Cold Water Long Term Submersion & Survival
Research and Case Histories
Greetings,

For more years than I would have thought, I have attended the DEMA Show. I have experienced DEMA in 4 different cities and managed to make a great many friends and acquaintances in that time.

We started PSDiver Monthly (now PSDiver Magazine) with a concept I presented to some of my friends at a DEMA in Las Vegas many years ago. This event is where I connect and reconnect with a lot of people in the scuba world.

This year was no different and we have added a couple of new sponsors to the magazine and our workshops.

Shearwater and Dive Right In Scuba have joined our PSDiver Magazine “family”.

When you can, welcome them to our world. Since before we started the PSDiver SURVIVAL Workshop we were using and outfitting divers with the EEZYCUT Trilobite. This year they have joined us as a sponsor of our PSDiver Workshops.

There is a LOT that goes on at a DEMA Show. The vendor floor is packed with all things scuba and even though it has shrunk in size over the years, it is an indispensable venue for those in the scuba / underwater business.

The meeting rooms are separate from the show floor and classes or programs are held hourly each day of the show in numerous rooms. Some of these are private, some are paid attendance and the rest are open to the attendees. These classes and programs include everything from lectures on travel locations to training agency standards and revisions, to John Hott conducting an OTS FFM Technician school.

Each year I usually try to make one or two of the lectures related to PSDiving. This year I made it to the NAUI PSD presentation. I was only able to stay for a brief time but my understanding is their program is still being developed and the new book they presented at their booth is a draft that was printed as an example for the DEMA Show. I am looking forward to reviewing their program.
I also attended a SDI/TDI/ERDI meeting. They have a new freediver program (Performance Freediving International) that looks to be pretty exciting.

TDI hosts their TDI Tech Party during DEMA. This year was a blowout – standing room only! This year the original founders of the company were present and were presented with the TDI Technical Diving Pioneer Award. The founders spoke of their journey of development the following day.

Most of our Sponsors / Advertisers display at the DEMA Show. We take the opportunity to visit and catch up on their latest news and products. It is always interesting to me how we fit PSD into their businesses.

The founders on stage at the TDI Tech Party receiving their “Technical Diving Pioneer” award presented by TDI. This is the first time they have come together in 15 years! (Left to right) David Sipperly, Flemming Elleboe, Peter Meyer, Brian Carney, Bret Gilliam, Stephanie Miele, Mitch Skaggs, Joe Odom

Photo: Rick Carlson

(From Left to Right) Mitch Skaggs, Bret Gilliam, David Sipperly, and Brian Carney during their Dema Seminar "The story of How it all started". An important moment for TDI as this is the second time in 15 years that they have come together. The first being the night before at the TDI Tech Party.

Photo: Rick Carlson

Sometimes we learn of the next big thing that is coming out but are sworn to secrecy. It is frustrating at times because I get excited and want to talk about it.

A few years back I started a PSD Standards project that was to be a foundation for the Water Response Training Council to use. We ultimately published the proposed PSD Consensus Standards in PSDiver Magazine Issue 110.

The WRTC never went anywhere. The reasons are many and ultimately do not matter. They failed – again.

Since the DEMA Show is attended by most ALL of the original members of the WRTC, I presented the idea that PSDiver would restart the PSD Standards Project. The proposal was simple. “Will you work with ME to develop a consensus standard for Public Safety Diving?” I had the opportunity to talk with three of the WRTC original agencies and all three said YES.

It is my hope that we will be able to restart the PSD
Standards Project and use the original proposed standard as our foundation. This means we will eventually build another peer group to work on the project.

The original group was hosted on Yahoo Groups but Yahoo no longer supports their Groups program. I will most likely set up a private Facebook group specifically for this and will post information on our Facebook Group and Page when we are ready to start. If you want to be part of the group, let me know.

The PSDiver Workshop Initiative has been extraordinary. With no exception, we have been invited to return to every location where we conducted a workshop. With our sponsor support we have managed to produce a remarkable workshop concept that allows us to keep the student cost low.

Our PSDiver SURVIVAL Workshop is the most popular and we are presently working on adding a couple of instructors to help conduct the workshops. If you have not seen or heard anything about them yet, join us on both our Facebook Page and our discussion group.

This issue is BIG. There is a LOT of research here on long time immersion survivors. ALL of the hyperlinks are active so you can follow them as you choose. It amazes me how resilient the human body is. However improbable survival may be for a long term submersion, no victim should be considered dead until they are warmed properly.

It is possible the research shared in this issue will prompt you to reevaluate how you treat a victim of a long term submersion. It is also possible you will be able to use the research as fodder when you ask for new, different or additional PPE for your team. While we do recover bodies, the potential to save a life in cold water is possible - and documented proof is contained herein for you.

Dive Safe! We want to talk with you, not about you.

Mark Phillips
Editor / Publisher
PSDiver Magazine
Cold Water / Long Term Submersion Survival

In this issue, we have provided a massive amount of research into cold water, near death drownings and survivors. Our ability to rescue those in trouble is usually hampered by water, an IDLH environment. Humans cannot breathe water and our work as water rescue and recovery teams is highlighted by that fact.

For years we have heard about miraculous interventions where a person had drowned and had been underwater for an abnormal length of time and been revived; People who walked on thin ice, swimmers who dove into cold water and never returned to the surface, even instances where infants survived a drowning event. But we only use their examples to highlight a “Golden Hour” where we define the possibility of rescue. Maybe we need to rethink that “hour”.

The materials, articles and research presented in this issue of PSDiver Magazine should offer you an opportunity to study case histories of the individuals and the circumstances that led to their survival.

The links highlighted in blue are active links and will take you beyond this publication. You just have to be connected to the internet and be reading the issue. Most graphics are hyperlinked as well and will take you to an original source or a video related to the article.

While we cannot depend on cold water keeping a victim alive, the material contained here documents a need to consider extending our timeline beyond a “Golden Hour”.

Charles Joughin – April 15, 1912
‘There Was No Great Shock Or Anything’: How A Baker Survived The Titanic Disaster By Getting Really Drunk

https://nationalpost.com/news/there-was-no-great-shock-or-anything-how-a-baker-survived-the-titanic-disaster-by-getting-really-drunk
February 22, 2017 by Tristan Hopper

In a haze of unknown liquor, Charles Joughin became the textbook example of how to survive a shipwreck

They were supposed to be figuring out how the world’s largest ocean liner had sunk.

But instead, one of the members of the British Titanic inquiry was grilling a survivor on how tipsy he’d been at the time of the disaster.

“This is very important,” said the questioner, shushing the wigged Wreck Commissioner when asked the purpose of this booze-related interrogation. “I think his getting a drink had a lot to do with saving his life.”

Before the inquiry sat Charles Joughin, the chief baker of the RMS Titanic and one of the most remarkable survival stories of that fateful night.

The baker had nonchalantly stepped off the stern of the sinking liner. Then, as 1,500 screaming, panicked souls drowned and froze to death around him, Joughin calmly paddled around until dawn. After being fished out by a lifeboat, he was back at work within days.

It was an almost physiologically impossible feat of survival. And according to the British Titanic inquiry, it was because the 33-year-old Englishman had the presence of mind to greet history’s greatest maritime disaster by getting smashed.

If you would like to write articles, help with the fatality research, SOP Project or even become a part of our PSDiver Workshop Initiative, send an email to: Mark@PSDiver.com.
To be sure, a good rule of thumb is that a drunk man will usually freeze to death faster than a sober man.

The warming sensation of a glass of brandy (and the telltale red cheeks that sometimes results) is caused by vasodilation, the phenomenon of warm blood rushing to the surface of the skin.

In a survival situation, having all that warm blood away from the vital organs means that the drinker is at greater risk of hypothermia.

However, Canadian hypothermia expert Gordon Giesbrecht figures that in the -2 C temperature of the North Atlantic, the water was cold enough to quickly tighten Joughin’s blood vessels and cancel out any effect of the alcohol.

“At low to moderate doses of alcohol, cold will win out,” said Giesbrecht, a University of Manitoba professor who has performed hundreds of cold-water immersion studies.

What Joughin would have had, however, is the awesome, life-saving power of liquid courage.

Alcohol remains a leading cause of humans getting into fatal situations, including freezing to death. Nevertheless, the relaxing qualities of the drug have long been known to give humans an uncanny ability to survive trauma.

A recent study looked at 14 years of Illinois hospital data and found that stab and gunshot victims were more likely to survive with the more inebriated they were.

“In an ER, cold patients who are really drunk can walk in and they’re conscious at a temperature that they shouldn’t be,” said Giesbrecht.

And indeed, Joughin’s actions that night speak to a man unfazed by impending disaster.

Immediately after hearing the collision with an iceberg, the chief baker leapt out of his bunk and began dispatching his staff to stock the lifeboats with bread and biscuits.

This done, he popped back into his cabin for a drink before heading topside to help load lifeboats.

Not only did Joughin refuse his own place in a boat, but he and a few other men began forcibly chucking reluctant women into empty seats, likely saving their lives.

“We threw them in,” he testified later.

The top deck of the increasingly listing Titanic was mostly cleared of lifeboats by 1:30 a.m. To most, this was a panic-inducing sign that all hope of rescue was gone. But to Joughin, it was a cue to head back to his cabin for another drink.
“He sat down on his bunk and nursed it along — aware but not particularly caring that the water now rippled through the cabin doorway,” wrote historian Walter Lord in A Night to Remember. Lord was in touch with Joughin just before the baker’s 1956 death.

Joughin then splashed topside again, where he took it upon himself to begin throwing deck chairs overboard, with an eye to filling the water with impromptu floatation devices.

Parched, he then worked his way back to his pantry to get a drink of water.

The baker was standing on the stern when the ship broke in half. And yet, he remembered the violent, catastrophic breakup only as a “great list over to port.”

“There was no great shock, or anything,” he told the inquiry. Deftly moving through swarms of people, Joughin made it to the stern rail of the ship. At exactly 2:20 a.m., he rode the sinking Titanic into the sea like an elevator.

As with all surviving Titanic crew members, 2:20 a.m. on April 15, 1912 was also the exact moment at which the White Star Line stopped paying him.

The first stage of cold water immersion is known as “cold shock,” the horrifying sensation of having the skin cool. The feeling is what the Titanic’s second officer,
Charles Lightoller, described as being “like a thousand knives being driven into one’s body.” Common side-effects include gasping and hyperventilation.

Even today, the myth persists that the human body cannot withstand more than a few minutes in the ocean. Thus, many people thrown into the sea assume that cold shock is the icy grip of death closing around them.

In reality, the cold shock ends after 90 seconds. Even in the winter waters of the North Atlantic, an average-sized adult still has 10 minutes before going numb, and at least an hour before the heart stops.

“The average adult is a big chunk of meat and it takes a lot of energy to cool it off,” said Giesbrecht.

Regardless, cold shock was a stage that many Titanic victims did not survive. In the panicked flailing of those first minutes, many drowned or dramatically sped up their loss of body temperature.

But Joughin, who had made sure to cinch his lifebelt before going in, met the ice-choked North Atlantic with a stiff upper lip of almost mythic proportions.

“I was just paddling and treading water,” he testified.

Brock University’s Stephen Cheung is another leading Canadian expert in hypothermic responses.

While he is certainly not in the camp to advocate alcohol as an antidote to shipwrecks, he noted that the effect on Joughin would have been to “increase or bolster his courage.”

“It would also decrease his feeling of cold, so he may have
indeed been more fearless and not feeling as cold and therefore as panicked,” he wrote in an email to the National Post. The baker, in fact, had unwittingly become a textbook example of how to survive a shipwreck.

First, he delayed immersion; among those who went into the water that night, Joughin was the absolute last to get wet.

Second — and most important — he managed to stay calm and strategize a way out of the water.

This is a tragedy seen all too frequently by first responders: the disaster victims who panic and die while their salvation is right in front of them. The lost hiker who walks right past a trail; the fire victim who pushes rather than pulls on a fire exit; the aircraft pilot who misses the single button that would prevent a fatal crash.

Joughin spent nearly two hours floating in darkness. Then, he used the first rays of dawn to spot an overturned lifeboat set adrift in the Titanic’s chaotic final minutes.

He paddled over, pulled himself out of the water and was eventually hauled to safety by a passing lifeboat.

When he was brought aboard the rescue ship RMS Carpathia, Joughin was essentially fine. “I was all right barring my feet, they were swelled,” he testified.

Given the circumstances, Giesbrecht said that the only step Joughin missed was to put on more clothing. Extra layers — even wet layers — slow down the loss of body heat.

Joughin returned to ship baking and worked long enough that he made bread aboard Second World War troopships.

Although he gave few interviews, the comic relief of the “drunk baker” has featured in multiple fictionalized accounts of the disaster, including the 1997 blockbuster Titanic. And naturally, Joughin’s saga was chronicled in a 2016 episode of the series Drunk History.

But while scholars have obsessed about the boozy reputation of Charles Joughin, beneath it all might simply have been a man unwilling to die.

“It’s impossible for scientists to predict who will perform and respond well to extreme situations,” noted Cheung.

“Some people give up very quickly, others you just cannot seem to kill.”

18 year Old Student August 7, 1977
Doctor Challenges Theory On Drowning
https://www.nytimes.com › 1977/08/07 › archives › doctor-challenges-theor...
Aug 7, 1977

An 18-year-old student from Jackson, Mich., was trapped in his submerged car in a frozen pond for 38 minutes. Although rescuers pronounced him dead at the scene, he was revived and two weeks later was able to return to college, where he now is an “A” student. A physician also “drowned” in a lake near Ann Arbor.

Jimmy Tontlewicz - January 15, 1984
Icy Water of Lake Credited With Recovery: Boy Near Normal Now After ‘Drowning’
JAN. 20, 1985 By SHARON COHEN - ASSOCIATED PRESS
The first signs were dismal. No heartbeat. No pulse. After 20 minutes under water in an icy lake, the boy was technically dead.
But now, one year after nearly drowning in a sledding accident, Jimmy Tontlewicz has made giant strides on the road to recovery.

He attends kindergarten. He has taken swimming lessons. And he is undergoing therapy for a speech problem that resulted from his near tragedy.

Today, Jimmy Tontlewicz, whose struggle for survival captivated the nation, is an active—in fact, a little too active—5 1/2-year-old.

Watching over Jimmy is “like taking care of five kids,” said his 30-year-old mother, Kathy.

In many ways, Jimmy’s progress since Jan. 15, 1984—the day he was pulled unconscious from the 32-degree waters of Lake Michigan—is nothing short of miraculous.

“It’s like God had him in his hands,” said his father, Terrence, who was with Jimmy on the sledding outing and made a futile attempt to rescue him. “People wanted a miracle and it happened.”

Indeed, Jimmy’s plight touched people all over America. Many sent flowers, gifts, even bubble gum. Some lit candles. Others donated money.

Of $200,000 raised in funds set up by the Chicago SunTimes and Chicago Tribune, about $175,000 was spent on medical bills, said Kenneth Ditkowsky, an attorney for Jimmy’s mother.

“People have really laid out their heart to this kid,” Ditkowsky said.

But in other ways, the last year has been troubled for Jimmy and his parents, who were separated at the time of the accident and are now getting divorced. Jimmy’s mother is on welfare, and she says it has been “real rough” making ends meet and coping with hours of uncertainty, weeks of hospital vigils and months of therapy.

“He had to learn how to do everything over again,” she said. “He had to learn how to eat . . . to talk . . . and walk. He was like a baby.”

Jimmy has made a complete physical recovery, doctors say, but he is hyperactive and has learning disabilities, although it’s not clear whether those problems are related to the accident.

The doctors “are certainly satisfied with his recovery and they’re hopeful with the appropriate environment to learn in, he’ll overcome his learning disabilities,” said Jane Crowley, a spokeswoman at Children’s Memorial Hospital, where the boy has been treated.

And the hard work needed to reach that goal has begun. His mother says Jimmy will be entering classes for those with learning disabilities.

Jimmy’s mother said that at times, Jimmy has a very short attention span and cannot sit still long enough to finish dinner, which she must help him with.
But at other times, she said, Jimmy “runs through the house like a normal kid. He gets into trouble like a normal kid. And he plays like a normal kid.”

Jimmy’s brush with death, his mother added, has not made him fearful of water and he took swimming lessons last year. Jimmy’s nightmare began on a Sunday afternoon when he fell into the ice-covered lake while trying to retrieve a sled that had slipped down an embankment.

His father jumped in to rescue him but blacked out. The last words he heard were, “Save me, Dad.” Tontlewicz was pulled from the water by firefighters and citizens, including a television crew working nearby.

When Jimmy was plucked from the lake after being submerged 20 minutes, he had no heartbeat or pulse. Technically, he was dead.

But Jimmy had a lot working in his favor—particularly, the cold water, which may have given him a second chance at life.

Scientists say a biological phenomenon called the mammalian diving reflex, triggered by the shock of cold water, enables humans—like whales and seals—to live without breathing for longer than normal.

When he was first hospitalized, doctors placed Jimmy in a drug-induced coma to control his brain activity.

Slowly, he came around. Within days he moved his arms and legs. Then he awoke. He began talking. And after three months of hospitalization and therapy, he went home.

“He’s a tough guy,” his 36-year-old father said. “I taught him to be tough. That had a lot to do with saving his life.”

1980s Newsmakers: Where Are They Now?
November 23, 2011 Cynthia Dizikes, Chicago Tribune

John Mansfield still remembers the frantic call from his sister nearly 30 years ago.

Mansfield's nephew had been sledding with his father near Lake Michigan on Jan. 15, 1984, when they both fell into the lake. Jimmy Tontlewicz, then 4½, was under the frigid water for 20 minutes. After rescuers pulled him out, he was declared dead.

"She said Jimmy had an accident, and he's in the hospital," recalled Mansfield during a recent interview. "My stomach turned. I couldn't believe it."

But doctors revived Tontlewicz, and he survived. His parents' marriage did not.

Mansfield gave only sparse details about his nephew because, he said, his sister and her ex-husband have ongoing legal issues involving their son.

Tontlewicz and his mother, Kathy, declined to be interviewed.

But Mansfield said that Tontlewicz, who prefers to be called James, is doing well despite some lasting developmental problems. He grew up to be about 6 feet tall, is still blond and, surprisingly, likes water.

Tontlewicz, 31, also likes cars and has a subscription to several car magazines. He lives with his mother and works as a janitor.
"Jimmy never talks about the accident," said Mansfield, who sees his nephew about once a week. "It's something in the past that nobody here remembers."

Although Tontlewicz can be distant at times and still has a soft spot on his head where doctors inserted a bolt to monitor his brain pressure, Mansfield said that most of the time it would be hard to tell that anything traumatic ever happened.

"He is going on living his life," Mansfield said.

Related:
Four-year-old Jimmy Tontlewicz, submerged under icy Lake Michigan waters...

Doctors Say 'Technically Dead' Boy Now 'Completely Recovered'
Frigid water may have saved boy, experts say

Michelle Funk - June 10, 1986
The Doctor's World; Ingenuity and a 'Miraculous' Revival

The 66 minutes Michelle spent in the creek was "the longest documented submersion with an intact neurological outcome," said an editorial accompanying the report in the July 15 issue of the journal. It was also the first successful use of a heart-lung bypass machine to rewarm a child whose temperature had plunged in accidental hypothermia.

The technique, extracorporeal rewarming, involves warming the blood as it is pumped through the heart-lung machine used in open-heart surgery. Typically, surgeons use it to restore normal body temperature after intentionally cooling patients down for operations. Such chilling can reduce brain damage by slowing the metabolism so that stores of glucose and oxygen will last longer.

Dr. Bolte got the notion to try the technique several months before the accident, when he became fascinated by accounts of extracorporeal warming in adult victims of hypothermia. He made plans with heart surgeons to use the bypass machine if he had to treat a child with severe hypothermia.

Use of the machine in this case illustrates the ingenuity that often drives medical progress. It also points up the risks that must be weighed before using new techniques. Michelle's family and doctors agonized over the possibility that if they succeeded in reviving her, her brain might have been severely damaged.

