



SNORKEL SAFETY STUDY: SUMMARY OF SURVEY

2025



150 Surveys Reported

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Introduction to the Snorkel Safety Survey

“ I was snorkeling with Joe after a guided kayak trip. Fifteen minutes into the snorkeling, I noticed Joe was head up, treading water. I swam over and asked him if he was okay.

He said "I'm having trouble breathing through this mask. I'd like to go closer to shore so I can stand up and breathe easier" I said "Okay, just slow your breathing and let's head back to shore slowly".

He put the mask back on and we started swimming. Maybe a minute later I looked over, and Joe was swimming away from me, parallel to shore. I yelled for him, no response. I swam over to him, maybe 10 feet and he was unresponsive. I turned him over onto his back and waived to the shore for help. Several men came running out and helped me get Joe to shore.

One man noticed the mask was flooded. They pulled it off and started CPR. 911 was called - they didn't arrive for 45 minutes. Paramedics worked on him for another half hour, then we were transported to the hospital where he was pronounced dead on arrival.”

— **Narrative taken from the Snorkel Safety Survey, used with permission.**



Indicates total number of responses to that question

Many snorkel drownings are mysterious. A snorkeler is often discovered motionless and unresponsive without any previous sign of distress. What is happening? While there are a lot of assumptions, no one really knows. The Snorkel Safety Study team felt that the best source of information is the individual who gets into trouble. **The Snorkel Safety Survey (Survey)** was designed to collect this information.

A Study hypothesis was that the snorkel itself triggered pulmonary edema, something not previously considered. The hope was that the timing and sequence of events during a drowning incident would provide clues as to whether the person had experienced a process of drowning by aspiration (inhalation of water) or by pulmonary edema.

Survey questions target the anticipated risk factors such as: lack of swimming or snorkeling experience; ocean conditions (such as currents, waves or rocks); preexisting health conditions; trauma (such as heart attacks, stings or bites, injury); trouble with equipment (such as leaky masks or snorkel malfunction); inattention to location (such as drifting beyond a safe distance), and report of aspiration, . Other questions explored the role and importance of lifeguards, “buddies,” bystanders, friends, and family.

Hawaii Department of Health statistics show that far more visitors die while snorkeling than residents, and that snorkeling is the number-one cause of visitor deaths in Hawaii. While often attributed to a lack of swimming/snorkeling experience, a Study hypothesis was that this difference might also be related to the impact of being at altitude during recent prolonged air travel.

The Snorkel Safety Survey was first disseminated in December, 2018, and continued to collect data until the end of 2021. Further details can be found at www.snorkelsafetystudy.com

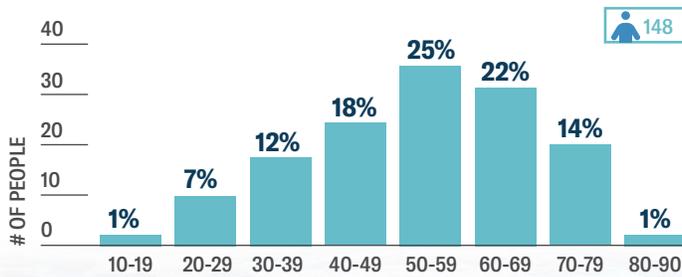
The following are the responses to questions on the Survey. Not all questions are reported here, as they may be irrelevant, do not inform, or contain personal data. One hundred and fifty (150) surveys are summarized here. Data is affected by the COVID-19 quarantine during 2020 and 2021, when tourism was halted.



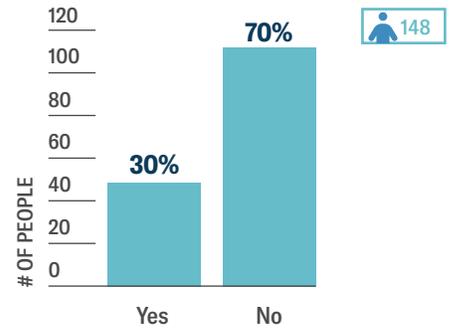
Demographics

Most snorkelers who encounter problems are over 50 years old (62%) and non-residents (70%). Fatal drownings are more common among males, which corresponds with higher rates of diastolic dysfunction in males.

