from becoming statistics. The panel members universally agreed that this was a problem, and Concannon remarked that "sometimes you can lead a horse to water, but you have to put the right end in the trough." Generally, the panel members emphasized adherence to industry standards, awareness of the risks associated with diving and acceptance of personal responsibility as the best way to avoid scuba diving fatalities.

Conclusion

Overall, the legal panel expressed its collective belief that more and better data are needed to identify the underlying causes of scuba diving fatalities before any progress can be made in significantly reducing such fatalities. It is difficult to solve a problem without knowing exactly what the problem is. However, significant progress was made on this front throughout this workshop, although there is clearly more work to be done.

Finally, divers must take more responsibility for their own safety. Some fatalities are inevitably caused by situations escalating out of control. However, the vast majority of diving fatalities can be attributed to human error. If divers made better decisions further back in the decision tree so that common triggers did not occur, a significant number of fatalities and their associated costs could be avoided each and every year.

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Discussion

DR. PETAR DENOBLE: Are there any legal tactics that divers or dive operators should consider to improve their position in case a diver dies so that his family is not denied insurance? Definitely we would like to improve investigations, but probably nothing else will change in the next five, 10 years, again, 80 percent of divers, diver errors out there, but how we can improve our position from your experience? What I can do as a diver or dive operator?

DAVID CONCANNON: I think I understand the question. What can we do — what can dive operators do to improve their position to protect themselves and things of that nature? This is just my personal opinion, not as a lawyer but as a diver. I really like it when I go someplace to dive and the dive operator checks out my skills and my abilities. I do not get offended by that. I would not be unhappy; I would be, but I understand, hey, you are too fat, you have been sitting around a desk too much in the last year, so maybe you ought to do an orientation dive first. That is just my feeling on it. It is not a hard and fast rule, but I think that if you have been in this industry long enough, you can spot a statistic a mile away, you know who the divers are who are going to probably make a mistake and lead to an accident. And I think you have a moral responsibility to maybe flag them if you can. That is just my opinion.

MARK HRUSKA: I would disagree a hundred percent with that. Right now we are facing an issue where we are being threatened with a lawsuit because an instructor did not want to train a child who had ADD. The instructor was worried about the safety of the child, which is obvious. And this guy just did not want to take on that responsibility. If you are going to stop and evaluate every obese diver who comes in your shop and then be responsible for determining whether or not they are good to go, I think that is a burden that no operator should ever assume or should even have to assume. So that is just my thought on that. I would have to respectfully disagree with you there.

CRAIG JENNI: Likewise. I want to add, the whole idea behind personal responsibility is ultimately it is the diver's responsibility as to whether he or she is qualified and in condition and has done the pre-dive check of his equipment and the pre-dive plan with his partner to determine whether he is capable of making that dive. Anything to take away from that is asking for trouble unless you are in an instructional setting. So, Doctor, to answer your question maybe more succinctly and correctly, how to protect the dive operator, follow the industry standards, follow safe dive practices, utilize liability releases and have a good insurance company. As far as the individual is concerned, I am not altogether sure I understood your question, but I think I understood it to be, how do you protect yourself as an individual if your dive partner experiences some kind of a problem and is injured or killed? Was that the nature of your question? Well, we are seeing more and more lawsuits arise as a result of dive partners of decedent divers. It is a very sticky question, very difficult thing. It is unique. It is individual to each case. Each one of those has a unique setting to it, and it depends on so many variables that it would be hard to identify those in this simple setting or this short setting. The simple plan would be to make sure that you are familiar with your dive plan that you have agreed to with your dive partner and that you are familiar with their dive equipment. Be able to respond in an event of an emergency, and do the best you can. As a dive buddy that is what we would all want from our dive buddy in the event that we had an emergency.

DR. JAKE FREIBERGER: I would like to try to find out how big the problem is of liability suits after fatalities. I would like to know what your estimate is of the percentage of fatalities that have liability cases generated by them. I would like to know whether or not those are commercial versus recreational. And then finally, if you can answer this, I would like to know what percent of the liability claims made by the plaintiff are attributable to equipment, training, either the charter operation, and then finally attributable to a fitness-to-dive recommendation. So you may need to answer this individually. I know you probably have not thought about this as a group, but just the five of your collective experience if you could discuss that.