Perhaps the greatest fascination for experts, as Dr. James P. Orlowski of the Cleveland Clinic said in the editorial in the journal, is that the survival of victims of ice water submersion "defy our accepted limits for recovery from" lack of oxygen. But no one knows for how long a human can be hypothermic and, after rewarming, survive with a normal brain.
Michelle fell into a creek swollen by runoff from the winter snowpack near her home in Salt Lake City on June 10, 1986. Her brother saw the accident and called their mother, who searched for Michelle for from 4 to 10 minutes before calling the emergency phone number, 911.

Within eight minutes, rescue workers began a search. When they found no trace of the girl, they reduced the outflow from a reservoir that feeds the creek. As the water level dropped, rescuers saw the child's arm sticking out of the water. She was wedged against a rock, and there was no evidence of an air pocket.

When rescuers finally pulled her from the water, 62 minutes after her mother's call, she was very cold and blue. She had no pulse and was not breathing. Her pupils were fixed and widely dilated, as they would be with severe brain damage or death. A monitor detected no heartbeat.

Nevertheless, rescue workers began cardiopulmonary resuscitation, forcing air into her lungs and blood throughout her body. They continued it in a helicopter ambulance that flew her to the hospital.

In the emergency room, Dr. Bolte and technicians set up the bypass machine. When the child arrived, Dr. Bolte led a team in injecting warmed fluids into Michelle's veins and stomach. They squeezed warmed air through a tube into her lungs. About three hours after the child had fallen into the creek, she still appeared lifeless.

"Many would have declared her dead at that point," said Dr. Howard W. Corneli, another pediatrician on the team. "Other staff members thought Dr. Bolte was crazy."

Dr. Bolte recalled in an interview: "We had to decide how hard to push to save her life. You do not want to be in the position where you are creating a child that is going to end up in a vegetative state."

One crucial factor was her temperature, measured in the hospital as low as 66 degrees Fahrenheit.

"Most important, the child was so profoundly cold," Dr. Bolte said. "Also, we had a rough idea she had been under for about 45 minutes," the longest period from which anyone had ever recovered with their brain intact. If it had been much longer, he said he would have stopped.

Two other factors encouraged Dr. Bolte to forge ahead. One was a finding that the amounts of oxygen and other gases in Michelle's blood, although abnormal, were "incredibly good under the circumstances."

The other was the absence of any apparent head injuries or broken bones. Injections of heparin, an anticoagulant, would be needed to prevent clots as Michelle's blood flowed through the heart-lung machine. If she had been injured, bleeding would have been an intolerable risk.

When Michelle's parents arrived, Dr. Bolte said, "we told them the possible scenarios and that if we rewarmed the child there was a strong likelihood that she would have
significant brain damage." Everyone decided "to go for it because rewarming was her only chance," Dr. Bolte said.

In the operating room, the doctors delicately inserted tubes into the narrow blood vessels of the child's groin and connected the tubes to the machine. It began pumping, and slowly her temperature began to rise.

When it reached 77 degrees Fahrenheit, she gasped.

Moments later she opened her eyes. A few minutes later her pupils, responding to the bright lights in the operating room, narrowed, a sign of returning brain function. Then the doctors detected a faint heartbeat.

"We realized she had a shot," Dr. Bolte said. "We were excited, but people were not giving high-fives to each other because we remained guarded."

After 53 minutes of rewarming, Michelle was removed from the machine and sent to an intensive care unit. The doctors knew Michelle could die from pneumonia or some other complication and, indeed, she had a stormy course for a few weeks. Doctors still could not be sure that she escaped serious brain damage. For a while, she could not see. Yet her parents and doctors remained hopeful.

As the days went on, Michelle's brain activity showed steady improvement. After two weeks, she smiled when she heard her parents enter the hospital room. After three weeks she whispered a few words, and by four weeks she used four-word phrases and sat up for 10 seconds.

By the time she left the hospital, more than two months after the accident, she talked at the level of a 3-year-old and her motor skills were normal, except for a slight tremor in her hands. It has since disappeared.

After it was clear that Michelle was recovering, Dr. Bolte and other team members visited the accident scene. Documenting the time that elapsed with each step of the rescue, the doctors learned that Michelle had extended by 21 minutes the previous record for survival after cold-water submersion.

At warmer temperatures, normal recovery can occur if oxygen is deprived for less than five to seven minutes. But when a person is deprived of oxygen for 12 to 14 minutes, it almost always results in brain damage or death.

Michelle, the doctors reasoned, must have quickly become profoundly hypothermic, thus staving off significant brain damage.

But her case is no guarantee that others, too, would have a miraculous recovery, since the factors that determine a favorable outcome in hypothermia are still not known.

Moreover, many toddlers and young children drown in swimming pools in their backyards. Erecting fences around the swimming pools and other preventive steps would save many more lives than resuscitations with heart-lung machines.

Related:

Child Who Almost Drowned Is `Lifesaver'
Spirit To Survive
FARGO, N.D. -- A boy who was submerged 45 minutes in the icy Red River now seems to recognize his parents and shows no signs of permanent brain damage in what his doctor called 'truly life back from the dead.'

Strangers from around the nation have offered gifts and prayers for the recovery of Alvaro Garza, 11, since he was rescued Friday from the frigid river by firefighters in a rowboat.

Garza, hooked to a respirator and in critical but stable condition at St. Luke's Hospitals, underwent surgery this morning to have his chest closed after doctors took him off a heart-lung machine. Dr. William Norberg, pediatric critical care specialist at St. Luke's, said the operation took about 30 minutes and was a success.

'It was close to routine,' Norberg said. 'We were able to close it without any effect to his cardiac output or his respiration.'

Garza's rib cage had remained open since he was attached to a heart-lung bypass machine Friday night. Use of the bypass was discontinued late Friday, but tissue swelling prevented the repair earlier.

'He needs time to lay around and catch up with his healing,' Norberg said. 'Tomorrow we should know a lot more.'

Garza had a body temperature of 80 degrees and no heartbeat for up to 10 minutes after arriving in the emergency room. But Norberg said Sunday he believes the boy will recover completely.

'I'm proud to hear better about my son. I thank everybody for helping him,' said Alvaro Garza Sr., 30, who is unemployed. 'He's feeling better every day. I hope every thing goes all right. Thanks to the doctors and God.'

'One can't help but be very encouraged,' said Norberg. 'Right now, he shows some signs of abnormalities from a brain-wave tests. But he is responding to voices, he focuses his eyes,' the physician said. 'He can't talk, but he moves all his extremities. We have very good hopes he will turn out totally normal. I see no permanent defects. 'He still has an awful long way to go. Only in the next several days or weeks will we be able to know for certain,' Norberg said.

Norberg said the boy's body functions gradually slowed until they stopped while he was submerged.

'By rewarming and controlling the circulation, we were able to revive him. It was truly life back from the dead,' he said. 'When he came out of the river, he met the criteria for death. There was no pulse. We thought maybe after 5 to 10 minutes, we heard a heartbeat, maybe.'

Alvaro fell through the river's ice while playing with friends. He apparently chased a squirrel onto the ice.

Fargo Fire Department paramedics searching in a rowboat rescued the boy. People on the riverbank pulled the boat ashore by rope. Just before the boat reached the shore, a
firefighter carrying Alvaro jumped out and ran to a waiting ambulance, which sped to the hospital 2 minutes away.

Hospital spokeswoman Kathy Borge said public support has poured in for the boy and his parents, who live in Moorhead, Minn., across the river from Fargo. Schools and churches have delivered packets of letters and get-well wishes.

'We've been getting calls from all over the United States,' she said. 'People want to send money, do whatever they can. We've also gotten calls from people that are holding prayer vigils.'

Doctors say it is uncertain how far body temperature can drop without causing death, but one out of three persons die if their temperature drops from 98.6 to 90 and three-quarters of those whose temperature drops to 82 die, according to Dr. Richard Kenney, professor of physiology at George Washington University in Washington, D.C. Chances of survival are better the younger the victim is, he added.

It also is possible for a drowning victim to stay submerged longer in cold water than in warm water before dying because when the face is exposed to cold water, blood is automatically shunted to the heart and brain and the body uses less oxygen.

20 Years Later ‘Miracle’ Still Remembers Near-Drowning

ARGO, N.D.—Alvaro Garza Jr., still remembers the day 20 years ago when he was saved from the Red River.

The 11-year-old boy became known as a Christmas miracle after he survived 45 minutes in the icy water.

“I still remember it every year,” said Garza, now 31 and the father of four children. He works as a driller on a Texas oil rig.

“I’m the one that makes the holes. I make $23 an hour, pretty good money,” he said.

One of his children, 10-year-old Alvaro Garza III, nearly
drowned about six years ago on a family trip to a state park in Texas, he said. The boy was pulled from a river, much as his father was two decades ago, he said.

Garza said he tells his children to respect the water and not take chances like the one he took after three companions dared him to venture out onto the ice to claim a dead squirrel for its tail.

Rescuers arrived a few minutes after Garza went in the Red River on Dec. 4, 1987, but it took longer for police and firefighters to find his body deep under the ice.

Steve Kennedy, a rookie officer with the Moorhead, Minn., Police Department at the time, recalled that he maneuvered the boat while firefighters combed the water with long poles. After Garza was found, “everybody grabbed him, and then it was just a mad rush for shore and the ambulance and away he went,” Kennedy said.

The boy, whose core body temperature had dropped to 77 degrees, was hooked to a heart-lung machine.

“They were able to take his blood and warm it up and put it right back in his body,” said Roberta Young, a registered nurse at MeritCare Hospital in Fargo.

The extreme cold of the water actually helped the boy’s chances by triggering an oxygen-conserving response that shut down all but the body’s most critical functions, she said.

“When you’re caring for children, their resiliency is sometimes really quite astounding,” Young said.

Eleven-year-old Alvaro Garza and his mother, Mary. (Forum News Service)

Murray Brown – January 18, 1990
BACK FROM THE DEAD
March 2, 1990 By Susan Christian Times Staff Writer

In the wee hours of Jan. 18, the fates conspired against Murray Brown.

Rain was pouring that frigid night in Las Vegas, where the Costa Mesa native had just relocated. Brown was driving home from a pool game after socializing over a few drinks. The slick roads were dangerous even for the most sober of drivers.

A stray shopping cart had wandered into Brown’s path. He swerved to miss it and skidded off the street. His Jeep, made for climbing rugged terrain, plowed right over an embankment that would have rebuffed lighter vehicles.
The flood-control channel below—normally dry as the Nevada desert—had been transformed into a gushing river.

Brown’s Jeep rolled twice, landing upside down. He was knocked unconscious, his body submerged in freezing water.

From that point on, the fates smiled on Murray Brown.

In a residential neighborhood at 12:30 on a rainy morning, not many people were out and about. But Sandra Torres and Edna DeJohnette happened to drive by Brown’s belly-up Jeep just seconds after it had tumbled into the channel.

“We were stopped at a traffic light,” Torres recalled. “I noticed a shopping cart on the other side of the street, which made me look to the right. That’s when I saw wheels sticking out of the ditch; they were still turning.”

The two young women called 911 from a nearby convenience store. Within minutes, seven firefighters, five police officers and three paramedics had arrived on the scene. Torres and DeJohnette pitched in.

Battling ice-cold water as torrential as a stormy sea, rescue workers freed Brown from his vehicle—then wrestled to bring him ashore. At one harrowing moment, Brown’s limp body slipped through the rope, and Las Vegas Fire Department Capt. Perry Hortt dove under to retrieve him.

“I wrapped my legs around him and hung on to the rope,” Hortt said. “The water was moving so fast that I thought we might be swept away.”

It wasn’t until Brown had been whisked away by the ambulance that his rescuers stopped to wonder whether the man for whom they had risked their lives could possibly survive.

“We started thinking, boy, he had to have been under water for at least 20 minutes,” Hortt said. “The time factor didn’t even enter into our thoughts before—we were so focused on just getting him out. But once the rescue was over, we felt pretty down. We didn’t think he was going to make it.”

When Brown arrived at the hospital, his body temperature had dropped below 88 degrees—which is, in most cases, the point of no return for a victim suffering both hypothermia and injuries. He had no signs of neurological activity; he was not breathing; his heartbeat was slow and irregular.

But Brown had landed at University Medical Center, home to a one-of-a-kind, blood-warming machine. And so his lucky streak persisted.

After attempting the usual methods of resuscitating a hypothermia victim who has injuries—irrigating his abdominal cavity with warm water, wrapping him in electric blankets—doctors resorted to the new device. Unwittingly, Brown became a pioneer in medicine; the machine had been
tested successfully on laboratory animals but never on a human.

Its creator, trauma specialist Larry Gentilello, said Brown was virtually dead when the doctor put his machine into action. “Statistically, he had no chance,” said Gentilello, who is a staff physician at University Medical Center. “His temperature declined three degrees while he was in the emergency room; the conventional treatments had no impact whatsoever.

“Within about 20 minutes of starting the new re-warming method, he began to breathe, his heart function normalized, he began to reach for his tubes and make purposeful movements. His temperature rose one degree every 10 minutes.”

Brown lay unconscious for the following week. Although tests indicated that he had not suffered a serious head injury, doctors were unable to assess brain damage.

Then he drifted awake--his mischievous personality intact. Today, Brown remembers nothing of his car accident, nothing of the rescue workers’ desperate struggle to deliver him from death, nothing of the ambulance or the electric blankets or the blood-warming machine or the six days in a coma.

“I was kind of out of it that night. In fact, I was kind of dead that night,” he said.

Did he have a near-death experience? Float outside his body? Go through a tunnel? See a bright light? Anything of that nature?

“No. Sorry,” Brown said in mock apology. “I talked to a lot of people in the hospital who did have near-death experiences, but I didn’t. Somehow I got robbed of that--I think because I was never meant to die.”

Last week, after spending a month in the Las Vegas hospital, Brown returned to the Costa Mesa house he grew up in. He plans to complete his recuperation under the loving care of his family.

And loving, it is. Brown’s parents stayed by the side of their youngest child and only son throughout his hospitalization, and his five sisters frequently visited from California.

“My first memory after waking up is of my parents being there,” Brown said. “My family was there constantly. I wouldn’t have made it without them.”

Except for some residual numbness in his fingers due to frostbite, Brown has fully--and miraculously, some say--recovered from his ordeal. Only three weeks before his release, doctors feared the possibility of brain damage.

Yet here was this friendly young man, less than 24 hours out of the hospital, popping one-liners and playfully sparring with family members as if nothing much had happened.
When it was pointed out that his adoring father seemed to be waiting on him hand and foot (“Do you want a soda, son? Would you like ice in that soda?”), Brown teasingly shushed the suggestion: “Don’t tell him—he might stop.”

“I’m so damned glad to have him back, I’ll do anything for him,” said his father, Richard Brown.

“Dad figures that when he’s old, he’ll want me around to bring him sodas,” the younger Brown quipped.

Brown is the kind of person you like right off the bat. He is naturally amiable, effortlessly confident, disarmingly candid. His self-styled goofiness makes him seem younger than his 27 years.

“It still doesn’t feel real to me. Did I actually go through that?” Brown marveled.

(Blood tests showed that Brown had been drinking before the accident: Police reported his blood-alcohol level above the legal limit, but the hospital reading was under the limit. No charges were filed.)

Brown’s sister, Janine, joined in. “We got the call at about 2:30 a.m., and we took a 6 a.m. flight out,” she said of that heartbreaking morning. “We anticipated the worst. We were afraid that even if he lived he would be a, um, a . . . .”

“Tomato,” Murray Brown completed her sentence.

“We talked with Mom and Dad about how far we wanted to go with this—with trying to keep Murray alive—if he had brain damage,” she continued.

And if he did? Would Brown want to live if his mental abilities had been impaired?

“I’ve got an attitude that if these hands don’t come back, I don’t want to be here,” he answered. “So, no, if I were handicapped worse than I already am, it would require quite a bit of adjustment for me to be on Earth.”

His hands? All that he could have lost—his life or his intellect or his mobility—and nerve damage to his hands is enough to make him question his will to survive?

“I know it seems minor, but this is all I have,” he said, holding up his hands. “At present, I would not be able to practice my profession. I haven’t gone to school so that I could use my brain predominately to make money. I’ve always taken great pride in what I’ve built—my hands are how I do that.”

In fact, he had moved to Las Vegas a few months ago earlier to look for a job installing ceramic tile.

“A friend of mine who lives in Las Vegas called and said the housing industry there was really expanding,” Brown explained. “He said he knew of some work for me, so I decided to go for it.”

Suddenly, Brown turned sanguine. “I’ll beat it—I know I will,” he said, squeezing the therapeutic rubber ball intended to help strengthen his fingers.

“I still have my charm.” He took his visitor’s hand and kissed it: “See? I haven’t lost my touch with women.”

“There are a lot of psychological difficulties in coping with a near-death experience,” Dr. Gentilello said.

“Obviously, Murray is extremely lucky to come out of this without brain damage. But for a person who almost died, it doesn’t make much sense to him when people say he’s lucky.
because he would rather have not had the experience at all,” the doctor said.

However, Brown eventually “will learn to adjust to whatever disability he is left with,” he said. “He is still going through a grieving process, but soon he will put things into perspective. It helps that he has such a supportive family--a truly wonderful family.”

Mention the name Murray Brown to anyone who had something to do with his rescue or recovery, and praise for his family follows.

It’s a family that telephoned Sandra Torres and Edna DeJohnette every day that Brown was in the hospital to update them on his progress. “One of his sisters kept asking us to come to the hospital and meet them,” Torres said.

“When I finally met Murray’s father, the first thing he said to me was, ‘What in the devil were you two girls doing out on a night like that?’--as if he were my father,” she laughed.

The Browns became famous around University Medical Center for their congeniality and their devotion to one another. For that matter, the Browns became famous throughout the city of Las Vegas.

A few factors combined to make Murray Brown both a local media event and a local hero: his daring rescue captured by a television cameraman; the never-before-used blood-warming machine that revived him; his amazing rally.

“Sure, we wouldn’t have covered the story as closely as we did if we hadn’t gotten this exclusive footage,” admitted Eric Hulnick, executive producer of News 3 at KVBC, the NBC-affiliate station in Las Vegas. “We did not pass up any legitimate chance to use that video--we’ve aired it dozens of times, and it’s still compelling.”

Cameraman Jeff Lonetree, a 22-year-old greenhorn who had started at KVBC just three days before, heard about an overturned Jeep on the police radio and went to check it out--mainly to get in some practice. After all, the accident was only four blocks from the station, so he figured that little effort would be wasted if the story proved too mundane for broadcast.

But rather than a routine smashup, the cub reporter found himself shooting rescue workers braving angry waters to save a half-drowned man. The film appeared that night on “NBC News” with Tom Brokaw, and later on “The Today Show” and “Good Morning America.”

That Brown became the first hypothermia victim to be resurrected by Gentilello’s new machine heightened media interest. The device recirculates the patient’s own blood on a continuous basis--draining it from an artery, heating it to 101 degrees, then pumping it back into the body through a vein.

“Over 90% of hypothermia that we see is due to shock from severe injury rather than exposure to a cold environment,” Gentilello said. “In a case where the hypothermia is due only to environmental causes, a cardiac-bypass machine is very
effective in warming the victim. But that method has one drawback--it requires the administration of an anticoagulant; otherwise, the blood would clot up the bypass machine.

“So a cardiac-bypass machine is not an option for someone who has suffered injuries--the anticoagulant would cause him to bleed to death. Murray had head cuts and abdominal injuries; there was no viable solution except for the blood-warming machine.”

Speed is another advantage of the new devise--officially named a Continuous Arterio-Venous Rewarming machine, or a CAVR for short. “The conventional techniques used on an accident victim take a very long time--at least 12 hours--in restoring the body to its normal temperature,” Gentilello explained. “With the CAVR, we were able to re-warm Murray in a little over an hour.”

And thus Murray Brown could go home again.