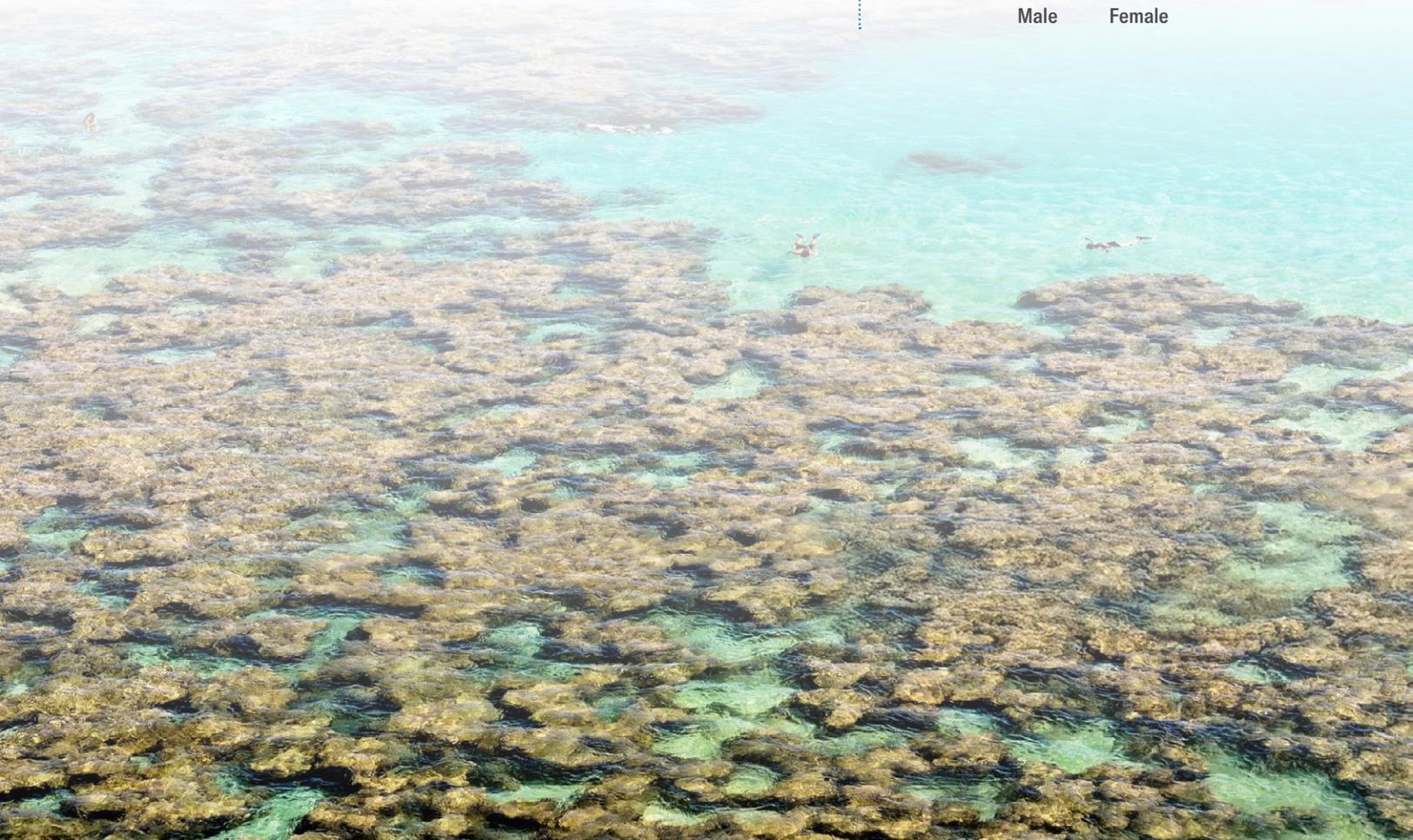
AGE AT TIME OF INCIDENT



RESIDENT OF HAWAI'I?



WHAT IS YOUR GENDER?