JENNI: What a multifaceted question. I will narrow it to exactly what I want to answer, and that is what you will get.

FREIBERGER: How many cases have you had in the last five years?

JENNI: We probably have 40 to 60 active cases right now.

FREIBERGER: What percentage of the fatalities ended up as cases?

JENNI: I had the pleasure of working with these three gentlemen co-defending lawsuits. When you ask what percentage of those from fatalities and what percent were injuries, I really do not have any knowledge.

FREIBERGER: That was not the question. I was asking of the fatalities, what percentage ended up as lawsuits?

HRUSKA: I can tell you in Florida that almost every recreational fatality ends up in a lawsuit.

CONCANNON: I can answer. From my perspective in my practice I have far more incidents in the files. An incident is classified as a fatality. Whatever the statute of limitation is in that particular jurisdiction, might be two years, might be three years, it is an incident from that time period that might turn into a lawsuit before the expiration. Normally it happens at the end of that time period, and maybe 1 in 10 incidents turns into litigation and actual lawsuit. I am not talking about things that are settled before a lawsuit is filed, but in my experience it is roughly 1 in 10 cases actually goes and becomes a lawsuit.

FREIBERGER: Are any of you able to break it down into equipment, training, charter operation or fitness to dive?

CONCANNON: Some of us have a variety of clients that we represent. Some of us represent training agencies. Some of us represent equipment manufacturers. So ordinarily our files probably relate to our clients. But generally speaking, in these cases the plaintiffs' attorneys have a "sue them all" mentality and allege everything you can think of, everything-but-the-kitchen-sink mentality. So the vast majority of them are "this was a defective training case," "this was a defective equipment case," and then the other issues like fitness to dive come later.

FREIBERGER: So there is no area that you can attribute to increased legal risk?

CONCANNON: Where I see a hundred percent of my cases come from is the inability of somebody to accept that somebody did something wrong. That is an honest answer.

STEVEN HEWITT: I would like just to add to your question. Again, I am on the West Coast. I see different kinds of cases. I only see kinds of cases from the different clients that I work for, so there is a limitation there. But if you want to identify two or three common factors in the large cases that present the biggest exposure for the dive community and have a huge economic impact, and that is where you have someone between the ages of 40 and 60 who is dying. The cause of death is not clear; it is not well-explained. Usually there is a buddy separation somehow, buddy is not there to give information. There is usually some kind of an element to the whole picture where there is this suggestion that if something had been done differently, the decedent might have survived.

FREIBERGER: So that can apply to any of the categories I mentioned, it sounds like, it just depends on what the attorney chooses?

HEWITT: The way you posed your question, those are the common factors.

MARTY McCAFFERTY: One of the problems we run into at DAN on the medical information line is a number of divers who consider diving a constitutional right, and that is really problematic. We do expound on all the risks that we can or have knowledge of when it comes to medical conditions and diving. And we do find that divers operator shop. They know if they go to one dive operator, they are going to require a medical release, somebody else does not. If they know their medical condition is likely to raise red flags, they simply go to an alternate dive operator who does not require it. So part of it is the dive industry itself. Two is that we need to stop being politically correct and hit divers over the head with the information that they need to know, and we are failing to do that, all of us, industry included. The other issue is how are we going to get, because of the small number of fatalities every year — yes, West Coast, Southeast — where we have a large number of divers, they are going to take the time to invest because they see more dive fatalities. You take a sheriff's department in Lake Wobegone, Minn., he sees one diving death every three years, they are not going to spend the time or the money to make some kind of protocol. So how are we going to address this across the board? Also, how do we get with health information problems? Our neighbors north of the border are militant about confidentiality laws, and this makes for a real problem. Working at DAN trying to get information from foreign governments is extremely impossible. So legally how do we try to get more cooperation with agencies that see very few numbers? And how do we get those confidentiality laws circumvented when necessary?