For most Americans, Las Vegas is that place with the gaudy strip of casinos where people go to play blackjack and witness sometimes second-rate entertainment. But the Browns came to know a completely different side of the city, a side far removed from the flashing neon signs. “Everybody was so nice to us, so caring,” Richard Brown said. “It was like spending a month in a small town, where people look out for one another.”

“To lose something, and then to get it back, makes it even more precious,” said the elder Brown, his arm draped around his son. “This experience has made me wish that I had spent more time with my kids when they were growing up. If I could do it over again, I would work less, indulge in fewer luxuries--so that I could stay at home more.”

Yes, Murray is the baby of the family, and the only boy, but his mother shrugged off any hint that he might be singled out as extra-special. “We would react the same way if this had happened to any of our children,” Yvette Brown said, dabbing her eyes. “We just love them all so much.”

They still are in awe of this particular child’s miraculous return. “It’s as if it were all orchestrated,” Richard Brown said. “Right down the line, like clockwork, click, click, click: the girls saw the car, the medics got there, the hospital was only a mile away, the blood-warming machine was at the hospital.

“Any one of a dozen things could have changed just a hair--those two girls could had lingered over another cup of coffee--and Murray wouldn’t be here.”

What luck, an outsider might think, that Murray Brown’s accident occurred near the only hospital in the world with the blood-warming machine so crucial to saving his life.

But Brown--ever realistic, ever straight-talking--sees the situation a little differently: “Well, if I’d had the accident in Costa Mesa, my Jeep wouldn’t have crashed into a ditch full of freezing water.”

You can’t argue with logic.

Related: Video- Back from the dead in Las Vegas

Jesus Dennis April 1995
A Boy’s Long Brush With Death; A Toddler Survives After Hours Without Oxygen or a Pulse
In the Pediatric Intensive Care Unit at Montefiore Medical Center in the Bronx, a chunky dark-haired toddler named Jesus Dennis lies strapped to a bed, with an array of tubes delivering pain killers and sedatives into his veins and a thick white liquid for nourishment into his stomach. But he is alive.

Jesus is here because on Easter, the police say, he splashed water on his stepfather and in response the man held him underwater in the bathtub until he was unconscious. He arrived in the emergency room of Bronx Municipal Hospital Center without a pulse or blood pressure, apparently dead.

Though still in critical condition, Jesus is a lucky 3-year-old -- lucky that it was a chilly April day and the tap water in the apartment was cold. So while most abused children who are dunked in the bath for punishment are scalded with hot water, Jesus was nearly frozen. And doctors say that is probably why he lived -- apparently without brain damage -- despite the fact that he was not breathing and his heart had not been pumping for hours.

When the body is cooled rapidly and stays very cold, the heart stops beating. But the body’s metabolism also comes to a near standstill, sharply reducing the vital organs’ need for blood and oxygen. At a body temperature below 80 degrees, a person can survive for a number of hours in a sort of suspended animation -- not measurably alive, yet not technically dead.

When warmed up, the body can -- miraculously -- churn back to life, which is why ambulance crews will never pronounce a patient dead if he or she is cold.

Jesus had a body temperature of just 77 degrees when paramedics took him to Bronx Municipal Hospital's emergency room. With blankets, warmed intravenous fluid and warmed oxygen, doctors gradually pushed the body temperature up, and as it approached 90 degrees, his heart kicked in.

"If he wasn't so cold, he would be dead," said Dr. Lewis P. Singer, director of the intensive care unit at Montefiore, where he was transferred several hours later. "The tap water was probably 40 degrees and after he lost consciousness, they didn't dry him off so he stayed wet and cold."

Dr. Singer said there had been reports in the medical literature of patients, generally children, who had managed to survive prolonged immersion in cold water. "But that is usually in the height of winter or in northern Canadian lakes," he said. "It's really unusual to recreate those conditions indoors here."

At normal body temperatures, the brain can survive for only about five minutes without oxygen. But when cooled, it can last for much longer periods, although doctors say survival varies with each individual. And despite his ordeal, Jesus is so far acting and thinking like a normal child.

On Monday, as Eunice Clark, the head nurse in the intensive care unit, attempted to suction secretion from Jesus'
breathing tube, the boy did what any child would do in the same predicament: squirming and fighting to pull the breathing tube out. His lungs were severely injured in the dunking and doctors expect he will need the ventilator to breath for him for at least another week.

"It's O.K., Jesus," said Ms. Clark, stroking his thick black hair. "Would you like to watch Power Rangers? Let's see what's on," she said while punching the button of a remote control. A giant purple dinosaur singing about the importance of eating vegetables appeared on the television screen above his bed, and in response the little boy's big eyes grew wider and he immediately calmed down.

"Do you like Barney?" she asked; it was the first time she had seen him awake enough to ask such questions since he arrived. The little boy, who cannot speak because of the tube down his throat, nodded. She instructed a colleague to fetch one of the numerous Barney dolls he has been sent by well-wishers. Gifts for the baby have been stockpiled in various offices, but now that he is waking up, an army of animals is migrating toward his room.

"Do you have one of these at home?" she asked, taking an oxygen monitor off his finger and placing the stuffed animal within reach of his hand. He touched the purple fur and shook his head no.

It has not been an easy life for Jesus. As an infant he was admitted to the hospital with a fractured skull, a fractured rib and burns; his mother, Grisell Dennis, was held responsible for the injuries and sentenced to probation. As a result, Jesus, his twin sister and two older siblings were placed in foster care. Marjorie Valleau, a spokeswoman for the Human Resources Administration, said that for reasons of confidentiality the agency could not provide details about the case but confirmed that the children had been in foster care.

But people familiar with the case said that the children had been returned to their mother last May after she had been enrolled in a so-called "home rebuilding program," involving parenting classes and counseling.

By that time, Ms. Dennis was living with Rene DeJesus, the man now accused of hurting Jesus on Easter. He faces charges of first-degree assault and reckless endangerment. The couple have a baby who is 3 months old. The baby and Ms. Dennis's other children are all in foster care.

Jesus' mother was home when he nearly drowned. Officers at the 43d Precinct said she is under investigation in this case. She visited her son in the hospital once, two days after the near drowning. "She was upset about the shape the baby was in and upset that she was in the same situation she had been in before," said Hope Salmansohn, a clinical social worker at Montefiore. "She was very ambivalent in feeling, torn between loyalty to her baby and to her boyfriend."

Doctors now expect Jesus to recover although they say they do not yet know if he suffered some subtle brain injury as a result of his ordeal. They add that he may also need physical rehabilitation after being in bed tied to a ventilator for weeks.

In the last week, he has started to communicate more with the doctors and nurses, indicating that he wants ice to wet his lips and also asking for his mom, Ms. Clark, the nurse, said. But he is still in pain, the result of the ventilator tube in his throat and the three large tubes that were inserted through the side of his chest wall to treat his collapsed lungs. As he watched Barney, he reached over to Ms. Clark, to hold her hand. And after a few rapt minutes, he began to squirm and mouthed "tired" around the ventilator tube.

"You want to nap?" Ms. Clark asked. He nodded. And with an extra dose of sedative, he drifted off.
Anna Bågenholm – May 1999
This Is How a Norwegian Woman Survived The Lowest Body Temperature Ever Recorded
https://www.sciencealert.com/this-woman-survived-the-lowest-body-temperature-ever-recorded
14 Oct 2016 Fiona Macdonald

In May 1999, 29-year-old radiologist Anna Bågenholm and two other young doctors set out for a day of skiing in the Kjolen Mountains of Norway. All experienced skiers, they headed off track to enjoy the fresh powder, but Bågenholm took a fall and slid downhill, landing head-first through the ice of a frozen stream.

Her friends quickly grabbed hold of her skis and tried to pull her out, but the ice was too thick and she was jammed between rocks. They called for help, but in the meantime, Bågenholm was stuck upside down, in heavy gear, and being pulled in by icy cold water - pretty much a worst-case scenario.

Thankfully, she managed to find a pocket of air, and struggled to stay conscious waiting for help to arrive, but after 40 minutes, she stopped moving. By the time the rescue team arrived, she had been under the ice for 80 minutes, and was frozen solid.

Her heart wasn't beating, she wasn't breathing. She was clinically dead. No one had ever been brought back from such a low temperature before, but her friends immediately started CPR on her, hoping that she might be able to be revived after being air-lifted to the University Hospital of North Norway in Tromsø.

By the time she reached the operating room at the hospital, it had been more than 2.5 hours since she first fell in the ice, and her temperature was still an unprecedented 13.7 degrees Celsius (56.7 Fahrenheit).

"She has completely dilated pupils. She is ashen, flaxen white. She's wet. She's ice cold when I touch her skin, and she looks absolutely dead," head of the emergency medical department, Mads Gilbert, told CNN a decade later.

"On the ECG [electrocardiogram], which the doctor on the helicopter has connected her to, there is a completely flat line. Like you could have drawn it with a ruler. No signs of life whatsoever."

But he made an important decision. "We will not declare her dead until she is warm and dead," said Gilbert.

Gilbert's hope was that Bågenholm was so cold that her brain would have begun to slow down before she died, protecting it from damage.

At our bodies' preferred temperature of 37.5 degrees Celsius (99.5 Fahrenheit), our brains can only go for around 20 minutes without oxygen before irreversible damage sets in. But as we cool down, the body's metabolism also slows way down in order to keep us alive, which means the brain can get by with far less oxygen.
Given how unprecedentedly cold Bågenholm was, Gilbert thought that perhaps the continuous CPR she’d received since being pulled out of the frozen river might have been enough to keep her brain functioning properly.

His team hooked Bågenholm up to a heart-lung machine, and they pumped her blood out of her body to warm up before circulating it through her again - very gradually, over several hours, her temperature began to rise.

The heart monitor blipped a few times, but continued to flatline. The team waited.

At around 4pm the next day, almost a day after Bågenholm had fallen into the river, her heart restarted, and began pumping the blood on its own again.

Gradually the rest of her body began to heal, too. After 12 days, she opened her eyes, but it took more than a year for her to be able to move and walk again due to nerve damage.

She’s now fully recovered, and works at the same hospital that saved her life.

Her case didn't only make the record books, and a study in The Lancet journal - it also changed the way doctors approached hypothermia deaths.

"In a victim of very deep accidental hypothermia, nine hours of resuscitation and stabilization led to good physical and mental recovery. This potential outcome should be borne in mind for all such victims," concluded The Lancet study.

Before 1999, no patient had survived being frozen to death at the University Hospital of North Norway. But between 1999 and 2013, nine out of 24 patients survived hypothermic cardiac arrest, a 2014 study led by Gilbert found.

Doctors at the University of Pittsburgh Medical Centre hospital are now actually inducing hypothermia in critical patients, to prolong the window in which they can stop their bleeding and save their lives.

"We think of death as being a moment in time," physiologist Kevin Fong told NPR back in 2014, "but actually, it is a process."

When we're warm, that process happens in minutes, but when we're cold it slows down - and, occasionally, that can work in our favour.

"It's the three important things about emergency medicine, which is never give up, never give up, never give up," Torvind Næsheim, one of the doctors who was skiing with Bågenholm that day told CNN. "Because there's always hope."

The Woman Who Survived the Lowest Body Temperature Ever
October 10, 2016 By Cara Giaimo

How a Swedish skier was basically frozen — but lived.

Anna Bågenholm Has Spent Much of her life at the University Hospital of North Norway in Tromso. As a radiologist there, she performs MRIs and CT scans, checks up on patients, and makes rounds. But nearly two decades ago, in this same hospital, she also made history, on the other side of the
The day of the accident couldn’t have been more normal. One morning in May of 1999, Bågenholm and a couple of friends finished up their shifts at a hospital in Narvik, Norway, grabbed their skis, and headed for the nearby Kjolen Mountains. All were devoted skiers, and had chosen to do their residencies in Narvik for its proximity to the slopes. They had already spent much of the season getting to know their new neighborhood, shaking off the storm and stress of medical school on the mountains’ off-trail nooks and crannies.

Conditions were great—powder coated the runs, and the Arctic summer sun promised to shine long into the night. But a few runs into their trip, disaster struck. Bågenholm caught some snow the wrong way and tripped, losing her skis. She tumbled and slid until she hit a frozen stream. Then she cracked through the ice, and was pulled upside-down into the rushing water.

Seconds later, her friends reached her. They grabbed her boots, preventing her from sinking further, but they couldn’t yank her out. As they phoned for help, Bågenholm struggled upward under the water, searching the undersurface of the ice until she found an air pocket large enough to let her breathe. Her clothes got heavier and heavier, soaked through with near-frozen water. Her core temperature plummeted. Eventually, everything went black.

Like most good defenses, this happens from the outside in. Since air pulls heat away from the surface of the body, blood vessels in your skin begin constricting, shunting blood away from your arms and legs and back to the core, where it stays warm. This is good for overall survival, but not as great for the fingers, toes, and ears, common early victims of frostbite.

If this conserved heat isn’t enough, the body begins making more warmth the best way it knows how: by working its muscles. If you can’t (or won’t) go run around on your own, the shivers will start up. You’ll likely feel these involuntary shakes first in your chest muscles, then in your arms and legs.

This is essentially the body’s forced exercise program, generating waves of heat that rewarm the blood. But it, too, can backfire, depleting the body’s nutritional stores, or...
jacking the heart up, putting the body at greater risk for a heart attack or a stroke.

If the body temperature continues to drop, getting down to 95 degrees or lower, hypothermia begins to set in. Blood pressure drops. Breathing becomes shallow. As the brain loses oxygen, it can inspire some strange behavioral symptoms: slurred speech, confusion, nonsensical actions.

Early Arctic explorers didn’t have a name for hypothermia, but they knew it when they saw it. “There can be no doubt that in a blizzard a man has not only to safeguard the circulation in his limbs, but must struggle with a sluggishness of brain and an absence of reasoning power which is far more likely to undo him,” wrote Robert Falcon Scott in the records of his 1911 expedition, describing one of his men as suffering from a frostbitten hand and a “half-thawed brain.”

This is when the brain can make a bad situation worse. Some hypothermia victims take their clothes off. Others hide in a hole in the snow. Deserted by their leader, the rest of the organs begin giving up, too.

Bågenholm was, by all measures, much too cold. By the time the rescue team showed up with a rope and a pointed shovel, hacked a hole in the ice, and pulled her out, she had been submerged for about 80 minutes. She had no heartbeat. Her skin was ghost white; her pupils huge. The emergency helicopter ride took up another hour, filled with fervent praying and near-constant CPR attempts.

When the helicopter landed at University Hospital, Dr. Mads Gilbert, the head of the emergency medical department, feared the worst. “She’s ice cold when I touch her skin, and she looks absolutely dead,” Gilbert later told CNN. “On the electrocardiogram... there is a completely flat line,” Gilbert remembered. “Like you could have drawn it with a ruler. No signs of life whatsoever.”

Even after a couple of hours out of the water, Bågenholm’s core temperature was 56.7 degrees Farenheit, about 42 degrees below normal. As physiologist Kevin Fong writes in Extreme Medicine: How Exploration Transformed Medicine in the Twentieth Century, “This was genuine terra incognita.

Any attempt to resuscitate Anna further could only proceed in the knowledge that in similar situations past medical teams had always failed.”
But Gilbert and his team weren’t giving up just yet. “The decision was made,” he recalled. “We will not declare her dead until she is warm and dead.”

Considered in its most basic form, coldness is simply a lack of energy. Heat comes from motion, and vice versa; when you don’t have one, it’s tough to make the other.

But if you’re trapped in a chilly situation, there are ways to make sluggishness work for you. Asked for stories of cold and derring-do, arctic historian Russell A. Potter mentions the tale of 20th-century adventurer Peter Freuchen, trapped in a snowdrift: “Without any tools to dig his way out, so the story goes, he took a shit and shaped it into a knife,” he says.

Slightly less creatively, studies have shown that when experienced arctic explorers are asked to stick their fingers in icy water, they feel less cold than average Joes do—their bodies have slowed down their responses, trained by repeated exposure into playing the long game. The body temperature of swimmer Lewis Pugh, famous for taking on the melting North Pole in a Speedo, jumps two degrees whenever he sees the water. “Before I swim my body becomes like a furnace,” Pugh told The Lancet in 2005. “It realizes that I’m going to get cold, and so turns on the burners.”

Bågenholm had been plunged directly into the stream. Her body hadn’t had time to train itself, or to slowly acclimate. The best she could hope for was that her brain had been essentially flash-frozen, taken down to a state where it needed very little oxygen to survive. If the cold had slowed her down that far, when they warmed her up, she might still be in there.

Gilbert and his team rushed Bågenholm into an operating room. They hooked her up to a heart-lung machine, pumping her blood out of her body to warm it and then routing it back through again. (This bears repeating: they had to warm her blood outside of her own body.) They watched her vitals. Slowly, over hours, her temperature rose. The EKG blipped, then flatlined, then blipped again. They kept waiting.

Around 4 p.m., Bågenholm’s heart kicked back into gear, squeezing and releasing and pumping the now-warm blood on its own. Led by her reawakened heart, the rest of Bågenholm’s body began the slow process of healing. After 12 days, she opened her eyes. It took much longer—
years— for her to be able to move, walk, and finally even ski again. But eventually, through grit and determination and physical therapy, she did.

“We think of death as being a moment in time,” Fong told NPR in 2014, “but actually, it is a process.”

Usually, that process happens over minutes. But cold slows down everything—even the progressive lack of oxygen that, in most circumstances, quickly kills a brain. For Bågenholm, he says, “it smeared it out to be hours long. Long enough that [the doctors] might intervene.”

Gilbert’s bet had paid off. Even as the frigid water had stopped her heart, paralyzed her muscles, and frazzled her nerves, it had preserved her brain. And so thanks to the very thing that might have killed her, Bågenholm didn’t freeze to death. She just froze.

**Driver Revived After Icy Plunge**

http://www.canada.com/edmonton/edmon...4-00E64D4CBA7F

November 22, 2003 Conal Mullen The Edmonton Journal

EDMONTON - A man who spent 30 minutes submerged in icy water after his car flipped and slid into a drainage ditch was brought back to life by paramedics Wednesday evening following a dramatic rescue that involved firefighters and passersby.

The driver, in his 50s, was in critical and unstable condition in hospital Wednesday night, said police Const. Gerry Zatylny.

"It was a hell of a rescue effort, that's for sure," said Zatylny, who praised firefighters, paramedics and civilians.

"You realize a person's chances aren't great when he's submerged in water."

The car was headed east on a service road beside 63rd Avenue near 91st Street when it slipped between a guardrail and the edge of a drainage area shortly before 6:30 p.m.

The car toppled off the embankment and slid upside down, breaking through the ice in a storm-water drainage ditch.

Alvin Dixon was driving home from work at the time.

"It was awful," he said. "I saw brake lights and then nothing."

He said a woman phoned 911 while he and another passersby
tried to reach the car.

"We were told not to go down by another guy. He goes, 'Don't be stupid.' But what do you do -- you've got to help."

Dixon tied cargo straps to the guardrail and started to lower himself down. He jumped to the car but slipped and cut his leg.

"We got on the top of the car and we were calling but we couldn't hear anybody inside. I got down into the water and tried opening the door. Both doors were locked. Only the back-end of the car was sticking out. The rest of it was under water."

Dixon tried to break the window but couldn't.

Camille Tabib said he saw the two men on top of the car but it was impossible to reach the submerged driver.

"We tried screaming at him," Tabib said, "but we couldn't hear anything.

"This guy could not have been more cursed tonight. The way the car went in, it was doomed. The guy was submerged under water for half an hour. If this guy survives, it's amazing."

Tabib said emergency crews arrived quickly. There were eventually 18 firefighters and 10 paramedics attending.

Fire Capt. Randy Owen, commander of the rescue, said two firefighters went into the water immediately. It was up to their chests, and full of mud and oil.

The driver's compartment was submerged and the man was still in the driver's seat, unconscious. Owen said the water was more than a metre deep and filled the interior of the car. He confirmed the driver was under water for about 30 minutes.