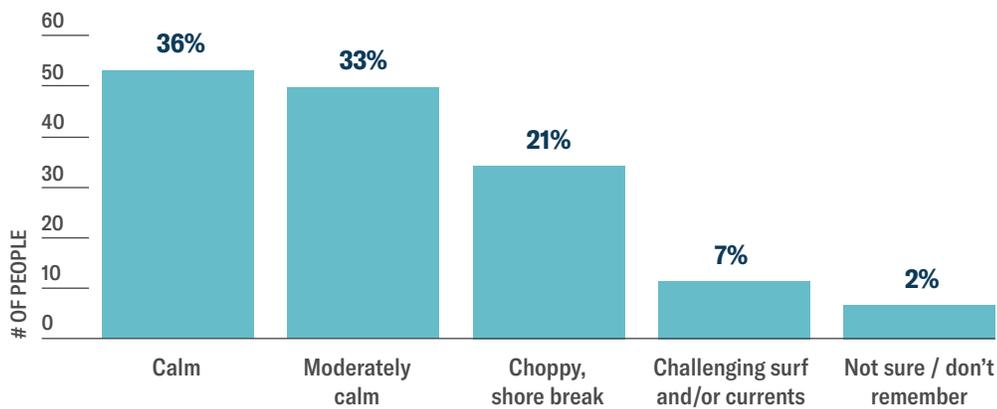


Ocean Conditions

Snorkelers usually enter the water when it is calm and clear.

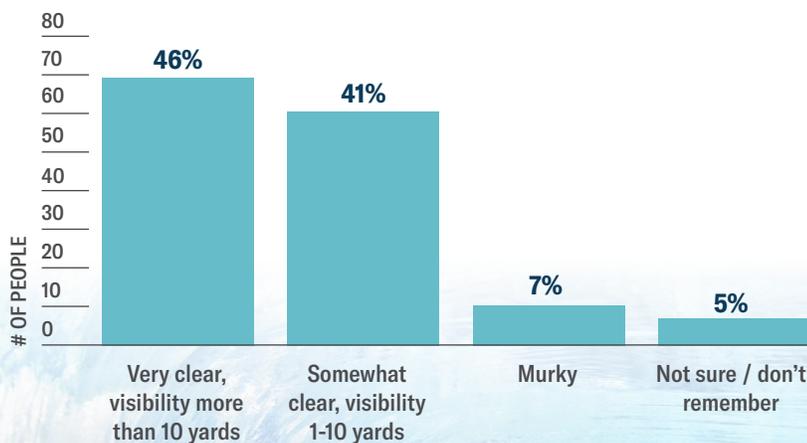
WHAT WERE THE OCEAN CONDITIONS?

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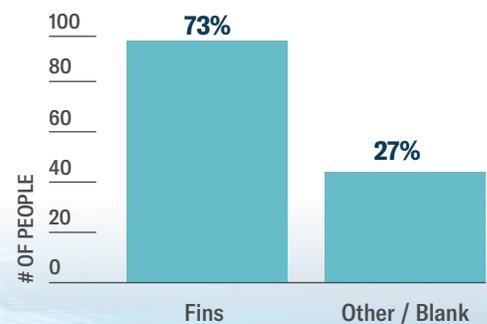
WHAT WAS THE VISIBILITY?

151



WHAT WERE YOU WEARING AT THE TIME OF THE INCIDENT?

145

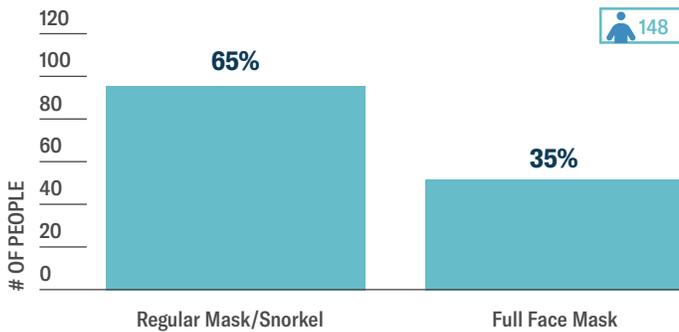




RISK FACTOR - The Snorkel

Most snorkelers used traditional snorkels and masks. Those who used full-face masks reported issues with their equipment. Most people wore fins, while those without them mentioned they wish they would have worn fins.

WHAT SNORKEL GEAR WAS USED?



