

While drowning numbers soar, beach safety programs are largely unevaluated

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A global review of coastal drowning science has found there is only one study worldwide that has evaluated beach safety education programs in schools.

Researchers from UNSW's Beach Safety Research Group have conducted the first in-depth review specific to coastal drowning.

The study, published in *PLOS ONE*, reviewed 146 coastal drowning studies from around the world.

"We found that evaluation of coastal drowning prevention strategies is rare," said William Koon, the lead author of the study and a Ph.D. candidate in the School of Biological, Earth and Environmental Sciences said.

"This means we simply don't have enough data showing what works and what doesn't work.

"There was only one study worldwide—involving a private primary school in Queensland—to see if beach [safety](#) education program is effective in schools."

Since the review, an additional school-based evaluation of water safety virtual reality programs in Victoria has been published.

Mr Koon said the review's findings are concerning as tens of thousands of Australian primary and secondary school students participate in beach or water safety programs from lifeguards and lifesavers every year.

"There is remarkably little information out there to say [firstly], does it work and [secondly], here's how it works best," Mr Koon said.

"We need to assess if programs function as intended, and continually refine them to improve effectiveness."

Researchers and UNSW Beach Safety Research Group founding members Dr. Amy Peden, Dr. Jaz Lawes and Professor Rob Brander

were also involved in the study.

"I find it interesting that over the last 16 years we haven't really seen any improvement in the number of coastal drownings each year in Australia, despite lots of ongoing school and public education programs," Professor Brander said.

The study found that more than three-quarters (76.7%) of coastal drowning research was from high-income countries. Australia is leading the way with 49 studies, followed by the US (28 studies).

It also found that existing drowning prevention strategies are largely un-evaluated, with little research being done in low-income countries where a majority of drowning events occur.

Mr Koon said while there were 125 coastal drowning deaths in Australia last year, the World Health Organisation estimates that more than 90 percent of all drowning occurs in low-and middle-income countries.

He said to address this global health problem, researchers need to start looking to local data from lower-resourced settings to understand the coastal safety issues there and prioritise drowning prevention programs for different groups of people.

"Researchers like myself need to ask 'is what I learned from Australian coastal safety research applicable to a place like Ghana or Costa Rica or India, where similar hazards exist, but the cultural context is very different'," he said.

The researchers conducted the review to better understand the science driving safety initiatives and highlight gaps in the field of coastal drowning, in order to prioritise future studies and prevention initiatives that will ultimately save lives.

They focused on fatal unintentional coastal drowning that was unrelated to boating, disaster (ie cyclones) or occupational accidents (ie commercial fishermen or scuba divers).

They found studies inconsistently reported intentional, occupational and boating coastal drowning deaths, and the terminology used to describe coastal waters was also non-uniform.

"Reviews such as this one are so important as they highlight gaps in the current evidence base, identifying opportunities for future research to really make a difference, rather than more of the same," study co-author Dr. Amy Peden, from the UNSW School of Population Health said.

Over 100 different risk factors related to coastal drowning were identified, but the data sources, outcomes used, and analyses employed were variable.

"What we learned is that the consistency in reporting and analysing of these different scenarios was just all over the place," Mr Koon said. "Not every place in the world is recording drowning in the same way.

Studies were also published in a variety of journals representing different disciplines.

Many studies recommended prevention measures, most frequently related to education, lifeguards and signage.

"Is that enough? Are these efforts working? How well? We don't have enough data to answer these questions," Mr Koon said.

There are limited resources for evaluations on water safety programs, he said.

"But someone with a long-term view should start to see that investment in monitoring and evaluation is a way to really make sure the work is doing what it's supposed to do," he said. He says it is important to continue to refine school water safety programs.

"There are probably different lessons to be learned, such as messaging at different ages, whether that's stopping to look for rips or putting on sunscreen, avoiding alcohol or avoiding jumping off rocks and cliffs.

He said there has been "remarkably little information" studying prevention measures.

"Research on danger signs on beaches has already told us that people don't really look at signs, and if they do, are not really influenced to change decisions or behaviour," he said.

"We're still in the stage where most programs are driven by expert opinion without much supporting data."

He said Australia continues to lead the world in drowning prevention and water safety research because organisations like Surf Life Saving Australia and Royal Life Saving Society—Australia maintain robust databases, with some of the most detailed drowning data in the world.

UNSW Beach Safety Research Group researchers are currently working with Lake Macquarie lifeguards to evaluate a beach safety [program](#) which they deliver to high school students.

"We hope to be able to offer some recommendations on how other people in the industry can move forward with evaluating some of their school and other beach safety education programs," he said.

"As our review has shown, the kind of information this evaluation will

yield addresses a massive gap in our understanding of what's effective and what's not in the drowning prevention education space," Dr. Peden said.

"Identifying what can improving safety and reduce young people's risk of drowning during adolescence can result in positive behaviours throughout adulthood."

More information: William Koon et al, Coastal drowning: A scoping review of burden, risk factors, and prevention strategies, *PLOS ONE* (2021). [DOI: 10.1371/journal.pone.0246034](https://doi.org/10.1371/journal.pone.0246034)

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