A tow truck and a four-wheel-drive vehicle soon arrived on the scene. Dave Dempsey and Rod Sexauer, who own Dependable Automotive Services nearby, arrived with their friend Shane Sloan and passerby Reg Daley, who used his 4X4 to anchor the tow truck.

Dempsey said they tried to tow the car from the water but broke two cables.

"After about 15 minutes it was more or less panic," Dempsey said.

Finally, towing in tandem with a fire truck, they pulled the twisted wreckage from the water.

Dixon said two firefighters in wetsuits managed to reach the driver.

"The two frogmen who pulled him out of the car -- they climbed in the car and broke the glass. And all I heard was, 'No pulse.' "

Paramedics took over and worked on the man as they rushed him to hospital, said Owen.

"Minutes ago they just got a pulse," he said at about 7:30
p.m. "It even surprised us."

When Owen announced the news, a cheer of relief went up from some rescuers still at the scene.

"He's got a pulse," Sloan said again. "It's unbelievable. That's the main thing, that he's alive. It seemed like it took forever."

Dixon was in an ambulance getting treatment for his cut when the good news came over a radio.

"That was really good to hear," he said. "It's amazing the work they did."

Police and firefighters praised the tow truck drivers and others.

"I was quite surprised to see that privately owned tow truck down there," Zatylny said. "Thank God he was here."

Owen said the cold water may have helped. People have survived an hour underwater in such conditions, he said, because the cold slows the heart rate.

Family Prays For The 'Impossible'

http://www.canada.com/edmonton/edmon...F-C4DDF67B9166

November 22, 2003 Florence Loyie The Edmonton Journal

EDMONTON - Ivan Clancey was on his way home to pick up his family for church when his car rolled and slid into a water-filled drainage ditch Wednesday evening.

Clancey, 56, spent 30 minutes submerged in the icy water as rescuers worked frantically to save him. He had no pulse when he was pulled from his crumpled black sedan.

Paramedics brought him back to life as they rushed him to hospital, where he was listed Thursday in critical but stable condition.

Family friend Dianne Hazlett said Clancey's family is at his bedside, and relatives are flying in from across Canada to give support. The family is originally from Newfoundland.

Everyone is praying Clancey will make a full recovery, Hazlett said. "We are all very hopeful and very positive. We believe the impossible can become the possible. The doctors are suspecting a number of things, but we are going to have to wait for the next 24 hours -- time will tell."

Clancey was on his way home from his job as general manager at CSE Power Products when the accident happened just before 6:30 p.m. He was driving east on a service road beside 63rd Avenue near 91st Street when his car slid over the curb and between a guardrail and the edge of the drainage ditch. The car toppled off the embankment and slid upside down, breaking through the ice in a storm-water drainage ditch.

Several passersby tried to rescue Clancey but could not open the car's locked doors or break the window glass.

Emergency crews arrived quickly and two firefighters waded into the water immediately. The water was chest-high and full of mud and oil.

A tow truck and a four-wheel-drive truck arrived. The 4X4 anchored the tow truck while it tried to haul the car from the water, but the cables broke. Working together, the tow truck and a fire truck finally pulled the sedan out.

Mike Dawood and another firefighter, both wearing wetsuits,
climbed into the car and pulled Clancey out. Dawood said it took a few seconds to get Clancey out because he was strapped in and slumped in a bad position.

"I could tell from the first moment I looked in the car that he was unconscious. He had been under water for quite a few minutes at that point. His head was covered with the mud and slime from the bottom of the ditch, and it smelled like swamp."

Dawood said incredible teamwork by civilians, police, paramedics and firefighters got Clancey out of the car and breathing again.

"I've been on dramatic rescues before, but this was different. There were so many on scene. When I arrived on scene, there was a police officer on top of the car wrapping the tow cable around the axle. I thought it was amazing how the police were helping the firefighters, even the civilians. "That one guy who saw the plunge as it happened, he actually ran in there and was trying to break the glass."

"I sure hope (Clancey) comes through because we are all rooting for him."

Police are investigating the accident to see if road conditions played a role.

(HAMILTON, Oh.) -- After being trapped for nearly half an hour in a torrent of water underneath a dam, a Hamilton firefighter remains in critical condition. Thirty two year old Chris Gabbard was injured during a training exercise when the boat he was in flipped over tossing him and another person overboard. Gabbard and three others were practicing rescue maneuvers on the Great Miami River.

Investigators say that the two aluminum boats that were caught in the churning waters were shredded.

Another firefighter, John Hansbauer, is recovering from head injuries at University Hospital and is listed in fair condition.

'Miracle' Recovery Has Ohio Firefighter Set To Go Home After Near-Drowning
https://www.firefighterclosecalls.com/miracle-recovery-has-ohio-firefighter-set-to-go-home-after-near-drowning/
May 30, 2007  By Joshua Rinaldi Staff Writer

A Hamilton firefighter who has been hospitalized since being trapped under water for more than 20 minutes during a training exercise in April will be going home Friday, according to a hospital spokesman.

Guy Karrick, a spokesman for the Drake Center in Cincinnati, said Chris Gabbard will be released at noon Friday. He said there would be some “tremendous visuals” at the discharge, which is expected to include Gabbard receiving a ride home in a fire truck.

After more than six weeks of recovery from the accident on the Great Miami River, it is good that Gabbard is going home, said Hamilton Fire Chief Joe Schutte. “It’s truly a miracle,” he said.
Gabbard, 32, has been recovering since the April 17 accident that occurred during recertification training on the Great Miami River. About 12 members of the department’s River Rescue Team were present when two boats drifted toward the turbulent water near the dam and overturned.

Gabbard, a four-year firefighter, and three others fell into the water near the low-level dam. Three of the firefighters were pulled out of the water within minutes. Gabbard was under the water more than 20 minutes.

Gabbard was taken to The Fort Hamilton Hospital and then to University Hospital in Cincinnati before being transferred to the Drake Center.

A second firefighter, John Hansbauer, who sustained spinal and leg injuries during the accident, was released from Drake in early May.

After the accident, Schutte asked the community to pray for the recovery of Gabbard and Hansbauer.

“The prayers were certainly answered,” Schutte said. “There is no other way to explain it.”

R. Dennis Riddick, pastor of the Twinbrook Hills Baptist Church where Gabbard is a member, echoed Schutte’s claim that Gabbard’s recovery was miraculous.

“Both Fort Hamilton and University Hospitals gave him up and didn’t think he was going to live,” Riddick said. “Now, he’s up talking, eating regular food and getting visitors. He’s doing really well.”

Riddick said Gabbard was undergoing physical therapy to regain the use of his legs and had been walking some distances on his own.

First Responders Share Their Stories Of Recovery At Drake

First responders share their stories of recovery at Drake In this special tribute issue of Turning Point, Drake Center is pleased to honor the many first responders who, in time of emergency, put their lives on the line for the sake of others. Drake Center has a special closeness to first responders—many of them work here, and many of them are treated and recover here after they incur serious injuries while on the job.

Read on for stories of three exceptional first responders whose lives were changed—in an instant.

But with drive, determination and help from Drake Center, they are reclaiming their health, restoring their hope and rebuilding their lives.
On April 17, 2007, while conducting a water rescue drill in the Great Miami River with his fire unit, Chris Gabbard was thrown overboard when his boat capsized. For the next 26 minutes, he was trapped under water, churning in the boil of the raging river.

“As I was being pulled out of the water, some of the guys said they started giving me mouth-to-mouth,” says Chris, who remembers nothing about the accident. His heart stopped three times on the way to the hospital. Each time he was brought back to life.

Chris was taken to Fort Hamilton Hospital, where he was stabilized, then was airlifted to University Hospital for treatment. He was admitted to Drake Center May 2, 2007, with significant respiratory and neurologic deficits.

“He was in a vegetative state and unresponsive,” said his wife, Michelle.

He was placed in the care of Mark Goddard, M.D., director for physical medicine and rehabilitation, who, upon initial assessment, saw no apparent response when he asked Chris to move his thumb. But about two minutes into the examination, Goddard noticed that Chris was, in fact, responding by moving his thumb. He also had significant rigidity in his arms and legs. Goddard prescribed Sinemet, a drug typically used for Parkinson’s patients, to help reactivate Chris’ brain.

Goddard also prescribed several other therapies: physical therapy to help with rigidity and improve walking; occupational therapy to assist with arm/hand coordination; and speech therapy to help with his cognitive and communications skills. Within two weeks, Chris began feeding himself and even standing. Within a month, he was walking, dressing and performing basic activities.

On June 2, 2007, Chris had recovered enough to walk out of Drake and climb aboard Engine 5 for his first ride home in six weeks. He continued outpatient therapy at Drake for nine months and in May 2008 returned to his full-time job. He has even successfully performed the water rescue drill that caused his accident.

About his miraculous recovery, Chris says: “God is good, you know. He has a purpose for me. Through Him is how Dr. Goddard and the rest of the doctors and therapists at Drake helped me get to where I am now.”

Related: FF Survives Near Drowning (30 Minutes Submerged)

10 years later: Hamilton firefighter reflects on near-death experience

Sara Gullickson 05-22-2009
N.D. Teen Survives 30 Minutes Trapped In Car, Submerged In Lake
Friday, May 22, 2009 by Emily Kaiser in News
Doctors call this 19-year-old survival a miracle after she swerved into a lake off of I-94 and was submerged underwater for 30 minutes before rescue crews saved her.

Sara Gullickson crashed near Valley City when she swerved to avoid a goose and landed in a nearby lake, says KSTP. Gullickson called for help on her cell phone as her car started filling with water.

When she was finally rescued, paramedics say she was unconscious. She was taken to Merit Care in Fargo where she was in a coma for nine days.

Three weeks later she is working to regain her strength after the accident. She lost about 11 pounds of muscle.

Troy Adams 02-24-2010
Toddler Survives After Being Submerged in Cold Water for 15 Minutes
April 7, 2010 by Atula

An Ohio toddler surprised everyone when he miraculously recovered from an accident that left him trapped and submerged for almost 20 minutes in an Ohio creek.

On February 24 Laura Adams picked up 2-year-old twins Lexi and Troy after her shift at work. Tired, she fell asleep at the wheel and started drifting off the road. Even though she tried to gain control, her car collided with a guard rail and plunged into the freezing water 3 feet down a creek.

Laura, who was not wearing a seat belt, swam out of the window and tried to get her twins out of their booster seats in the back. The effort failed and in desperation Laura waved a passing motorist for help. Together they tried again and this time, were able to rescue Lexi who had been in water for more than 5 minutes and was not breathing.

“At first, she wasn’t responding. About the time the paramedics showed up, she started puking and breathing on her own,” says Laura.

Troy was still in the water, locked in the wrecked car. As rescuers poured in, they cut the car and hastily freed the toddler who had been submerged in cold water for at least 15 to 17 minutes. His body showed no signs of life.
“When I called my family, all I could say was, ‘Troy’s dead,’ says Laura. “They had just gotten him out of the water at that time. I had no idea he would make it.”

Dr. Michael Bigham who took care of Troy at the Akron Children’s Hospital was equally tensed. The toddler had not been breathing for more than 15 minutes, was being ventilated with the help of a tracheotomy and was also suffering from hypothermia. But here, the doctor’s experience prevailed.

Instead of immediately warming him, the doctors let Troy’s body remain cool for the first 24 hours. Dr. Bigham still feared that his brain would be irreversibly damaged due to lack of oxygen and Laura surely thought her son would not survive the night.

But the night ended happily as did other days and weeks. After a month in the hospital and rehab centre MRI scans show Troy’s brain is indeed functioning normally although he still has some difficulty swallowing.

“There’s some protection provided by the cold water,” Dr. Bigham says. “That is surely what saved Troy’s life and allowed him to be so high-functioning at this point. As long as he continues to progress at the rate he’s been progressing, there is no reason to expect he won’t fully recover. He’s showed no plateauing at all.

“He’s a lucky kid.”

Bronson Staker 01-30-2010
Amazing Toddler Recovers After Being Pronounced DOA
https://www.growingyourbaby.com/amazing-toddler-recovers-after-being-pronounced-doa/
March 13, 2010 by Lisa Arneill

If you looked at Bronson Staker today, you would see a typical 18-month-old that enjoys doing all of the things that toddlers do.

It’s amazing to believe that the Utah toddler was pronounced dead just six weeks ago after he was found lying face down in the bathtub.

Bronson’s mother, Sara Staker, had been bathing him and his 2-year-old brother in late January when she became momentarily distracted by one of her other two children.

When Sara returned to the bathroom she found Bronson facedown in the water, showing no signs of life.

“It was horrible. It was the most helpless feeling I’ve ever had in my life,” Sara told the Today’s Show yesterday. “There was no question in my mind that he was gone. He was white, his lips were blue. His eyes were rolled back.”

After she called 911 Sara started CPR on Bronson’s lifeless little body but he didn’t respond. When first responders arrived they continued revival efforts. They, too, were unable to restore the toddler’s heartbeat.

Even though Bronson was pronounced DOA — dead on arrival by paramedics, he was taken to the ER, where doctors continued resuscitation efforts for over 40 minutes. It was then that his heartbeat was restored and he was placed on a ventilator to assist with breathing.
At this point, doctors told Matt and Sara that there was a high likelihood that Bronson had suffered serious brain damage during the long period that he was clinically dead and his brain was deprived of oxygen. They said there was an experimental treatment called therapeutic hypothermia that might improve his chances of recovery. It would involve lowering Bronson’s body temperature to 91 degrees, almost eight degrees below normal, and putting him in a coma to reduce brain swelling. He would be maintained in that state for almost two weeks, and when he was warmed up and revived, he probably would not be the same boy they knew.

After the Stakers gave doctors the go ahead Bronson was hooked up to more tubes and wires than his parents could count, covered with a blanket filled with chilling fluid, and put in intensive care.

“It was excruciating, because every fiber of your being as a mother wants to hold your child, especially when they’re hurting,” Sara said. “You want to hold him and hug him and wrap him in a blanket and keep him warm.”

As the day grew nearer when Bronson would be revived, doctors, therapists and rehabilitation experts advised the Stakers to get physical and occupational therapy equipment for their home and be prepared for a six-month regimen. Thirteen days after Bronson was admitted doctors warmed his body to bring him out of his coma and allowed him to regain consciousness.

“I walked in the room and the lights were on. Immediately I could see that he was tracking and connecting and looking from one nurse to the other. When I walked in, he lifted his chin and I could see that he knew who I was,” Sara said.

“Everything was there,” Matt said. “He was weak because he was lying down for [13] days, but all his cognitive [functions], how his brain works, it was still there.”

Now 6 weeks later, Bronson shows no signs of any damage. In fact, his parents say that he is learning vocabulary faster than he was before the accident.

While his outcome is rare, doctors have used therapeutic hypothermia before to treat children who’ve drowned. A 2009 review of the method in the Journal of Neurotrauma predicts that therapeutic hypothermia will soon have “broad applications” in pediatric medicine.

Now that she’s had time to reflect Sara says she learned so much from this accident.

“Life is just so fragile. As parents, we’re so busy and we try to multitask things. It’s really easy to get distracted by the things that aren’t the most important things, and the things that are the most important suffer.

Related:
- Bronson Staker: A True Story, A Miracle
- Family Hopes Their 'Second Chance' Will Inspire Others
In 2011, a Danish school trip went disastrously wrong. A group of children fell into ice-cold water, and 'died'. Their hearts stopped beating for several hours.

And yet, in the largest known case of its kind, all seven came back to life.

They shared their extraordinary story with us.

________ More on the incident below __________

### Outcome Of Accidental Hypothermia With Or Without Circulatory Arrest: Experience

From The Danish Præstø Fjord Boating Accident

[https://www.sciencedirect.com/science/article/abs/pii/S0300957212002584?fbclid=IwAR0p7aZklLkAWfr8ynUY0MQ9s6NVGIQRYuv25WdyHzpvS_aJDcWancQlw](https://www.sciencedirect.com/science/article/abs/pii/S0300957212002584?fbclid=IwAR0p7aZklLkAWfr8ynUY0MQ9s6NVGIQRYuv25WdyHzpvS_aJDcWancQlw)

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**Abstract**

**Background**

Resuscitation guidelines for the treatment of accidental hypothermia are based primarily on isolated cases. Mortality rates are high despite aggressive treatment aimed at restoring spontaneous circulation and normothermia.

**Methods**

The present report is based on a boating accident where 15 healthy subjects (median age 16 (range 15–45) years) were immersed in 2 °C salt water. Seven victims were recovered...
in circulatory arrest with a median temperature of 18.4 °C (range 15.5–20.2 °C). They were all rewarmed with extracorporeal membrane oxygenation (ECMO) and were subsequently evaluated with advanced neuroradiological and functional testing. The remaining 7 had established spontaneous circulation without the use of ECMO. One victim drowned in the accident.

**Results**
The victims that survived the accident without circulatory arrest were predominantly females with a higher body mass index. Victims with circulatory arrest pH on arrival was a median of 6.61 (range 6.43–6.94), with ECMO being established a median of 226 (178–241) min after the accident. Magnetic resonance spectroscopy showed neuronal dysfunction in five. In five victims initial normal white matter spectra progressed to show evidence of abnormal axonal membranes. Based on the seven-level Functional Independence Measure test functional outcome was good in six circulatory arrest victims and in all without circulatory arrest. Mild to moderate cognitive dysfunction was seen in six and severe dysfunction in one circulatory arrest victim.

**Conclusion**
Seven patients with profound accidental hypothermic circulatory arrest were successfully resuscitated using a management approach that included extracorporeal rewarming, followed by successive periods of therapeutic hypothermia and sedated normothermia and intensive neurorehabilitation. Seven other hypothermic victims (core temperature as low as 23 °C) that did not suffer circulatory arrest also survived the accident.

**Charles Dale Ostrander 08-05-2011**
**Boy Rescued From Surf Leaves ICU, Can Speak**


Aug. 11, 2011 By Mike Baker Associated Press

LONG BEACH, Wash. – Charles Ostrander’s head hung back lifelessly as he was carried out of the frigid Pacific, 15 minutes or more after a riptide sucked in the 12-year-old.

Today, he’s alive. How?

You could say prayers. There were many along the beach late last week as his body bobbed limply just below the ocean’s surface. But there was also a team of volunteer rescuers, the medics who performed CPR well after all seemed lost, and another 12-year-old who risked her own life to help him before anyone else could.

And there was the ocean itself. At 56 degrees, the water was cold enough that it may have bought rescuers a little time.

The boy, who goes by his nickname, Dale, has spoken a few words since his ordeal and was moved out of intensive care Wednesday. It’s unclear whether he’ll fully recover, but his parents, Chad and Kirsten, have hope.

“There’s been several miracles just in the circumstances of finding him, the fact that he’s not dead, the fact that he can move, the fact that he can speak,” Chad Ostrander said. “Unbelievable.”
Dale was visiting the southwest Washington coast with members of his church youth group Friday when the ocean’s strong currents pulled him and another boy far from shore. They were just wading, not swimming, his father said.

“A riptide hit them, kind of knocked them off their feet,” said Shanon Kissel, a sawmill worker who was boogie boarding in a shallow area nearby with his daughter, Nicole.

Nicole took off after Dale on her boogie board, even though her father was yelling that she was going into a dangerous area.

“She didn’t hear me. She just kept going after Dale,” Kissel said.

The boy, dressed in a long-sleeve shirt and pants, struggled onto Nicole’s 3-foot-long boogie board. The pair paddled ferociously toward shore as the rip current pulled them even farther from it.

Nicole said Dale told her, “Keep paddling. We’re almost there.”

Shanon Kissel said he reached the other boy – who was not identified – and pulled him onto his own board. He yelled at bystanders to call 911 and went to call for help himself.

When Kissel got back in the water he saw Nicole and Dale clinging to her board, turned sideways in rolling waves about 150 feet beyond the crashing surf. He was swimming out to the children when a wave knocked the pair off her board.

“She turns around to face him like she’s gonna go back after him,” Kissel said. “I had to tell her to get back on the board.”