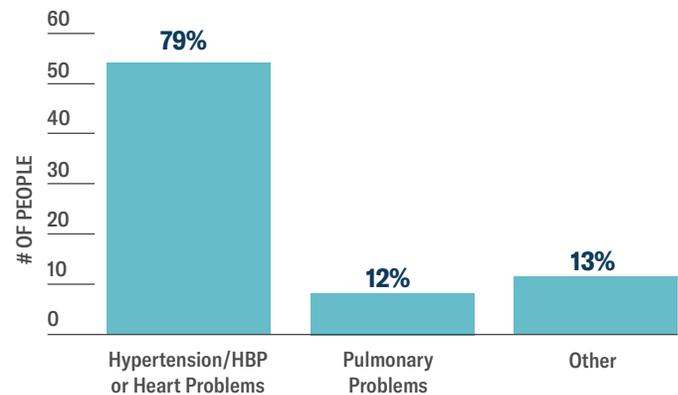


RISK FACTOR - Heart Health

Respondents were naturally hesitant to disclose their medical history, resulting in a low response rate. Nonetheless, the data indicated a notable incidence of heart issues, aligning with the Snorkel Safety Study's identification of heart disease, particularly diastolic dysfunction, as a significant risk factor.

DO YOU HAVE A HISTORY OF ANY CONDITIONS? ALL THAT APPLY

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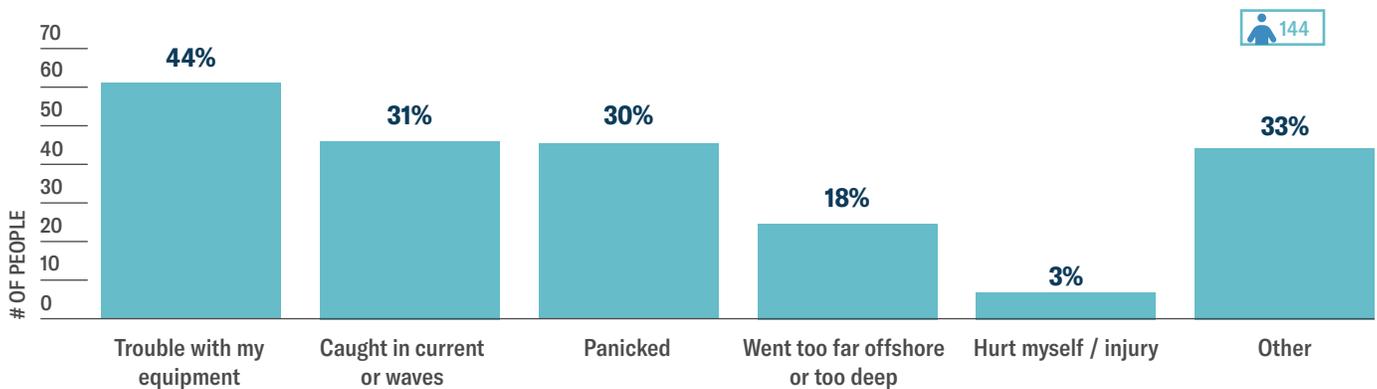




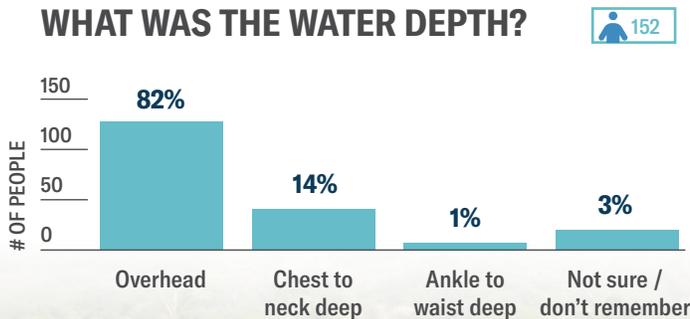
RISK FACTOR - Exertion

The likelihood of SIROPE increases when snorkelers increase their exertion while continuing to breathe through the snorkel, such as when caught in a current, deep water, or being too far from shore. Exercising while snorkeling also presents risks.

WHAT, IF ANYTHING, DO YOU THINK TRIGGERED THE INCIDENT? ALL THAT APPLY



WHAT WAS THE WATER DEPTH?