CONCANNON: One suggestion I would have is that I looked on the DAN Asia-Pacific website, and there is a questionnaire that divers can fill out and provide information about critical incidents on the DAN Asia-Pacific website. There is not currently one on the DAN America website that I could find. That is one way to gather information that would get around the confidentiality laws because the people who own the information are submitting it. That is a very difficult question to answer. As you indicated and Mark said, you can lead a horse to water, but you have to put it right into the trough. And we

see a lot of accidents that are people who feel like it is their constitutional right to dive, and they go out and they make a mistake and it is fatal. I do not honestly think that is a question we can answer in the time we have left, but we can discuss over the next two days if anybody wants to take a quick crack at it.

HEWITT: I know in the racing context, some of the organizations use presigned medical release authorizations, but it is very complicated and very sticky, takes a lot of sophisticated legal maneuvering to put something together like that that is valid.

DR. FRANS CRONJE: A fair number of the fatalities or drownings are unwitnessed; that would suggest failure of the buddy system. And my question to you is how often, if at all, is the buddy system really the target of the liability lawsuit, and would that ultimately possibly change the dedication toward a better buddy system if it were the case?

HRUSKA: I can answer the first part of your question. There have been several, not a lot, suits where the buddy has been sued for failing to act as a proper buddy. That usually comes about when there is no other source of insurance and the buddy has a homeowners insurance policy that will cover that particular incident. So that has not been a big area of litigation. But it is, for every one of us who dives regularly and crawls on a dive boat and ends up with a partner that you have never met before, something to think about because it can and does happen.

CRONJE: Then this is more about pockets than principle?

CONCANNON: There was a great law review article published last year on buddy liability. I've seen it in some of my cases where clearly it appears that the buddies — it is not a situation where there was a failure to rescue. It is very difficult, first of all, to sue a buddy. Second, there is an extreme reluctance oftentimes on the part of the family member to sue a buddy because it might have been the dead diver's best friend, wife, husband, brother. So you do not see it very often, but we are seeing it more regularly. We also see a lot of incidents that occur from solo diving, unfortunately. And that makes life a lot more difficult.

JENNI: We as divers are in a three-dimensional environment, frequently with limited visibility. There is a reason why we teach buddy procedures at the entry level. This is a common occurrence. So it is not altogether out of expectation to find that buddy separation is a component or an element of some fatalities. It is the nature of the environment that we are in. You cannot eliminate that type of risk.

FRANCOIS JAECK: You have to know that in France the highest rules that exist an implied contract of assistance between two divers. That makes it easier to sue your partner.

DR. PETER BENNETT: I raised an equipment issue earlier. I am not sure this is necessarily the right panel to bring this up. But it struck me again while I was sitting here, was that death due to drowning? And what is drowning? It is water going in the mouth. And why does it go in the mouth? Because you have a mouthpiece which we drop out and we breathe in water. If you put a full face mask on, it is not going to be drowning. I just wonder if we should be thinking of one piece of equipment, having a full-face-mask diving. And I wonder if you have cases with full face masks or is there a predominance of just the mouthpiece?

CONCANNON: I personally have never had a case involving the full face mask.

JENNI: I have done investigations of commercial-diving fatalities and public-safety-diving fatalities utilizing full face masks. It complicates the equipment issue to a certain degree. Certainly from your perspective and what you are addressing as far as an incapacitated diver having a regulator, a conventional mouthpiece style, set in stage regulator, falling out of their mouth, a full face mask would be great, but that is not what the standard in the industry is, and I don't see it going that direction.

KARL HUGGINS: One of the things that has been brought up is the dive computer and interrogating the dive computer. One of the things that I have found is that people who just pull the information off and look at it without knowing what the computer does or how it stores the information or what it is looking at can sometimes make erroneous conclusions based on that information. So in an investigation if you are getting information from the computer, you want to know how it is recording the information. It's like the ascent-rate warnings. If you just look at the screen and it shows a vast ascent rate, that means it occurred sometime during the dive, not necessarily during the final ascent. Then what does that ascent-rate warning indicate? I may mean they went faster than 60 feet per minute, and that is all you can say. Just know what the limitations are of that witness that you have so you do not just draw conclusions without knowing the underlying data gathering of that piece of equipment.