She did, but Ostrander had disappeared.

Fire officials and other rescuers arrived. Some stood atop trucks, using binoculars to try to locate the boy.

Members of Dale’s church group cried and prayed, kneeling in the sand.

Eddie Mendez, a volunteer water rescuer, was working his day job at a construction site when the emergency call came in. The 34-year-old immediately drove over to the beach and changed into a wet suit while his colleague launched two personal watercraft.

Mendez said he saw a shadow moving under the breaking...
water offshore, so he and a diver rushed over. They scanned the area for a few minutes before Mendez spotted the shadow again. They found the boy floating about two feet below the surface of the water.

As they pulled the boy on board, Mendez realized he was rescuing a child – about the age of his own daughter.

“I thought, ‘Wow, this is like my own child,’ ” Mendez said.

Mendez drove the boy to the beach, where emergency responders began trying to revive him. There was no sign of life but they kept performing CPR as they transported him. Finally, after Dale reached a nearby hospital, his pulse returned.

Then Dale was flown from the southwest Washington coast to OHSU Doernbecher Children’s Hospital in Portland. His parents were still steeling themselves for the worst.

“I expected to say our goodbyes and so did my wife, and we were just prepared for that,” Chad Ostrander said. But on Sunday night, as he was eased off sedatives, Dale opened his eyes.

“At that moment, that was the first glimmer of any hope,” his father said. “It didn’t mean he was going to make it. It just meant that there was hope.”

Dale starting talking on Monday. When his parents encouraged him to cough to clear his throat, he replied, “I don’t have to.”

Doctors have cautioned his parents that even if Dale survives, he could have permanent brain damage.

The physicians “were very clear that he had been under for too long, had been without oxygen for too long,” Kirsten Ostrander said. “We trust (God) no matter what.”

Dale will need speech and physical therapy, and can’t get out of his hospital bed yet, his father said.

“Things are going along better than anyone expected so at this point we’re very happy,” he said.

“Honestly, all of the doctors’ prospects are very negative. They’re very honest and blunt. But they said every once in a while there’s a miracle, and we don’t want to give up on that,” Ostrander said.

**MAY 24, 2019 Update On Dale:** He got to have six sessions with a physical therapist earlier this year, and seemed to benefit from the extra exercise. The therapist realized we would not be able to continue the sessions (our insurance only pays for six visits a year, and Dale's Medicaid is "under construction"), so he formulated a set of conditioning exercises that Dale could do daily at home. Which Dale does, if he remembers or if we nag him! The therapist stated that he believed Dale’s muscles are strong but unreliable. Dale's legs and arms tend to twitch and jerk unpredictably; this causes Dale to lose confidence in his own limbs' ability to support him. Consequently, he takes short, stumbling steps and constantly hunches over, preparing for the next jerk or fall. We are continually trying to convince Dale that the
exercises will help him gain stability and confidence, but that, frankly, is an ongoing battle!

We're still looking for ideas to keep Dale's mind sharp and his time occupied with more than just YouTube. A very kind man at church gave Dale a HUGE book about computers, as well as an old monitor and keyboard to practice taking apart...and, hopefully, putting back together again. Dale's read part of the book but is afraid of ruining the monitor, so he has yet to experiment with it. Several people have offered suggestions for Dale to try, and we appreciate each one. His attention span lasts for only a few weeks at a time; he is genuinely interested in each new project, but loses that interest within a short time. So, if anyone has any project ideas or areas of interest to research, please let us know. We look into each new idea, but are forced to discard many of them because they cannot be tailored to suit Dale's physical abilities.

Related:

  Boy's Survival From Near-Drowning Has Medical Explanations

  Boy Survives After 25 Minutes Underwater, Rescued by 12-Year-Old Girl

Josh Johnson     November 15, 2013
Sartell Man In Critical Coma After Falling Through Thin Ice
NOVEMBER 16, 2013 Pam Louwagie

Joshua Johnson was often among the first to check ice conditions on Minnesota lakes, anticipating the start of ice fishing. Saturday, his family held vigil at a Twin Cities hospital as Johnson lay in critical condition in an induced coma after falling through.

Beth Johnson, his wife, said a "very good Samaritan" spotted him in the water of Little Rock Lake not far from their Sartell home on Friday. Authorities said the emergency call came about 11:25 a.m.

The caller told authorities that Johnson was 150 to 200 yards from shore, according to a news release from the Benton County Sheriff's Office.

By the time rescuers were able to reach Johnson, 30, he was submerged, the release said. They found him in about 10 feet of water about 12:20 p.m., and an ambulance took him to the St. Cloud Hospital. He was later airlifted to the University of Minnesota Medical Center, Fairview.

Several emergency agencies — including the Rice police and fire departments, the Minnesota State Patrol and the Minnesota Department of Natural Resources — answered the emergency call.

Investigating deputies found indications that Johnson had been on the lake ice fishing before he fell through. Ice near the shoreline was about 1½ to 2 inches thick.

Beth Johnson said her husband, a father of two with another child due in April, had the day off Friday from his work landscaping and cleaning out foreclosed homes. He is an avid outdoorsman and is familiar with Little Rock Lake, she said. She was at work Friday when he decided to go there.

"He had time off and wanted to enjoy it, a nice day," she said.

Authorities warned after the incident that even though ice has formed on some Minnesota lakes, there has not been enough
prolonged cold weather to make it safe, especially with recent warm weather.

Beth Johnson said Saturday afternoon that she and other family members were "praying and hoping" for her husband's recovery. "That's all we can do right now."

**Man Submerged In Lake Makes Miraculous Recovery**
December 11, 2013 Janel Klein

**Josh Johnson is recovering after falling through the ice on Little Rock Lake near Sauk Rapids.**

MINNEAPOLIS - Josh Johnson has always loved the outdoors, so when Little Rock Lake near Sauk Rapids froze by Nov. 15, he planned a day of fishing in his favorite spot 150 feet from shore.

"He was calling everyone to go out, and they pretty much told him, 'No,' that it was too early," said Josh's sister Heather Koch. "But he went out."

Josh went out and then went in to the water. He was screaming for help as he fell through the two-inch thick ice, then hanging onto a two by four he'd brought with him as rescuers struggled to reach him by boat. Once they got just 35 feet away, Josh slipped beneath the water. He was under for 40 minutes while searchers tossed a hook four times before they finally caught his leg.

"When I saw him come out of the water, he didn't look good," said Minnesota DNR Lt. Tony Musatov, who was one of the first responders. "That's what I'd call a good old-fashioned miracle."

It's a miracle because Josh's heart had stopped for nearly an hour.

"The doctors came out and said, 'We don't know if he's going to make it or not. Just go home,'" said Josh's father Bob Johnson.

Now at the University of Minnesota Medical Center Fairview, Josh is awake. He is improving and has no brain damage. His doctors say he's on track to make a full recovery.

"He shouldn't be here and he is," Bob Johnson said. "So it's going to be a whole new Christmas."

Josh is married with two young children and another on the way. His family is holding a benefit this weekend to help with his medical costs.

**There is a benefit at the Media Ballroom this Sunday.**
**Donations are still being accepted for his family.**

The public can stay up to date on his [CaringBridge page](https://www.kare11.com/article/news/man-submerged-in-lake-makes-miraculous-recovery/89-107681805).
Second Chance: Angler Lived After 20 Minutes Under Ice  

December 26, 2013 Sam Louwagie

RICE — The last thing Josh Johnson remembers seeing, before his world went dark, is the muck at the bottom of the lake billowing up around him.

He'd just spent 45 agonizing minutes fighting to stay on the surface of the frigid lake. He'd watched a rescue boat make painfully slow progress, having to break its way through ice to reach him. The boat was barely 10 yards away, according to one rescuer, when Johnson could no longer move his arms.

So he sank.

Johnson's fall through the ice on Little Rock Lake on Nov. 15, 2013, prompted an extraordinary rescue, long months of recovery, and an eventual change in his perspective and priorities. But as he slipped below the surface, Johnson said he doesn't remember thinking anything at all.

"My body had given up. Everything was frozen," he said. "I hit the bottom, saw the sand poof up, and I was out."

On Thin Ice

More than two years later, Johnson said he thinks a few times each week about his decision to go ice fishing that day. He alternates between wondering "how stupid could I be?" and insisting he had reason to believe the ice was safe.

Around 7 a.m. that Friday, Johnson, an avid ice-fisherman, tested the ice with his chisel the same way he always had. Before he left for the lake that morning his five-months-pregnant wife, Beth, told him the forecast called for a relatively warm day. She told him he "wasn't going to be so lucky one of these times."

But his chisel did not break through the ice when he swung it. So he went out to the middle of the lake and started fishing.

Around 9:30 a.m., Shane Sabraski drove past the lake after a morning of deer hunting near his Rice home. He spotted Johnson on the ice and couldn't believe somebody would be ice fishing that day, with the temperature quickly rising into the mid-40s.

Johnson, meanwhile sat happily fishing as the day warmed up. Around 11 a.m., he got up from his seat. The ice he stood on bobbed like a cork in the water.

Sartell Man Who Survived 25 Minutes Underwater Tells His Story  

January 23, 2014 By Reg Chapman MINNEAPOLIS (WCCO) —

For the first time, we’re hearing from a Sartell, Minn. man who fell through thin ice and spent more than 25 minutes underwater.

Josh Johnson went out fishing on Little Rock Lake in November when the ice gave way. He actually went out
there the night before and walked on the ice. He said he thought the ice was safe, so he returned to his favorite fishing spot on Little Rock Lake to be the first on the ice.

“Temperatures got too warm,” Johnson said. “It got to like 50 degrees that day.”

Johnson was 150 feet from shore, where the ice was only 2 inches thick.

“I heard the ice crack and I went down. The only thing I remember seeing was the bottom of the ice from in the lake below ... looking up and seeing the ice as I was going down,” Johnson said.

Shane Sabraski and Neil Maidl filled in the blanks for Johnson. They noticed him fishing from far off and drove closer to get a picture of the first ice fisherman of the season.

“When we drove around the lake to get the photo and he was splashing in the water, it was just — I don’t wanna say instinct — but I knew something had to be done before he disappeared forever,” Sabraski said.

The men tried reaching Johnson with a rope, but had no luck.

“You could feel the ice start to shift and we were going to fall through, so we hopped in the boat and then we had to bust ice most of the way. That’s what took so long,” Maidl said.

Johnson was under 10 feet of water for 25 minutes before he was rescued.

“The doctor gave me a five percent chance to live,” Johnson said.

He then spent three and a half weeks in a coma and lost more than 50 pounds.

“When I got up, I couldn’t even walk. I couldn’t do nothing with my legs,” Johnson said.

Johnson is thankful to be home and surrounded by his wife — and new best friends.

“I couldn’t ask for better guys to help me,” Johnson said.

Johnson will be rehabilitating for a year and he won’t be able to work. There’s a benefit fund set up at any Wells Fargo bank, if you’d like to help his family.

Helena White  Dec 28, 2014
Witness: 4-year-old rescued from vehicle was under water for 10 minutes
https://www.wlbt.com/story/27721982/witness-4-year-old-rescued-from-vehicle-was-under-water-for-10-minutes/
December 29, 2014 at 3:02 PM CST - Updated July 10

RANKIN COUNTY, MS (Mississippi News Now) - Around 4 o'clock on Sunday afternoon the Rankin County Sheriff's Department received a report of a one vehicle accident in the 1100 block of Star Road near Brandon.

The caller stated the vehicle overturned in the water and that a child was trapped inside.

Rankin County Deputies, Robinhood Fire Department, Rankin EOC and AMR responded to the scene.
The family has given WLBT permission to release the name of their child, 4-year-old Helena White.

Before first responders arrived on scene, residents from across the street and a passerby jumped into the water lifted the car far enough out of the water where Helena could be cut free of the child restraint.

She was moved to the side of the road where a deputy and one of the good Samaritans began CPR. After approximately 4 minutes of CPR she began breathing on her own.

Helena and her mother were transported to UMC where she is in critical condition.

A witness on the scene, Sherry Parker, tells us that she had to be underwater for nearly 10 minutes.

The heroic actions of the good Samaritans and deputy have given Helena a better chance of surviving this accident.

Sheriff Bailey and Helena's family are thanking the following heroic men and women, Sherry Jackson, Harmon Jackson, Tristen Jackson, Jessica Dickson, the unknown male, Deputy Wade Spencer and the Robinhood Fire Department.

One Year Anniversary Of Helena White's Water Rescue

December 29, 2015 Updated July 10 By Annette Peagler

RANKIN COUNTY, MS (Mississippi News Now) - It has been a year since The miraculous rescue of Helena White, a now 5-year-old girl, who was trapped in a car, underwater for 10 minutes.

Helena made a full recovery weeks after the tragic incident on December 28th, 2014.

Today, you wouldn't even notice a year ago that she was in a hospital bed fighting for her life.

"A couple of months after she got out of the hospital she started to remember a little bit before the wreck. Like when we were spinning out, she said, mommy are we going to crash. I said yes baby, but it's going to be okay," her mother, Chasity White, explains.
The tragic crash happened on Star Road in Rankin County. Helena does not fully remember the crash, but she remembers being in the hospital.

"She does want to see pictures all the time. She likes the video where they pulled the feeding tube out. I can't watch it but she loves it," White says.

"There was a lot of people around me," Helena remembers. When asked how she felt when she saw all of those people, she says, "Good. Made me feel like I wanted to get out of the hospital bed and guess what? I had to be in a wheel chair," she says.

Being in a wheelchair was something Helena says she misses the most.

"I miss it a lot. That way mommy can do everything I want her to do."

Helena bounced back from double pneumonia, MRSA and staph infection.

"She is very active. She's really awesome in school. Full recovery doesn't even cover it. She's just gone beyond expectations," White says.

The White family keeps in contact with the men who helped cut Helena out of the car. Her mom thanks God daily for sending the men to save her little girl.

"It's amazing to say the least. Extremely anxious to see what he has planned for her because it's obvious he has a big plan for her. She made it through so much to get here."

Related: Miracle girl who survived ten minutes trapped underwater in a car after a crash makes full recovery one year on

John Smith 01-19-2015

Missouri Teen Submerged in Icy Lake for 15 Minutes Makes 'Miracle' Recovery


February 5, 2015

A suburban St. Louis teenager who slipped through an icy lake last month and had no pulse for nearly 45 minutes after he was rescued has made a "miraculous" recovery, doctors said. In fact, 14-year-old John Smith's health has improved so much since the Jan. 19 accident that doctors allowed him to go home Wednesday, NBC affiliate KSDK reported. "I knew there were a lot of people in my corner praying for me," John, an eighth-grader from St. Charles, told the station.

John and two friends were walking over ice-covered Lake St. Louise when the trio fell through. One of the teens managed to swim back to shore while another clung to ice. By the time paramedics arrived, John had been submerged for more than 15 minutes. Crews attempted CPR for 15 minutes before doctors at SSM St. Joseph Hospital West continued the procedure for another 27 minutes, KSDK reported.

During that time, he showed no signs of life. But just then, John's mother, Joyce, entered the trauma room and started praying loudly, said Dr. Kent Sutterer. "Within a matter of a minute or two, his heart started again," the doctor told KSDK.

The 5-foot-3 teen's body temperature was at 88 degrees, and doctors were still worried that he could die within days if not hours. But not only did he survive — his brain functions returned to normal. "The only factors medically that were
really in John’s favor is that this was a cold-water drowning," Dr. Jeremy Garrett told the station.

Still, doctors remain baffled that his brain function was preserved. The tenacious teen, who loves playing basketball, must undergo several weeks of outpatient therapy after his brush with death. But Dr. Garrett said John’s recovery remains like nothing he has ever seen: "It's a bonafide miracle."

Related Links:

4 years ago, a St. Charles teen was under a frozen lake for 15 minutes. His resurrection story has inspired a new movie

Hollywood vs Reality

Gardell Martin  March 11, 2015

‘One Cannot Be Cold And Dead’: Here’s How This Boy Survived Near-Drowning After 1 Hour, 41 Minutes Of CPR

https://www.yahoo.com/lifestyle/one-cannot-be-cold-and-dead-heres-how-this-boy-114155195767.html

March 20, 2015 Yahoo Health

Randall Beachel pulled 22-month-old Gardell Martin from an icy creek on March 11 in Mifflinburg, Pennsylvania. The little boy’s brothers had lost track of him while playing, and he toppled into stream around 6 PM.

Martin’s body temperature had plummeted from a standard 98 degrees to just 77 degrees, he had no pulse and he appeared to be lifeless when his neighbor, Beachel, retrieved him.

“It was cold enough that my feet kind of instantly froze and I could not feel them,” Beachel said. “He was pretty much a lifeless baby.”

Martin was immediately given CPR, though, according to Buzzfeed News. He was rushed to one hospital, and then another by helicopter, where the CPR efforts continued for a total of an hour and 41 minutes.

Doctors warmed his body as they put the little boy on a ventilator and administered treatment. When Martin’s temperature hit 82 degrees, doctors registered a pulse. Not long after, his heart started to pump fully again. Around 2 AM the day after the incident — just after his dad, a truck driver, was able to be by his side for the first time — Martin woke up.

About a week later, the toddler is back home with his family. He suffered broken ribs from the extensive CPR, and also has a slight tremor, according to The Patriot News, but otherwise, he appears to be functioning normally with no devastating ill-effects from the terrifying incident.

How could a toddler fall into 34-degree water, remain lifeless for close to two hours, and then survive without any apparent brain or organ damage?

The icy water that caused Martin’s problems also sustained him. According to doctors, the hypothermia Martin developed from the cold conditions while he was submerged in that creek likely saved his life. Low temperatures can have a protective effect on the body, where the metabolic and oxygen needs of the organs are less for survival.
At least since the 1980s, scientists have wondered what we can learn about organ preservation from true hibernatory animals, since some of them can "store" their organs for long periods of time at temperatures of around 40 degree Fahrenheit.

Also interesting, in a 2009 study, researchers found that hypothermia among the severely injured is a risk factor for organ damage, but not mortality — so Martin’s case is still not typical, since he appears to have made a swift recovery. No one knows exactly what happened, and why Martin is faring so well and functioning in a relatively healthy manner.

“In my 23 years, I've not seen an hour and 41 minutes come back to this degree of neurologic recovery,” Dr. Frank Maffei, director of the pediatric intensive care unit at Geisinger’s Janet Weiss Children’s Hospital, told ABC News.

“It was an act of God,” said his mother, Rose Martin. “There is no doubt in my mind it’s a miracle. God had the right people in the right place at the right time and they all did a wonderful job.”

In near-drownings, youth is a protective factor, as historically, children under the age of five have seemingly had the best outcomes, according to emergency medicine physician Darria Long Gillespie, MD, an assistant professor at Emory University School of Medicine.

“Classically, cold water activates something called the ‘diving reflex’ in which the heart rate declines and blood is transferred to the more vital organs, accounting for improved survival,” Gillespie tells Yahoo Health, noting water temperature by no means guarantees survival.

“While it is true that hypothermia does reduce the body’s metabolic demands, which is why we do therapeutic hypothermia in other indications, it hasn’t been shown to improve outcomes in near-drownings.”

Gillespie agrees Martin’s case is rather miraculous. “Other factors associated with a poor prognosis that this child had included a resuscitation lasting more than 30 minutes, the fact that his submersion was so long, and the fact that he was unresponsive upon being found.”

So, how did Martin make it then? “I think that the biggest factors here were rapid and appropriate treatment, as well as continuing CPR until the child was warm and not giving up,” Gillespie says.

The rescue workers’ and doctors’ resolve is probably the major reason Martin is still here today. “There’s a saying that ‘One cannot be cold and dead’ — or, in other words, you don’t declare someone dead until they have been warmed and still show no signs of pulse or life,” Gillespie continues.