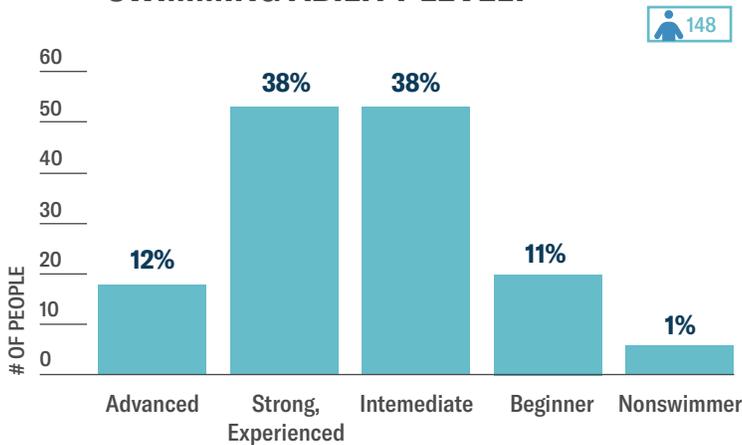




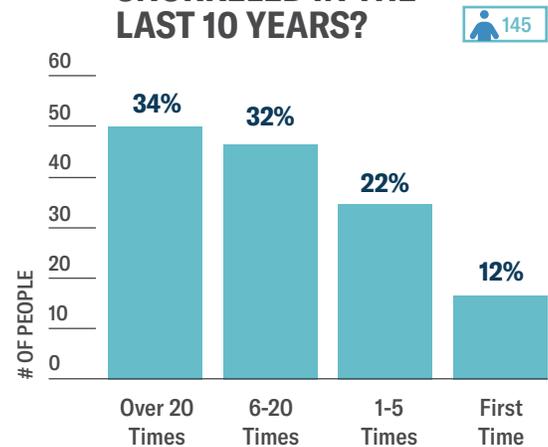
RISK FACTOR - Experience

Most participants considered themselves experienced swimmers or snorkelers. This indicates that inexperience may not be as significant a factor in getting into trouble as initially believed.

WHAT'S YOUR ESTIMATED SWIMMING ABILITY LEVEL?



HOW OFTEN HAVE YOU SNORKELED IN THE LAST 10 YEARS?



RISK FACTOR - Recent Prolonged Air Travel

The preponderance of visitors over residents who experienced fatal snorkel-related fatal drownings can not be explained through demographics (age, heart health, experience, gender, etc) alone. The single factor that distinguishes visitors over residents is (typically) recent prolonged air travel. Extended periods at high altitude has a negative affect on pulmonary function which can in turn affect heart health, even if temporarily, putting those arriving on long distance flights at some additional potential risk.



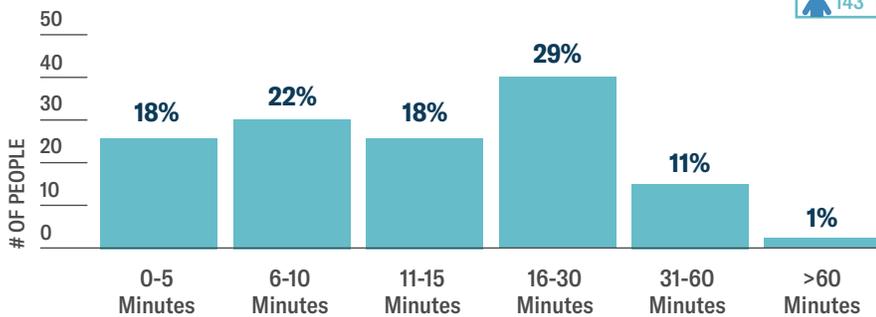


Aspiration or SIROPE?

The Snorkel Safety Study sought to determine if the process of getting into trouble was associated with SIROPE or Aspiration by asking those who had snorkel-related non-fatal drowning incidences to report their experience. The majority of cases suggested SIROPE.

WHAT WAS THE APPROPRIATE TIME BETWEEN GETTING IN THE WATER AND FIRST SIGNS OF DISTRESS?