CONCANNON: I appreciate that. Three years ago I wrote an article for *Dive Center Business* on the importance of preserving dive computer data. That was then picked up by Willis Insurance, and they sent that out to all their insurers. I believe they might require downloads to be submitted in addition to reports. But there are two problems associated with the collection of dive computer data. One is if you do not know what you are doing, you can overwrite the data and lose it. Number two is the interpretation you picked up on. As Steve Barsky said this morning, if you are doing an accident investigation or some type of equipment exam, just state the facts. Do not state your conclusions; state the facts. It is the collection of all the facts from many different sources that will come to a well-reasoned conclusion. Oftentimes in my experience the first conclusion that is reached at the time is maybe the most obvious, and then it is erroneous because later on you get other information. You can spend years chasing a rabbit down a hole and going in the wrong direction because somebody said something at the time or thought they saw something and go off in a completely different direction. It is the facts and the data that are important.

GENE HOBBS: I fully accept the fact that if I die while I am diving it is probably going to be because of something stupid I did. My family and all my dive buddies are aware that they are supposed to make this information available. The investigations themselves are a reactionary kind of thing. Thinking about being more proactive, just a few minutes ago we talked about the question of medical releases and getting all of my personal medical history out there is a little difficult. What about a power of attorney? What if I were to set this up now, where my attorney could guide the investigation immediately upon my death? They would find out and start making the phone calls to the coroners' offices, making sure they do get in contact with Dr. Caruso, making sure that my dive gear does go to the appropriate testing facility. My preference would be, obviously, the USN Experimental Diving Unit. Is there a way to set that up so that divers can actually take the responsibility themselves, and do you have any suggestions on how that might be able to go into practice?

CONCANNON: My suggestion is to put your wishes on a card, laminate it, and put it with your dive gear. In the event of an accident, call Steve Smith, and get that done. You would be one of the few people who do. I am not trying to be facetious, but it is one of those things where chances are, depending on where you do your diving, you have a more likely than not chance that the investigation is not going to be handled appropriately. Any mechanism you can use to assist is a good one.

HOBBS: There does seem to be quite a bit of interest between the technical side of things and making sure the information does get out there. That comes back to an educational issue. Is there a way to educate the general diving public to make them want to do that, and would you as legal professionals be willing to help guide that process proactively?

CONCANNON: The answer to the second question is yes, on my behalf.

HRUSKA: Never really thought about that.

CONCANNON: The answer to the first question is I personally read *Alert Diver* cover to cover every time I get it in the mail. Some of the diving press is a good place to start. Those of you who are instructors cannot hurt. There is a lot of different ways to skin a cat, different ways to disseminate information, but that could be one of them. Anybody else want to comment on that?

JENNI: Gene, I think it would be an outstanding idea to have a system set up where divers could acknowledge that they want so and so made aware of their death in the event of a death and that they want a pre-prescribed investigation. I am not altogether sure that is viable in today's legal world. Although I think it is very admirable of you to publicly announce that your diving death would likely be as a result of your own — and that you would want this follow-up investigation. Presumably the purpose of that follow-up investigation would be so that the rest of us could educate ourselves to avoid making the same mistakes that you made and, therefore, save other lives. That would be an ideal, utopian setup, but I just do not think that the legal climate is going to allow something like that.

DR. RICHARD VANN: Steve, you had mentioned how important getting a good investigation immediately was. Is there a role perhaps for the diving professionals? If they were trained to do some basic investigation, would that be at all useful?

HRUSKA: You are talking about the divemasters and so forth? I think they have a hard enough time being divemasters let alone investigators. I think other than taking basic steps to preserve equipment and getting the names of the witnesses to an event and filling out their incident reports per the requirements of their insurance companies, I think they have enough on their plate. Beyond that, I would not want to task these folks with any more than they have to do.