“For this very reason, people can have no signs of life while extremely cold, and then, in some cases, have a return of circulation once they are warm.”
Child Revived Almost 2 Hours After "Drowning" - But How?
March 2015

Last Wednesday evening, a 22-month-old child tripped and fell into an icy tributary of Buffalo Creek, outside Mifflinburg, Pennsylvania. The boy was quickly swept downstream for about a quarter of a mile before being washed up on a grassy knoll, which was where a neighbor later found him. The infant had no pulse and was not breathing at the time of discovery and may have been in the 1°C (34°F) water for as long as 30 minutes.

According to PennLive, emergency services were immediately called and as soon as they arrived they began to perform CPR on him, which continued uninterrupted as they made their way to Evangelical Community Hospital before boarding a helicopter destined for Geisinger.

Upon arrival, the child still had no pulse and his body temperature was a mere 25°C (77°F), which is substantially lower than the normal body temperature of 37°C (98.6°F), so attempts to resuscitate him were continued alongside administering fluids to warm him. The medical team was ready to admit him into surgery in order to place him on a heart bypass machine, but a pulse was finally detected after 20 minutes so doctors decided to carry on with resuscitation and warming efforts. Amazingly, CPR was carried out for a total of one hour and 41 minutes, which required the hands of many as it is such a tiring procedure.

Once he reached a more reasonable body temperature, the boy was given blood pressure medicine and placed on a ventilator. Amazingly, he woke up at 2am Thursday and, despite everything, he suffered no neurological damage. Five days on, he returned home with his parents, who said that he is healthy, smiling and talking again.

So how did he manage to make it through this dramatic event? His seemingly miraculous survival is attributable to a combination of two main factors: his age, and the fact that he fell into extremely cold water. And here’s why.

The most serious consequences of immersion are lack of oxygen, or hypoxia, and the effects that this has on the heart and brain. Cold water can actually help protect against these effects by two different mechanisms. First, it triggers something known as the diving reflex, which helps to conserve oxygen by slowing down the heart and shifting blood to vital parts of the body, such as the brain.

Interestingly, this response is much stronger in children, which is part of the reason that children are more likely than adults to survive after prolonged submersion.

Second, cold temperatures and swallowing of water can quickly lead to hypothermia. Body temperatures below 30°C cause brain tissue to become significantly resistant to hypoxia and also reduce its energy consumption by...
around 50%. Our bodies are equipped with temperature regulation mechanisms, but these are not fully developed in infants, making them more susceptible to hypothermia. Furthermore, children also have higher surface area to body mass ratios and less body fat than adults, meaning they cool much faster and thermo-regulate less efficiently.

Related:
- Boy who fell into icy stream resuscitated after nearly 2 hours of CPR
- Cold Seen as Key After Toddler Survives After Heart Stops for 30 Minutes

"Michael" — April 24, 2015
Surviving 42 Minutes Underwater...How Boy Beat the Odds
https://www.livescience.com/51046-how-boy-survived-near-drowning.html
June 02, 2015 By Elizabeth Palermo  Strange News

A teenager in Italy recently beat some incredible odds when he survived for 42 minutes underwater, according to news reports.

The 14-year-old boy, identified only as "Michael" by the Italian newspaper Milan Chronicle, reportedly dove off a bridge into a canal with some friends last month and never resurfaced. His foot became caught on something underwater and it took firefighters and other first responders nearly an hour to free him from the depths. Though Michael remained on life support for an entire month, he recently woke up and seems to be doing fine, Time reported.

While Michael's story is certainly unusual, it's not unheard of for people to survive prolonged stints underwater, according to Dr. Zianka Fallil, a neurologist at North Shore-LIJ's Cushing Neuroscience Institute in New York. Fallil, who called the teenager's recovery "quite remarkable," told Live Science that there are two physiological processes that may come into play when a person is submerged underwater for an extended period of time with no oxygen.

The first of these processes is known as the "diving reflex," or bradycardic response, a physiological response that has been observed most strongly in aquatic mammals, but which is also believed to take place in humans. (This is the same reflex that results in newborn babies holding their breath and opening their eyes when submerged in water). When a person's face is submerged in water, blood vessels constrict and the heart slows down considerably, Fallil explained. Blood is then diverted to parts of the body that need it most.

"The body protects the most efficient organs — the brain, the heart, the kidneys — and pulls the blood away from the extremities and other, not-as-essential, organs," Fallil said.

The diving reflex is often cited as the thing that saves people from nearly drowning. However, it's difficult to study this reflex in humans (likely because of the obvious dangers of recreating near-drowning experiences in a lab), said Fallil, who pointed to another, less controversial explanation for how people survive long stretches underwater — the selective brain cooling hypothesis.

"The selective brain cooling hypothesis [states] that, the quicker the brain cools, the more likely it is to survive," she said.

When you're immersed in cold water for a prolonged period of time, your body may carry out several processes that allow cooled blood to enter the brain, according to Fallil. One of these processes, hypercapnic vasodilation, occurs when the body retains carbon dioxide as a result of not breathing.
This extra carbon dioxide causes blood vessels in your brain to dilate (become wider), which in turn allows more cool blood to enter the brain.

While the selective brain cooling hypothesis has also not been widely tested in humans, it's considered a more likely explanation for how the brain might be protected during episodes of prolonged submersion than the diving reflex, Fallil said. And there have also been several other studies conducted to see what factors, besides the body's reflexes, can help you survive underwater.

"There are a few studies that have looked at near-drowning victims to see if age, the duration of submersion or the temperature of the water had anything to do with survival," Fallil said. "And the one thing that they did find a correlation with was time of submersion."

One study, published in the journal Resuscitation in 2002, found that submersion time serves as a predictor of survival for near-drowning victims. The average amount of time spent underwater by the 61 patients in the study was 10 minutes. But, the patients who spent less time underwater (just five minutes) had the least amount of neurological disability after the incident. The victims who didn't survive spent an average of 16 minutes underwater. A similar study, conducted in 2013, found that there was a very low likelihood of a "good outcome" following a submersion lasting longer than 10 minutes.

However, neither of these studies found a strong correlation between the likelihood of survival and the temperature of the water in which a person was submerged, or a person's age. So while several news reports about the Italian teenager's harrowing 42-minute ordeal have concluded that his survival was a result of his youth or the relatively cold temperature of the Milanese canal in April, these are actually just guesses.

It's just as likely that he survived because he received excellent medical attention, including the use of extracorporeal membrane oxygenation, or ECMO (a form of life support that removes carbon dioxide from the blood and oxygenates red blood cells), Fallil said.

Editor's Note: Medical experts agree that intentionally holding your breath underwater for extended periods of time (whether as part of a training exercise or a competition) is a dangerous activity that increases the risk of drowning.

Michi Wakes Up After A Month - "Under Water For 42 Minutes"
https://milano.corriere.it/notizie/cronaca/15_maggio_26/tragico-tuffo-naviglio-salvo-14enne-un-caso-un-milione-09e33f8a-03aa-11e5-8669-0b66e644b3b.shtml?refresh_ce
26 maggio 2015 by Francesco Sanfilippo

The boy had dived into the Naviglio. The doctors of the San Raffaele have put in place an extreme procedure: mechanical assistance with extracorporeal circulation.

His name is Michael, Michi for mom and dad, he is 14, he is alive and, considering what happened to him, he is very well.

This despite the damn dip in the Naviglio, in Castelletto di Cuggiono, and those interminable 42 minutes under water, at a depth of two meters. An eternal time, in which the heart...
of Michi stopped beating while a few meters from him, on the surface, his friends, the firemen and finally the divers tried to do everything to bring him back up, but he was stuck for one foot.

When they brought it back to the surface, everyone thought it was too late. But no.

Thanks to the fire brigade, the resuscitators of 118 and above all to the cardio-thoraco-vascular resuscitation team of the San Raffaele directed by Professor Alberto Zangrillo, Michi is still alive and well: "It is the greatest satisfaction of my whole career professional".

"The limit conditions to hope for a recovery are immersion in waters no warmer than 5 degrees for a time not exceeding 20 minutes, and in cardiac arrest for no more than 6 minutes," explain the doctors. Only taking into account the young age and the cold water of the Naviglio (which caused a slowdown in vital functions), Zangrillo decided to try "an intervention at first sight also for us irrational". There are data reported in scientific literature, "for the most part relating to cases recorded in the northern seas". Success has gone beyond the most optimistic expectations.

Speaks And Remembers Everything

Today the boy, a native of Cuggiono, "is vigilant, oriented in time and space, dialogues with parents and remembers the previous experience of the accident", as the doctors say. Lela, Michi's mother, was at the press conference sitting to the left of the professor. That damn April 24 didn't even understand the doctor's words. "I told her: Michi has a chance on a million to make it but without knowing what the outcome will be. Let us try," says Professor Zangrillo. Now thank the doctors and those who prayed to God for his son. On the right of the professor the father Stefano: he also thanks the doctors.

The Accident

The frames of that incident occurred a few minutes before 5 pm on April 24th remember them all: the beautiful sunny day, the sultry heat and the five friends who all dive together, from a bridge, in the turbid and cold water (15 degrees). All of them emerge except one, Michi, who gets stuck with one foot on the edge of one of the long poles arranged since time immemorial along the canal to act as a bank for the barges. It's panic. For 43 endless minutes everyone tries to get the boy out of the water. In the end, the divers of the Milan fire brigade succeeded, through a human chain, in taking the boy to the shore. Its temperature is 29 degrees, the heart is still, but the resuscitation maneuvers are
successful, because after a few minutes there is a faint pulse. The helicopter rescue service arrives and Michi, in desperate conditions and at times "refractory to resuscitation therapies" is transported to the San Raffaele.

The Rescue

The resuscitators have tried everything for everything, first with an extreme procedure of mechanical assistance of the circulation and then establishing extracorporeal circulation (with the Ecmo machine), in an organism in conditions of hypothermia. But the low temperature due to the icy waters of the Naviglio may have protected the vital centers.

It was necessary to amputate the right leg, below the knee, due to a blood perfusion problem. Then other very advanced intensive treatments were implemented to support heart, kidney and liver activities that no longer worked.

Over the days, Michi began to respond to therapies that slowly led him to resume kidney and liver function. Now the boy is awake and well. In a few days rehabilitation will begin: talk and joke, with doctors and parents, and think about his Juve that next week the Champions League final will be played.

"The other day - says Alberto Zangrillo - he asked us for a mojito. He recovered the spirit of that little boy who knows parents and friends. An exceptional boy, endowed with uncommon intelligence. Every day I talk to him and I joke."

Related: Italian boy survives being trapped underwater for 42 minutes

Italian teenager miraculously survives being stuck underwater for 42 MINUTES

Boy Survives Being Submerged for 42 Minutes
suction drain in one of the swimming pools of the park.

Other swimmers were completely unaware of what happened while the youngster spent several agonising minutes below the water.

Thankfully the young girl was finally spotted and pulled out by the lifeguards, although her lungs had filled with water.

Images of the rescue show lifeguards pulling out the lifeless body of the young girl from the water.

Her mother spoke to local TV station and reported that "she is now stable and out of danger."

Medics have also been able to discard the possibility of neurological damage, which was their main concern when the young girl arrived in the intensive care ward.

According to sources, the park attendants had opened the drains to empty the pools and encouraged people to leave.

The mother of the girl says they are considering reporting the park for negligence in and lack of proper safety measures.

The mother said: "What I want is justice, because this could happen again. I think it was negligence on their part for opening the drain when people were still inside the pool."

Authorities are currently investigating the matter to determine the responsibility of the park administrators in the incident.

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Eden Carlson 02-2016

Scientists Have Reversed Brain Damage in a 2-Year-Old Girl Who Drowned in a Swimming Pool


19 Jul 2017 Peter Dockrill

Researchers in the US have reported what they believe is a first-of-its-kind reversal of brain damage, after treating a drowned and resuscitated toddler with a combination of oxygen therapies.

The little girl, whose heart didn't beat on her own for 2 hours after drowning, showed deep grey matter injury and cerebral atrophy with grey and white matter loss after the incident, and could no longer speak, walk, or respond to voices – but would uncontrollably squirm around and shake her head.

Amazingly, thanks to a course of oxygen treatments – including hyperbaric oxygen therapy (HBOT) – administered by a team from LSU Health New Orleans and the University of North Dakota, doctors were able to significantly reverse the brain damage experienced by the toddler.

"The startling regrowth of tissue in this case occurred because we were able to intervene early in a growing child, before long-term tissue degeneration," says hyperbaric specialist Paul Harch from the LSU Health New Orleans School of Medicine.
The drowning occurred in February of last year, when two-year-old Eden Carlson slipped through a baby gate while her mother took a shower, then made it past a heavy door, before eventually falling into the family swimming pool.

She was in the water for 15 minutes before being discovered and had experienced cardiac arrest, and while her mother immediately began CPR, Eden wasn't successfully resuscitated for 2 hours, being eventually revived by doctors at Washington Regional Medical Centre in Fayetteville, Arkansas.

After receiving critical care in hospital for 48 days, the little girl was discharged, but due to the extent of her brain injuries and their physical side effects, Harch proposed treatment with oxygen therapies in an attempt to "wake up" Eden's damaged brain.

Hyperbaric oxygen therapy works by administering oxygen to a patient at an ambient pressure higher than atmospheric pressure, through the use of a sealed, pressurised chamber. By doing this, the amount of oxygen in a patient's blood supply is increased, which can restore normal levels of blood gases and repair damaged tissue.

In this case, Eden wasn't located close enough to a hyperbaric oxygen therapy chamber, so the team began a bridging course of normobaric oxygen treatments – delivered at sea level pressure – at fifty-five days after the drowning.

The treatments, given for 45 minutes twice a day through a nasal cannula, saw Eden recover alertness and reduced her squirming, giving her back increased movement of her arms and hands.

She also regained part of her ability to eat orally, and could speak short sequences – and laugh.

About three weeks later, the researchers moved Eden and family to New Orleans, where she began a round of new treatments in a hyperbaric chamber.

After just 10 sessions, Eden's mother observed that the toddler was back to "near normal, except for gross motor function", and so the little girl began physical therapy in addition to the hyperbaric treatment.

Once 39 hyperbaric sessions were completed, Eden's walking had improved, and her speech level was assessed to be now greater than it was at the time of the drowning. She demonstrated improvements on all neurological abnormality tests, and showed near normal motor function and cognition.

At the conclusion of the treatment, some 162 days after she drowned, MRI scans revealed that Eden still bore a mild residual injury to her brain, but had experienced a near-complete reversal of cortical and white matter atrophy.

The team studying her recovery say that to their knowledge, this kind of reversal is "unreported with any therapy".

And while they don't fully understand the exact breakdown of this amazing revival in Eden's fortunes, it's clear that normobaric and hyperbaric oxygen treatments combined to reduce inflammation and promote brain cell survival.
"Although it's impossible to conclude from this single case if the sequential application of normobaric oxygen then HBOT would be more effective than HBOT alone, in the absence of HBOT therapy, short duration, repetitive normobaric oxygen therapy may be an option until HBOT is available," Harch says.

"Such low-risk medical treatment may have a profound effect on recovery of function in similar patients who are neurologically devastated by drowning."

The findings are reported in Medical Gas Research.

Update: Since this story was first published, other scientists have voiced their concerns about whether the oxygen treatments administered to Eden could explain her recovery as suggested in the study.

In comments made to Live Science, paediatric neurologist Ian Miller from Nicklaus Children’s Hospital in Miami cast doubt on whether hyperbaric and normobaric treatments could deliver such a result.

"There is just no way that providing oxygen to a dead brain cell makes the brain cell recover," Miller told Live Science's Rachael Rettner. "That's not how the brain responds to injury and to oxygen once neurological death has occurred."

His concerns were shared by physiotherapist David Cifu from Virginia Commonwealth University, who said Eden's recovery was more likely due to factors other than hyperbaric treatment, which was unlikely to have restored her lost brain functions.

In separate comments, consultant anaesthetist Oliver Sykes from University College London told The Independent that there's no evidence that hyperbaric treatment can produce recoveries like this.

"I can't think of a reason why what has been reported would have happened, and I'd be very surprised if this was a repeatable result," he said. "I haven't heard of this kind of reported outcome before."

For what it's worth, the FDA warns people on its website that hyperbaric treatments have been touted to deliver a range of medical benefits for various ailments, but many of the results aren't clinically proven.

In response to his detractors, Harch told Live Science that Eden made "progressive accelerated neurological improvement with each week of HBOT.... Spontaneous recovery and growth of tissue can possibly occur over time, but the child was not improving at this rate until the introduction of each of these therapies". As for whether the treatment and recovery in this instance were more than just a coincidence is unclear, but if Harch's claims are correct, hopefully future research into HBOT can clarify what's going on here, and whether we've got a truly viable solution to these kinds of brain injuries. Until then, we're thrilled Eden has made the recovery she has, but have updated the article with these opinions to give a fuller picture on some of the questions surrounding this area of research.
Ashlyn Krell  February. 12, 2017

27 Minutes revisited: A life saved, a new little life to cherish

‘Some X-Factor’: Ashlyn Krell’s Amazing Recovery

With no sign of a heartbeat after almost half an hour submerged in cold water, Ashlyn Krell’s chances of survival were bleak. Paramedics picked up the rescue efforts after she was freed from her overturned car.

John-Henry Birtle  February 28, 2017

Boy, Four, Who Was Underwater In Swimming Pool For NINE Minutes Stuns Doctors By Recovering To Walk, Eat And Speak Again

https://www.dailymail.co.uk/news/article-4502294/Boy-underwater-NINE-minutes-stuns-doctors-recovery.html

May 13, 2017 By LIZ DUNPHY FOR MAILONLINE

Doctors feared that John-Henry Birtle would not be able to walk or talk again

He was starved of oxygen for 28 minutes and had no pulse for 20 minutes

After successful treatment the youngster has defied the odds to recover

A four-year-old boy has made a miracle recovery after cheating death when he fell into a swimming pool and was underwater - for nine minutes.

Doctors feared that John-Henry Birtle would not be able to walk, talk or recognise his parents Roseann or Lewis after being starved of oxygen for nearly half an hour.

But after successful treatment the youngster has defied the odds and is now eating, walking and starting to speak again just two months after the incident.
The schoolboy had toppled into the hotel pool while the family had been on holiday in Slough, Berks., on February 26. Mum-of-four Roseanne eventually noticed her missing son and jumped into the water to frantically pull him out of the pool.

A member of staff rushed to give the lifeless child CPR, as Roseann, of Newark, Notts., watched on in horror.

Incredibly, the youngster was starved of oxygen for 28 minutes and his pulse did not return for 20 minutes - meaning he had technically drowned in that time.

John-Henry was then rushed to John Radcliffe Hospital in Oxford, where he spent 13 days on life support.

He was later transferred to Nottingham Children's Hospital for specialist treatment where he has since made a remarkable recovery.

Yesterday, Roseanne said: 'He was starved of oxygen for 28 minutes. For those 28 minutes he was gone.

'Doctors said he wouldn't have a good quality of life, but he proved them all wrong and actually walked out of hospital five weeks later.

'He is expected to make a full recovery.

'We were praying the whole time the lady was giving him CPR, and I had faith that God was going to heal him. He is my miracle boy.

'Nottingham Children's Hospital have been absolutely fantastic, and now we want to give something back.

'When you get to spend a long time in hospital you see how hard they work and what a brilliant job they do.'

The family are now looking to fund-raise for the Nottingham Hospitals Charity's Big Appeal, with Lewis set to run the Tough Mudder challenge on May 14.

Barbara Cathcart, Chief Executive of Nottingham Hospitals Charity, said: 'This is a remarkable story of hope and healing and we wish John-Henry well for his continued recovery.

'I'm delighted that the family wants to fundraise for Nottingham Children's Hospital.

'Our Big Appeal will make a big difference to children like John-Henry by helping to improve family accommodation and make the hospital a more child-friendly place, as well as funding up to the minute diagnostic equipment and crucial research.'