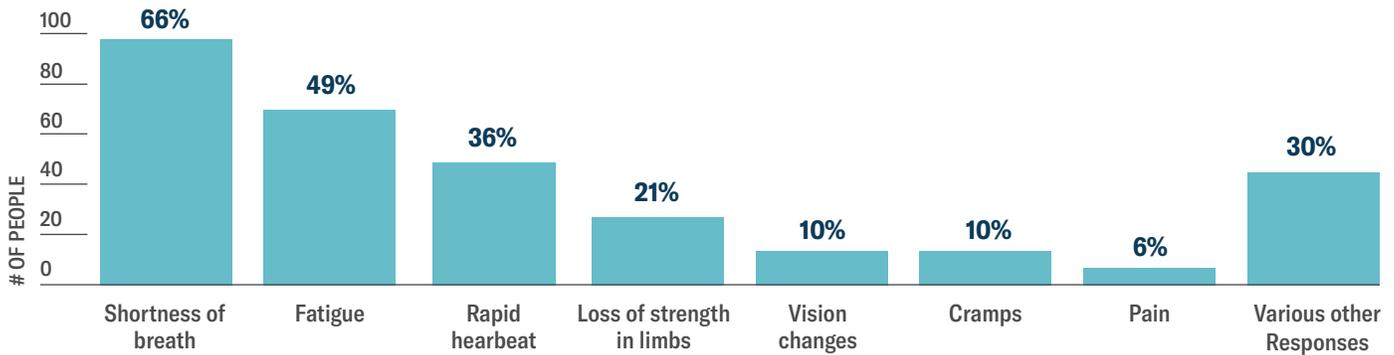
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Fifty-eight percent of snorkelers felt distressed within 15 minutes of entering the water. This is too short a time for most people to feel fatigue. It suggests that the body is experiencing some level of hypoxia.

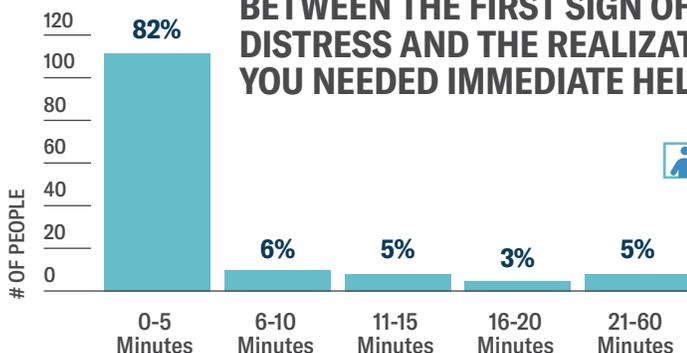
WHAT WERE YOUR FIRST SIGNS OF DISTRESS? ALL THAT APPLY

152



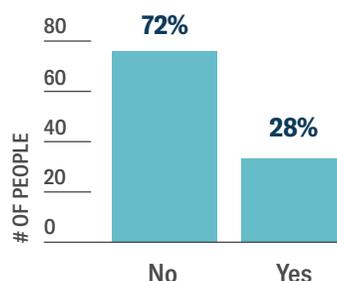
WHAT WAS THE INTERVAL BETWEEN THE FIRST SIGN OF DISTRESS AND THE REALIZATION YOU NEEDED IMMEDIATE HELP?

132



DID YOU ASPIRATE (INHALE) WATER AT ANY TIME?

106



Witnesses report a lack of aspiration in the majority of cases.



Responders

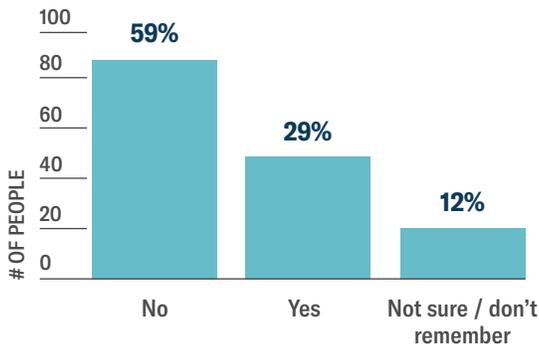
This data underscores the importance of lifeguards. In 2024, 1.5 million visitors went to Hanauma Bay, largely for snorkeling. Lifeguards there made 272 rescues that year, averaging 22 per month, significantly reducing potential fatalities.

Most survey respondents were at beaches without lifeguards, and many needed help reaching shore. Without lifeguards, rescue efforts fell to family, friends, and bystanders.