Related: 'Miracle Boy': Doctors Said He'd Never Walk or Talk Again After 28 Minutes Without Oxygen — but They Were Wrong

'Miracle boy’ makes recovery after surviving underwater without oxygen for 28 minutes
Puget Sound Woman 01-21-2018

ECMO Helps Revive Woman Thought To Be Drowned
February 16, 2018 by Christine Clarridge, The Seattle Times

Just before 3 a.m., the distress call came in to the Coast Guard's Small Boat Rescue Station in Seattle: A young woman and another person were on a weather-battled paddleboat in the middle of Puget Sound—and they were sinking.

The Coast Guard's Travis Curley, 31, and three other crew members raced their 45-foot response boat toward the reported location of the distressed boaters. As they rounded Duwamish Head at West Seattle's northern point, they heard from dispatchers that the woman had screamed just before the line went dead.

"Most likely, that means she was now in the water," said Curley, a boatswain's mate first class, recounting the Jan. 21 rescue.

After nearly two hours of searching through 4- to 5-foot waves and battling 35 mph wind gusts, a Coast Guard helicopter crew saw the 21-year-old Vashon Island woman floating face down near Seahurst Park in Burien.

Curley and his crew pulled her from the water and performed CPR before she was loaded into an ambulance at the Fauntleroy Ferry Terminal in West Seattle.

By the time she reached Harborview Medical Center, her body's core was at 77 degrees and it had been at least four hours since her heart or lungs had worked on their own. Had it not been for the use of a machine that re-oxygenates and warms patients' blood, "We don't think she would have survived," said Dr. Eileen Bulger, the UW Medicine physician who runs the hospital's trauma unit.

Against all odds, the woman made a full recovery; the man she was with did not make it.

"I WOULD DEFINITELY CALL IT A MIRACLE"

The Extracorporeal Membrane Oxygenation machine (ECMO) is a specialized pump that drains a patient's blood from a major vein, adds oxygen, strips out carbon dioxide, warms it and pumps it back into the body.

The machines have been used for decades as heart-lung machines during open-heart surgery and on newborns in intensive care.

But in the last decade they have been used increasingly on adults with traumatic heart and lung injuries, in Europe and in some parts of the United States.

Both Swedish Hospital and the UW Medical Center have ECMO machines that are used to support patients undergoing cardiac surgery. But those machines are reserved for specific patients under certain circumstances.

In contrast, Bulger believes using Harborview's five ECMO machines more widely to treat people with...
otherwise fatal lung and heart injuries fits the medical center's mission as the state's only Level I adult and pediatric trauma and burn center.

"This technology is really encouraging," said Dr. Steven Mitchell, UW Medicine's medical director of emergency services at Harborview.

Of the 28 patients who have been treated with one of the hospital's ECMO machines, 60 percent have survived and most of the survivors have flourished.

"I would definitely call it a miracle and I owe Dr. Bulger and her team my life," said Cmdr. David Harris, a naval flight officer who suffered devastating lung damage in a December 2016 accident at Naval Air Station Whidbey Island.

"There was massive overpressurization of a cockpit on the flight deck that essentially caused my lungs to explode and collapse," he said in a recent telephone interview.

His injuries were so severe that doctors believed he would not live, or if he did, his quality of life would be poor, he said.

He was treated by Navy medics on the ground and on the flight to Harborview and put on an ECMO machine. The machine was able to do the work of his lungs during his recovery, and they fully healed.

The 41-year-old married father of three young boys woke in the hospital on Jan. 3, 2017, and was discharged days later. He was back at work last Feb. 15 and was deployed with his squadron to the Western Pacific in March and later deployed to Turkey.

When he returned, Harris—who is training for his first full Iron Man competition—visited the staff at Harborview.

"It was really emotional for me to walk in there loud and proud and be able to say thank you to all the doctors and nurses and everyone that took care of me," Harris said.

"The bottom line," he said, "is I'm pretty confident I would not be alive if I had not been immediately sent to Harborview and if they had not put me on ECMO."

The machine is not the answer for every devastating illness, disease or accident. It can't restore neurological function lost to traumatic brain injuries, Bulger said.

But for people like Harris and the woman saved last month from Puget Sound, it has, indeed, been a lifesaver.

The Vashon Island woman, who asked not to be identified, has recovered with no apparent neurological damage.

She was placed on the ECMO machine almost immediately after her arrival at Harborview, according to her doctors, and within about 15 minutes, her body temperature was up to normal and her heart had been restarted.

Two days later, she was off the machine and giving her doctors the thumbs-up, Mitchell said.

Mitchell said the woman reported to her medical team that she had no memory of the incident that claimed the life of Tyler Ingraham, 27, of Des Moines. Mitchell said that kind of amnesia is normal for a person who has suffered an acute traumatic event.

But otherwise, he said, she was her old self again. "Her family definitely felt they got their daughter back," Bulger said.

"AT THE FRONTIER OF SOMETHING AMAZING"
When Travis Curley and his crew learned that the woman they had pulled from the water had survived, they went to see her.

"Everyone on the boat ... I don't know how to say it ... we felt bad. We thought we'd pulled a dead person out of the water, but when we got the update that she was alive and was going to make a full recovery, we were amazed. That's not usually how the story goes," he said.

"We all went up to meet her and she thanked us and her family thanked us," said Curley. "It doesn't always end like this, so it was really happy for us."

Bulger credits the Coast Guard crew as well as the EMTs who kept performing CPR long after some might have stopped.

It absolutely set the stage for success, she said, and it's one of the lessons she hopes people will learn from this: Learn CPR, don't give up during a cold-water recovery and remember that Harborview's ECMO machines are available.

"They are not miracle cures" said Bulger, "but we are at the frontier of something amazing and encouraging in acute care and we are opening the gates."

**Related:** 'We thought we'd pulled a dead person out of the water': Woman recovers after Puget Sound rescue

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**Steve Martin**  **February 6, 2018**

**Miracle Dad Survives Underwater For 34 Minutes After Falling Into Freezing Canal Following Heart Attack**


23 FEB 2018 BY David Thomas

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**The freezing water saved his life because it "preserved" his organs and stopped his body from shutting down**

A jogger from Cornwall who fell into a canal after suffering a heart attack and was submerged for over half an hour has made a miracle recovery - thanks to the cold water.

Steve Martin, 43, from Torpoint, was running along a towpath when he toppled into the freezing water on February 6.

The hospital technical inspector had finished a work conference in Worcester when he went for a jog in Stourport-on-Sever at around 6pm.

Incredibly, he spent 34 minutes floating face down in the canal before a passerby spotted him and emergency crews hauled him out using ropes.

He was rushed to intensive care and doctors warned his family to expect the worst as his body temperature had plummeted to 26C (78.8F) - down from 37C (98.6F).

Remarkably, the freezing water saved his life because it "preserved" his organs and stopped his body from shutting down.

But the superfit dad-of-two, from Torpoint, Cornwall, has...
defied the odds and is making a good recovery in hospital just two weeks after his heart attack.

His wife Anna, 38, an office worker, said: "Stephen was on a course in Worcester, he went for a run after then had a cardiac arrest and drowned in the canal.

"He was under the water for 34 minutes, he was resuscitated, and his body temperature was 26C.

"He wasn't expected to live, he was in an induced coma.

"Because of the cold water he survived. "It preserved his body.

"He was face first in the canal.

"He has knocked his two front teeth out and desperately needs to get new ones so he can talk and eat better.

"It has been very traumatic for myself and my children.

12yo Michigan boy   April 26, 2018
How A Child Survived Eight Terrifying Minutes Trapped Underwater

In an instant, he disappeared — slipping beneath the water in a shallow swimming pool on the South Carolina coast. The 12-year-old Michigan boy and a friend had been playing in a lazy river at the Avista Resort in North Myrtle Beach, a popular vacation spot in South Carolina. Then one of the children’s goggles broke and fell through a grate at the bottom of the pool, according to NBC affiliate WDIV.

The boy, identified in news reports as Evan, dipped under a few feet of water and lifted the grate, which was covering a drainage pipe. His leg was sucked into the intake and, just like that, he was trapped underwater.

Surveillance video captured the almost eight minutes in March that the boy struggled as bystanders tried to free him. “It was scary. It seemed to happen fast but take forever at the same time,” his mother, Alyssa Pappas, told the station.

Caught on camera: Boy trapped underwater in hotel pool for nearly 8 minutes survives with help from heroic rescuers

In an interview with NBC News that aired this week, Pappas spoke about the terrifying moment that her son nearly died and then the days that he spent in a drug-induced coma in the hospital fighting for his life. Typically, the human body can go without oxygen only for a few minutes before the organs, namely the lungs and brain, are at risk of permanent damage, according to Medical Daily.

“You’re on vacation. You think you can take it easy and relax. But even with adult supervision, things could happen,” she said. “It happens very quickly, and I just hope that this keeps somebody from going through what we went through.”

A sign posted near the swimming pool warned people that there was no lifeguard on duty and to “swim at your own risk.”

After the boy slipped underwater, he appeared to reach up and grab the grate, which his friend was holding for him. Inflatable inner tubes drifted around the lazy river as the friend tried desperately to pull the boy up by his arm. After about a minute-and-a-half, the friend started waving and calling for help.

A woman nearby hopped into the water and tried to pull the boy free.
“He’s drowning right now,” a 911 caller told an emergency dispatcher, according to audio that was obtained by the “Today” show. “We need somebody now.”

The morning show reported that a Pennsylvania corrections officer, a family friend who was also vacationing there, ran to the pool. The surveillance video showed the moment he jumped into the water still carrying an infant who was secured inside a baby swim ring and rushed to help the boy. Another woman tended to the infant as the man went to work.

The corrections officer, identified as Shaun Skursky, tried to pull the child from the drain. When he could not free the boy, Skursky started giving the child mouth-to-mouth resuscitation — surfacing to take breaths before going underwater again to give air to the child. After 7 minutes and 40 seconds — after good Samaritans and first responders worked to pull the boy free and resort employees switched off the swimming pool pumps — people pulled the boy from the pool and immediately started to perform CPR.

The boy’s mother told NBC News that for the next several days her son was kept in a medically induced coma and remained on a ventilator for more than a week. “You didn’t even know if he was going to open his eyes or what would happen once they did stop the medicine to wake him up,” she said in the interview.

But he did wake up, and is now home and back in school in Commerce Township, near Detroit. His mother said he is being monitored for potential brain damage.

Avista Resort did not immediately respond Tuesday to a request for comment by The Washington Post but said in a statement to NBC News that it is “thrilled” that the child is recovering from the incident.

Officials at the resort said that the swimming pool, which had reportedly passed inspections, “is safe for all of our guests” as long as the grates are in place. “Evidence confirms that the boy and his companion dislodged the grate before he caught his foot in the intake,” the resort said.

But the family’s attorney, Michael Morse, told the station that the grate should not have been loose enough for a child to remove. He could not immediately be reached for comment by The Post.

Pappas, the boy’s mother, said the ordeal was traumatic but that she is thankful her son is alive.

“I know that so many people prayed for him,” she said, sobbing. “It’s just a miracle, I think.”

Related: Mom: It’s a Miracle Boy Trapped Underwater for 8 Minutes Survived
Kacper Krauze  05-12-2019

Miracle As Schoolboy, 13, Is Revived After Spending 25 Minutes Submerged In A River

https://www.dailymail.co.uk/news/article-7021505/Miracle-schoolboy-13-revived-spending-25-minutes-submerged-river.html?fbclid=IwAR2U2EwcFQw4sMEyJAVFaRl64jP-1kXwqW2wFQR47ZLoQEB8xtQD7hZeF

12 May 2019 By Joe Middleton For Mailonline

• Kacper Krauze, 13, was pulled from the cold river in cardiac arrest but was saved by a treatment that pumped oxygenated and warmed his blood

• The Great North Air Ambulance Service (GNASS) worked with fire crews, police and ambulance staff to save the teen's life

• One of the most significant factors in Kacper's survival was the use of Extracorporeal Membrane Oxygenation (ECMO)

A schoolboy miraculously survived after spending 25 minutes submerged in a river.

Kacper Krauze, 13, was pulled from the cold river in cardiac arrest but was saved by a treatment that oxygenated and warmed his blood.

The Great North Air Ambulance Service (GNASS) worked with fire crews, police and ambulance staff to save the teen's life, after the incident in Appleby, Cumbria.

Steve Miles, GNAAS paramedic, said: 'I think this is what the job's all about. This is what we aim to achieve with every patient. You want a good outcome and to meet somebody like this.

On Tuesday the 13-year-old visited the charity's Langwathby base with his mother Wioletta and father Marek.

Mrs Krauze said: 'Every day it's a little bit better. It's like a miracle he survived. Thank you very much to the air ambulance. Absolutely wonderful job. Very, very professional people.'

'Last time I saw Kacper he was being resuscitated, he had no signs of life, and to meet him, talk to him, see him walking, is brilliant, absolutely fantastic.

One of the most significant factors in Kacper's survival was the use of Extracorporeal Membrane Oxygenation (ECMO). The ECMO machine is able to carry out the functions of both the heart and lungs, to provide blood flow and oxygen to the body. A cannula tube takes the patient's blood out of a large vein, to pass through the machine.

An external pump does the role of the heart, and blood passes a membrane that oxygenates the blood and removes carbon...
dioxide, doing the usual job of the lungs. The blood then goes back into the body through a tube in a large artery. The machine is also able to warm the blood, which was important as Kacper’s body temperature had cooled significantly while submerged in the river.

Dr Gospel, aircrew doctor and clinical fellow in paediatric intensive care at the Freeman Hospital in Newcastle, was part of the team responsible for delivering the ECMO therapy in hospital.

After meeting Kacper and his family again last week, she said: ‘Kacper has a truly inspiring story of amazing outcomes possible from the bleakest of circumstances. To see Kacper and his parents today, reminds us all of why we do what we do.’

GNAAS is reliant on donations to survive. To donate click here

Garrett Pettry – 06-19-2019
ITAL'S A MIRACLE: Two-Year-Old Survives Near-Drowning
https://www.13abc.com/content/news/Doctor--512427751.html
Jul 09, 2019 By Alexis Means, Kristian Brown and Lissa Guyton
Part 3: Garrett's doctor describes his miraculous recovery

TOLEDO, Ohio (WTVG) - Two-year-old Garrett Pettry is being called a miracle child after doctors say he nearly died falling into a pool back on June 19th.

According to Garrett's mom, he was with a babysitter, playing with other kids near the pool, when he fell in. Toledo police officers and firefighters responded to the scene, but the murky pool water made it difficult to find him. They say he was under for at least five minutes.

When he was finally pulled from the water, emergency crews performed CPR for more than twenty minutes as they rushed him to the hospital. Doctors in the ER continued to work on him before sending him up to the Pediatric Intensive Care Unit.

According to his doctor, it's a miracle he survived at all. Garrett was unresponsive when he arrived at the hospital. The only thing that gave his medical team hope was an electroencephalogram (EEG).

His doctors decided to put him on a cold protocol, chilling his body temperature to keep him alive, and it worked. On Monday, the happy, now-healthy, smiling two-year-old was finally able to go home, escorted by the same first responders who saved his life.

An Expert On Cold-Water 'Drownings' Says Some Of The Crash Victims Might Have Been Saved

In Kodiak, Alaska, Coast Guard flight surgeon Dr. Martin Nemiroff was watching TV news reports on the crash with intense professional interest. Nemiroff, 41, is probably this country’s leading expert on a little-known medical phenomenon: the resuscitation of people who have apparently died of drowning in cold water. A Brooklyn-born M.D. who previously taught at the University of Michigan, Nemiroff is a Navy-trained medical diver—often the first to reach survivors when a plane goes down in waters near his base. In Michigan and Alaska, he has been personally responsible for reviving 35 victims of submersion in cold water, some of whom had been under for as much as an
hour. Dr. Nemiroff discussed his specialty and how it might have been applied in Washington with PEOPLE’S Jeanne Abbott and Rebecca Bricker.

How long after the Air Florida crash could the victims have been saved?

There are many variables. The colder the water, the better. The Potomac was optimally cold—about 31°F. In water warmer than 70°F, victims do not do well after four to six minutes. Generally, if victims are retrieved from water colder than 70°F within an hour, their potential for survival is good, assuming they haven’t sustained serious injuries.

How is that possible?

Cold water slows the heartbeat, stops the breathing and redistributes the blood flow toward the organs that need most of the blood and oxygen—the heart, lungs and brain.

This is called “the diving response.” Cold reduces the brain’s need for oxygen and permits it to survive longer during an airless period.

Are most emergency medical personnel familiar with your research?

It’s widely known. There are teams of dive-rescue specialists around the country who are skilled at diving quickly, getting people out of the water in an hour or less and starting resuscitation. There’s an international association of dive-rescue specialists based in Colorado. These rescuers are most prevalent in Michigan, Alaska, Colorado and Washington State.

Is there such a squad in Washington, D.C.?

Not to my knowledge.

Could such a squad have made a difference there?

I certainly think so. Dive-rescue specialists would have been able to get to at least some of the victims. I was very frustrated watching the news of the crash, which is in no way a criticism of some of the heroic rescues that occurred. How long could the survivors have stayed conscious and afloat in such icy waters?

About five to 10 minutes. But even when they become unconscious, they are liable to stay afloat and would be recoverable for up to an hour.

What is the longest known submersion time for a cold-water drowning victim who has fully recovered?

Forty minutes. We’ve attempted to revive patients who have been in the water for one or two hours without complete success. Those victims had brain damage and only lived a few hours.

What factors determine a victim’s recovery?

How long the victim has been in the water, the water temperature, the victim’s age, how quickly cardiopulmonary resuscitation [CPR] was started and how well it was done. Another factor is how clean the water was—if it was muddy, we have poorer results because of impurities that have gotten into the victim’s system.

Does age make a big difference?

Statistically, the younger the victim, the better the survival rate. Children often die first, but they’re the easiest to save because they’re more resilient in being able to withstand a low-oxygen period. But in late December we received a report from Muskegon, Mich, of a 70-year-old man who was underwater for 40 minutes and had a complete recovery.
What is the resuscitation technique for cold-water drownings?

Restart the heart using CPR, which also includes removing water from the lungs, but don’t rewarm the body at the scene of the accident. Rewarming too quickly can cause shock, heart problems and sometimes skin burns. Once the victim is at the hospital, give him heated humidified oxygen to rewarm the lungs and heart. When the blood starts to circulate more normally, the body generates enough heat to rewarm itself. The body’s rewarming process generally takes one to three hours.

How long should you attempt to revive a victim?

I’ve tried to resuscitate victims up to 15 hours. One rule of thumb is that if we rewarm them to somewhere near normal body temperature without response, we cease our efforts.

Can CPR be given to victims while they’re still in the water?

The Coast Guard and various universities have been working on this. With current methods, too much time is lost from the moment we see a body until we start circulating that person’s blood more normally and start breathing for him. If I get in the water behind the victim, I can compress his chest against mine to restart the heart. In one air crash recovery I made in Alaska, I dove into a submerged cockpit and removed the pilot. When I brought him to the surface, I started CPR right away. He turned pink and had all the signs of success. But the pilot had un-survivable brain damage from the accident itself.

When did you first become interested in cold-water drownings?

In 1975 I treated a 2-year-old boy who had been missing for 20 minutes when a rescuer found him floating face down in a cold lake near Ann Arbor. But his mother refused to believe her son was dead and began mouth-to-mouth resuscitation and chest massage. By the time he reached me at the University Hospital the boy was fully revived, and he went home the next day.

First reports indicated that many of the Air Florida passengers died from crash injuries, not drowning. How will we ever know if more of them could have been saved? Autopsies could show how long the victims lived, how long they were potentially recoverable and what actual effect the water temperature had on their efforts to exit from the plane. I’m not involved in the investigation, so it’s hard to make a firm statement. But I’m less inclined than others to accept reports that the victims died of injuries. In this type of accident, a faster response by specialized personnel might have saved some of the victims.


http://thesurvivaldoctor.com/2012/07/06/cpr-and-drowning/

by James Hubbard, M.D., M.P.H.

Although I’ve never had to perform CPR on a drowning victim, I’ve done it on others. And I can tell you, it’s a little more complicated and messy than what you what you see on TV. There, the victims almost always make it. Just a little light chest pressing, maybe a push or two on the stomach, then, when all hope seems lost, the person suddenly spits out a gob of water, and that’s that.