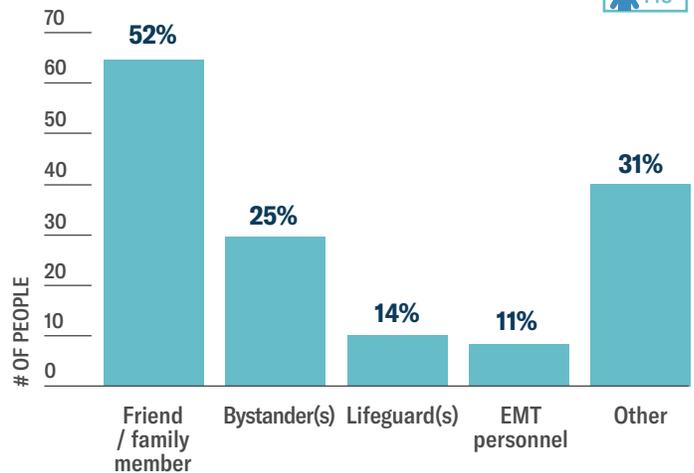
WAS A LIFEGUARD ON DUTY AT THE TIME OF THE INCIDENT?

150



WHO RESPONDED DURING YOUR INCIDENT?

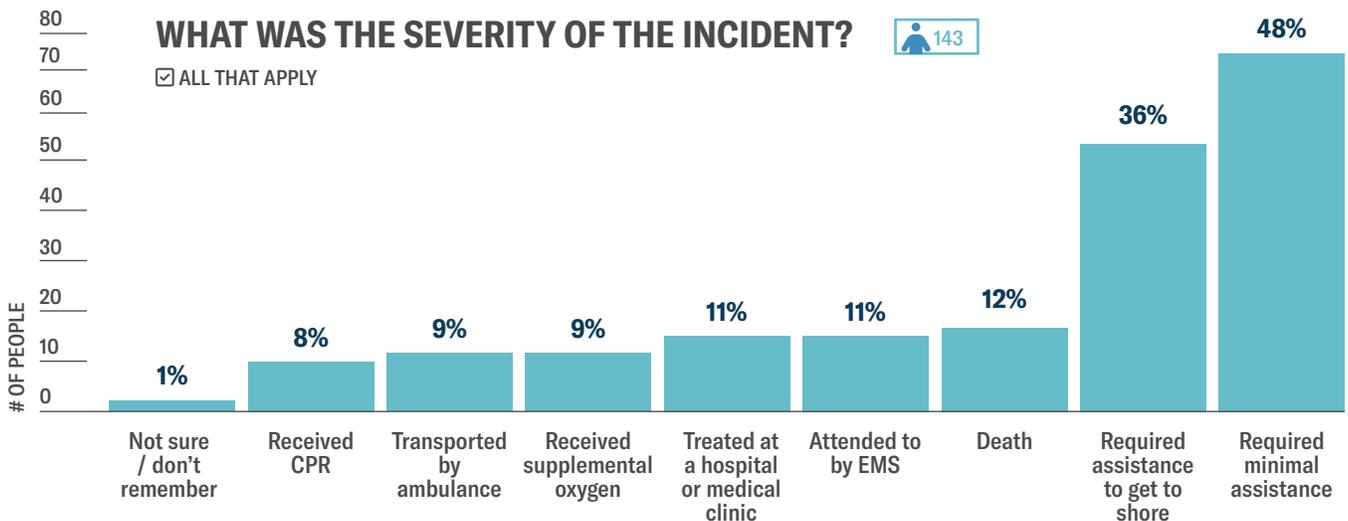
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WHAT WAS THE SEVERITY OF THE INCIDENT?

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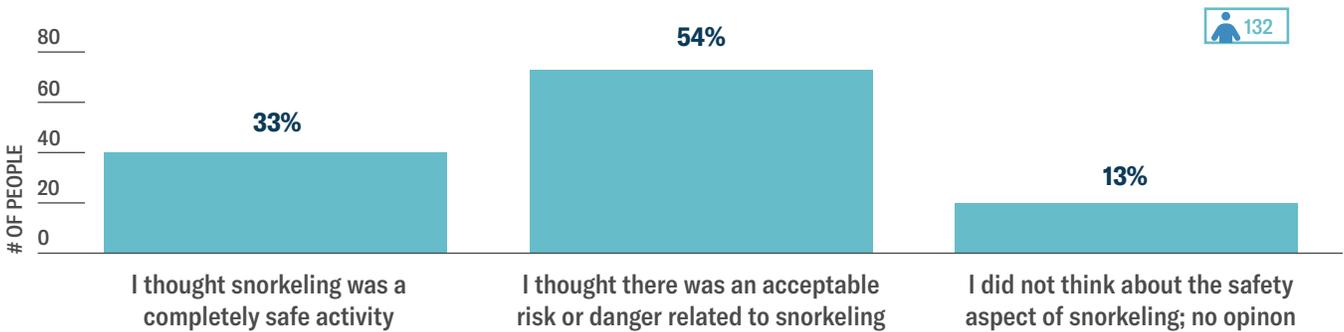
ALL THAT APPLY



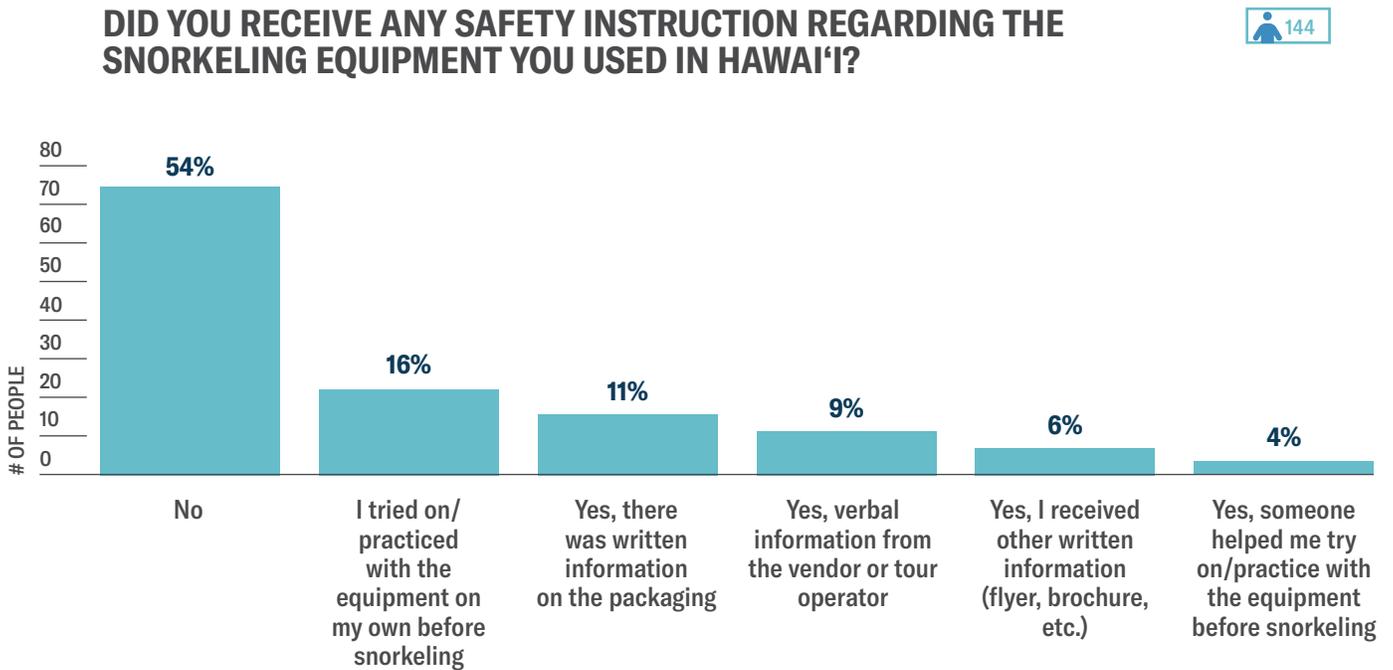


Education

PRIOR TO THE INCIDENT, DID YOU GENERALLY THINK SNORKELING WAS SAFE?



DID YOU RECEIVE ANY SAFETY INSTRUCTION REGARDING THE SNORKELING EQUIPMENT YOU USED IN HAWAI'I?





STAY AWARE, SNORKEL SMART

Informed Snorkelers Are Safer Snorkelers.



snorkelsafetystudy.com