In real life, for one thing, you’ve really got to press hard on the chest—much harder than any live actor is going to stand for. For another, it’s not only water that comes up.
eighty percent of near-drowning victims vomit at some point during the resuscitation. Bet you’re not going to see that on the next version of *Baywatch*.

So, for near-drowning victims, you use the old method and start mouth-to-mouth breathing ASAP, even if the person is still in water, if that’s possible without endangering yourself.

Two more caveats before starting official CPR on dry land:

1. Someone should call 911 ASAP.
2. Unless you witnessed the drowning and are sure the person could not have possibly hit their head, treat the victim as if there could be a neck injury. For more on that, [view my video here](#). (At 2:25, it shows how to turn someone with a possible neck injury.)

The ABCs of CPR for Near-Drowning Victims

**A. Open the airway.**

1. Sweep a couple of your fingers around in the mouth to remove any debris.
2. If there’s water in the mouth, turn the person on their side or pull up their middle a bit to let it drain. **Otherwise, don’t waste any more valuable time trying to get water out. It’s not coming.**
3. To open the airway, use the jaw-jut technique (because we’re assuming they could have a neck injury): place the fingers of both of your hands at the person’s jaw just below the ears, and jut the jaw forward (being careful not to move the neck).
4. Place your ear close to their nose to listen for breathing. Watch for chest movement at the same time. It’s much easier if a second person can do this while you’re holding the neck and jaw.

**If the person’s not breathing,**

**B. Blow.**

**The Real Way to Perform CPR on a Near-Drowning Victim**

These days hands-only CPR is the new, in thing for nonmedical responders. That is, no ventilation. Just good compressions of the chest at one hundred beats per minute (*the same rhythm as “Stayin’ Alive,”* or *“Another One Bites the Dust,”* depending on whether you’re an optimist or pessimist, I suppose). For times when someone’s heart just stops, it’s been found to work as well in the first few minutes as combining chest compressions with mouth-to-mouth.

But hands-only CPR is not the best way to go in a case of near-drowning because the person’s primary problem is lack of oxygen.
Pinch the victim’s nose shut and seal your mouth over theirs. Keep the jaw jutted as best you can. Blow hard enough to see their chest rise. Repeat in 2 seconds. If the chest is not rising, check the airway again for trash, reposition the jaw, and make sure you have a good seal over the mouth.

C. Check for a wrist or carotid pulse.

If there is a pulse but no breathing, continue mouth ventilations at five-second intervals.

If there is no pulse, someone needs to get on their knees, palms on the victim’s chest, elbows straight, and push down to compress the chest about two inches. Repeat this every couple of seconds while counting out loud, “one, two, three.” When you get to thirty, someone give the victim two deep breaths. If you’re the only person there, you have to do this. Make sure the chest moves up. If it doesn’t, you’re not breathing hard enough, or you need to recheck the airway.

Okay, what happens after the inevitable vomiting? You turn the victim on their side again, wipe the vomit out with your fingers, and reposition them back on their back (making sure you move them with neck-injury precautions and that the airway is back open).

If all this seems difficult and confusing, it can be made a lot easier by taking a hands-on class at your local hospital or Red Cross. I promise, they’ll be patient with you, it won’t be embarrassing, and you’ll be glad you did.

Photos by Ozarks Red Cross on Flickr.

An Analytical Look at Survivable Submersion Times
MARCH 19, 2013 by RYAN MOORE

After the tragic entrapment of a canoeist on the Little River last weekend, I found myself wondering about the odds of surviving a long submersion. The canoeist’s peers, a team experienced in swiftwater rescue, persisted in their rescue efforts for 37 minutes by repeatedly swimming into a rapid that had just ensnared their friend in an unseen feature and despite initial orders from responding authorities. Thus is the camaraderie and commitment within the boating community; few rescue personnel would have given the same concerted effort at such great risk to themselves. That a pulse and spontaneous respirations were restored following resuscitation is further testament to their efforts.

Unfortunately, the victim succumbed to his injuries later that evening in the hospital.

The decision to continue rescue efforts is personal and based on careful consideration of the risk to oneself and the likelihood of good outcome for the victim. Many boaters would place themselves in harm’s way given the slightest chance of successful rescue, and I’m sure some would even
risk harm to recover the body of a friend. Nobody can argue with those decisions, as long as they are based on an understanding of the chances for successful recovery.

While most boaters have an appreciation of the risk involved in a rescue, few understand the relationship between survival and time submerged. I have heard everything from scaling back efforts following the “1-minute window” to pursuing rescue up to an hour in cold water. Medical professionals were present for last week’s rescue, and their decision to continue the rescue was based on a variety of factors.

While contemplating what I would have done, I realized my knowledge was limited to a recollection that children can survive extended periods submerged in cold water, and that Rod Baird survived 6 minutes submerged under Hyroelectric Rock on the Chattooga. The following is an exploration of the subject to aid myself, and others, in similar situations.

**The Natural Course of Prolonged Submersion**

Death or severe disability by drowning is caused primarily by lack of oxygen to the brain. Fatal neurological injury normally occurs within 5 to 7 minutes of submersion, and almost always occurs following 12 to 14 minutes. Survivors may suffer a spectrum of disability ranging from memory loss to persistent vegetative state, as damage to the brain progresses inward from the cortex (higher brain functions) to the brainstem (heartbeat, respirations, reflexes). Challenges following resuscitation include fatal brain swelling, damage to the kidneys and lungs, and electrolyte imbalances which can cause cardiac arrest. Several studies have demonstrated the relationship between submersion time and survival, including a case series of children that found the risk of death or severe neurological disability to be 10% for 0 to 5 minutes, 56% for 6 to 9 minutes, 88% for 10 to 25 minutes, and 100% for greater than 25 minutes.

Submersion time over 5 minutes makes intact survival unlikely; however, there have been rare cases of survival following prolonged submersion, including the longest case ever documented, a 2.5 year old girl submerged for 66 minutes in 5°C (41°F) water. One physician writes, “Reports of such ‘miracle’ cases in the medical literature, although fascinating, can readily introduce a false optimism because of the limited reporting of the dismal outcome in the majority of prolonged submersion victims.”

There are 500,000 fatal cases of drowning per year worldwide, and exposure-adjusted, person-time estimates for drowning are 200 times as high as such estimates for deaths from traffic accidents.

Despite this frequency, a 2011 review of medical and news reports with documented submersion time and age found only 43 cases of survival with near-normal functionality following prolonged submersion (> 4 minutes). Two-thirds were children less than 12 years old, and the remaining adolescents and adults were noted to be small in size. Only 4 survived prolonged submersions in water greater than 6° C (42.8° F), and all were submerged less than 30 minutes.

The authors state that "this is likely to be a reflection of the fact that such survival is extremely rare in water warmer than 6 °C, rather than indicating that we have missed a large number of incidents in our search of the literature", although
the possibility of undocumented cases has been raised (12,13).

Cold water lengthens the survival time by two mechanisms. It triggers the mammalian diving reflex, which halts breathing and conserves oxygen by slowing the heart rate and moving blood to vital parts of the body. This response is stronger in children than adults. (14) An opposing “cold shock response” may predominate, which leads to a faster heart rate with potential fatal rhythm disturbances (15). This response also causes immediate aspiration and swallowing of water, which quickly cools the heart and carotid arteries leading to “selective brain cooling”. (4)

A reduction of brain temperature by 10° C decreases energy consumption by 50% and doubles the duration of time the brain can survive without oxygen. (16) This “therapeutic” hypothermia is accelerated by surface cooling in children and small adults with higher surface-area to body mass ratios and less subcutaneous fat. Panic by the victim (breath holding and vigorous attempts at escape) and protective gear worn in cold water work against these principles and may prevent therapeutic hypothermia.

Technical Guidelines for Rescue Attempts

There is no universal consensus on rescue efforts in prolonged submersion. A group of experts published the following based on the cases outlined above: “if water temperature is warmer than 6 °C (42.8 °F), survival/resuscitation is extremely unlikely if submerged longer than 30 minutes. If water temperature is 6°C or below, survival/resuscitation is extremely unlikely if submerged longer than 90 minutes.” (4)

They made no differentiation between children and adults given that there have been rare cases of adults surviving prolonged submersion. The possibility that cases of survival longer than 30 minutes in water warmer than 6°C exist, but have not been identified, has some promoting between 60 minutes (US Lifesaving Association) and 90 minutes (The Joint Royal College Ambulance Liaison Committee) of rescue efforts regardless of water temperature (12,13). The original authors point to a lack of evidence supporting such guidelines, adding that “when conditions are extreme, rescuers may be put at risk without foundation.” (17) Regardless of differing views, all agree that it is the responsibility of the commander to tailor efforts to the situation at hand, and specified timeframes are simply guides “likely to be of most use when rescuers are placed at high risk by continuing a search and subsequent...”

Relationship between water temp and submerged survival time for the rare instances of survival with full recovery outlined above. From Tipton 2011

PSDiver Magazine Issue 123 www.PSDiver.com  Page 74
rescue attempt.” (17) As another medical professional writes: “It is important to emphasize that the victim first needs rescuing and it is the decision to continue these attempts beyond the ‘likely’ survival time that is important for the commander. If the casualty is still awaiting rescue and is beneath unstable ice, in large seas or in the depths of a cave then we would hope rescuers would think carefully about the likelihood of survival versus the risk to those whom we know to be alive right now – the rescuers.” (18)

**Practical Guidelines for Rescue Attempts**

In dangerous swiftwater environments, the likelihood of survival should continuously be reassessed by the trip leader or individual leading the rescue. For the average person trapped underwater, intact survival is most likely if rescued within 5 minutes, and unlikely following 10 minutes. Cases of survival longer than this are rare, but efforts may be extended in controlled environments with acceptable risk. Guidelines vary between 30 minutes for water exceeding 6°C (4), to 90 minutes regardless of water temperature (12). The one consensus is that likelihood of survival decreases greatly with time submerged, and this should be considered in light of the risk to the rescuer.

Situational awareness is key, and each rescue will be unique. Accessible location, experienced team, and low risk to the rescuers make prolonged efforts more reasonable. Water colder than 6°C and small size of the person entrapped may increase the length of survival. Rivers in both rain fed and snowmelt regions may be colder than 6°C in the winter, but typically exceed this temperature in the spring, summer, and fall (see figures below the Conclusion section for average temperatures based on USGS data from a variety of popular whitewater runs (19)). For example, from March 10th to 16th this year, the Little River fluctuated from 4.4 to 10 °C (NOAA).

Of course, rivers vary widely in temperature due to a variety of factors (distance from source, air temperature, reservoir release), and each river should be considered independently for the implications on rescue efforts. Lastly, whitewater is dynamic, and the possibility of air pockets should be factored in to any consideration of submerged time.
Conclusion

The rescue attempt that spurred this discussion was certainly conducted within accepted timeframes for possible survival, and it is admirable that the team persisted through difficult conditions to give their peer a chance, however small. Nobody can fault such selflessness, and I hope a similarly skilled crew is present should I ever become entrapped on the river. I also hope that each rescuer would be able to make an informed decision given the circumstances and consider their risk against my chance of survival. I would never wish for heroics that are not founded in purpose and reason.

References:

“Nobody Is Dead Until Warm And Dead”: Prolonged resuscitation is warranted in arrested hypothermic victims also in remote areas – A retrospective study from northern Norway☆

Sept 2014 Resuscitation Volume 85, Issue 9, Pages 1204-1211

Abstract
Hypothermic cardiac arrest has high mortality and few known prognostic factors. We studied retrospectively 34 victims of accidental hypothermia with cardiac arrest admitted to The University Hospital of North Norway during 1985–2013 who were resuscitated and rewarmed by extracorporeal circulation.

No patient survived prior to 1999, while nine out of 24 (37.5%) survived hypothermic cardiac arrest from 1999 to 2013. The lowest measured core temperature among survivors was 13.7 °C; the longest time from cardiac arrest to return of spontaneous circulation was 6 h and 52 min.

The only predictor of survival identified was lower blood potassium concentration in the nine survivors compared with the non-survivors. Submersion was not associated with reduced survival. Non-survivors consumed modest hospital resources. Most survivors had a favourable neurological outcome.

Conclusion

Prehospital rescuers and hospital emergency teams cannot be sure which victim of hypothermic cardiac arrest will survive resuscitation attempts. Our experiences support starting immediate basic and advanced life support which must continue with maximum efforts until reaching a hospital with extracorporeal rewarming preparedness and clinical experience. The total extra expenditures on non-survivors are modest, and survivor's outcomes are favourable.

A continuous, strong chain of survival is crucial. The chain can be strengthened by informing and training the public, the prehospital professionals and hospital teams in clear consensus- and evidence-based guidelines. With few patients, further studies and international registers are needed to expand our knowledge of prognostic factors and rational treatment guidelines.48

We thus uphold our credo during the last 28 years: “No victim of accidental hypothermia is dead until warm and dead”.

Outcome After Resuscitation Beyond 30 Minutes In Drowned Children With Cardiac Arrest And Hypothermia: Dutch Nationwide Retrospective Cohort Study

https://www.bmj.com/content/350/bmj.h418
BMJ 2015; 350 doi: https://doi.org/10.1136/bmj.h418
10 February 2015

Abstract

Objectives

To evaluate the outcome of drowned children with cardiac arrest and hypothermia, and to determine distinct criteria for termination of cardiopulmonary resuscitation in drowned children with hypothermia and absence of spontaneous circulation.

Design: Nationwide retrospective cohort study.

Setting: Emergency departments and paediatric intensive care units of the eight university medical centres in the Netherlands.

Participants: Children aged up to 16 with cardiac arrest and hypothermia after drowning, who presented at emergency departments and/or were admitted to intensive care.

Main outcome measure: Survival and neurological outcome one year after the drowning incident. Poor outcome was defined as death or survival in a vegetative state or with
severe neurological disability (pediatric cerebral performance category (PCPC) ≥4).

Results
From 1993 to 2012, 160 children presented with cardiac arrest and hypothermia after drowning. In 98 (61%) of these children resuscitation was performed for more than 30 minutes (98/160, median duration 60 minutes), of whom 87 (89%) died (95% confidence interval 83% to 95%; 87/98). Eleven of the 98 children survived (11%, 5% to 17%), but all had a PCPC score ≥4. In the 62 (39%) children who did not require prolonged resuscitation, 17 (27%, 16% to 38%) survived with a PCPC score ≤3 after one year: 10 (6%) had a good neurological outcome (score 1), five (3%) had mild neurological disability (score 2), and two (1%) had moderate neurological disability (score 3). From the original 160 children, only 44 were alive at one year with any outcome.

Conclusions
Drowned children in whom return of spontaneous circulation is not achieved within 30 minutes of advanced life support have an extremely poor outcome. Good neurological outcome is more likely when spontaneous circulation returns within 30 minutes of advanced life support, especially when the drowning incident occurs in winter. These findings question the therapeutic value of resuscitation beyond 30 minutes in drowned children with cardiac arrest and hypothermia.

27 March 2016

Letter to the Editor
Stop prolonging resuscitations in drowned patients with asystole

Sir, In the 2015 European Resuscitation Council Guidelines (Truhlár et al.)1, it is still recommended to continue resuscitation in submersed patients with hypothermia or those drowned in cold water, thus ignoring the conventional asystole protocol.1 Compelling evidence to perform resuscitation beyond guideline recommendations on drowned patients in asystole does not exist. The existence of notorious ‘miracle’ cases still guides doctors when attempting prolonged resuscitation in drowning victims. However, each of these cases was hypothermic and/or drowned in cold water.2 Evidence from larger studies suggests that ceasing CPR after a maximum of 30 min is the only right option for all drowned patients.

Hypothermia is one factor in resuscitation guidelines to prolong resuscitation efforts. Studies on avalanche victims showed better (neurologically intact) survival in hypothermic patients and these studies have often been used to make a comparison to drowning. Brown et al., however, found that avalanche victims who suffocated first and subsequently developed hypothermia, as in drowning, experienced no protective effect of hypothermia.3 Hypothermia in drowning reflects submersion time and thus a reduced chance of survival rather than a slow metabolic state that might be
neuroprotective, as previously suggested.2 Taking the above into consideration, the maxim “you’re not dead until warm and dead” should not be used in victims of drowning.

Another factor to support the recommendation to prolong resuscitation in drowning is submersion in ice cold water below 6 °C. While it is true that hypothermia improves neurologically intact survival, it does not follow that patients in asystole should be resuscitated much longer. A large Dutch prospective study showed that no child in asystole – including hypothermic patients and those who drowned in ice cold water – who was resuscitated for more than 30 min survived without severe cerebral injury.4 A large, retrospective case control study with 1094 adult participants showed the same results.5 In fact, in both studies, the effect of resuscitating for a longer time than guideline recommendations always resulted in death, or worse, harm from severe neurological damage.4,5

Of all (potentially) life-threatened submersed patients who need hospital treatment, 1–3% will suffer neurological impairment according to a review by Topjian et al.6 In resuscitated drowned children this percentage was even higher: 20%. Included in the study on adults was the majority of patients who did not need resuscitation, which is most often the case after submersion. Therefore, this number considerably underestimates the incidence of neurological injury when resuscitating submersed patients for a longer period than recommended by asystole protocol. We conclude that no submersed patient in asystole should be resuscitated beyond 30 min, even when presenting with hypothermia and/or drowned in cold water.

References

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June 17, 2016, By Gabrielle Frank Source: TODAY
On a hot day, your first instinct to cool down might be to jump into the nearest body of cold water. That could be a dangerous mistake.

Over the July Fourth holiday, many families in the U.S. head to lakes, oceans or rivers to escape the heat and relax. Though, it's important to remember that the water in most areas is still very cold this time of year — and could be deadly.

In May 2017, 4-year-old girl London DeDios fell into the Provo River in Utah. According to the Utah County Sheriff’s Office, quickly afterward, her mother, Brenda Nalleli DeDios, 34, and a bystander, Sean Zacharey Thayne, 30, both jumped in after her.

DeDios and Thayne couldn’t locate the girl, and they were not able to get out of the river themselves. After authorities rescued them, they were transported to Utah Valley Hospital and pronounced dead. The 4-year-old girl's body was recovered the next day.

Though the river is dangerous on its own, full of rocks and branches, the temperature of the rapid water may have played a role.

"This river is cold in August when it's boiling outside," Utah County Sheriff's Sergeant Spencer Cannon told The Salt Lake Tribune. "It's even colder now, with snow melt coming off the mountains."

Daryl Devey, operations and maintenance manager at the Central Utah Water Conservancy, said that the water that day was around 47-50 degrees in that area of the river.

"That is really cold," noted Paul Newman, a recreational boating safety specialist for the U.S. Coast Guard. "Nothing compares you for that cold ... The 4-year-old was probably completely panicked," he added, though he is not involved with the case.

Cold water shock is rare, but more likely in warmer months when people are hot and don’t consider water temperatures. In July 2015, Cameron Gosling, a 14-year-old boy, jumped into the River Wear, just outside of Durham, England, and...
never resurfaced. His drowning was caused by cold water shock.

Now his mother, Fiona Gosling, works with the local county government to warn people of the dangers of cold bodies of water.

“Until we had to live with losing Cam, we had never heard of cold water shock,” Gosling told TODAY, via email. “It’s a subject that’s not spoken about enough.”

In the U.S., there's an average of more than 3,500 unintentional drowning deaths each year, according to the Centers for Disease Control and Prevention. Newman believes a number of unexplained natural water drownings in the U.S. could be linked to the condition. He's seen enough of them over the course of his 10-year career with the Coast Guard to speak out about the risk.

In comparison, the suggested water temperature for the average multi-purpose pool is 84 to 86 degrees, according to the U.S. Water Fitness Association.

“In reality, anything below the temperature of your own body can put you at risk,” Dr. Ryan Stanton, spokesman for the American College of Emergency Physicians, told TODAY. “For a lot of people, that range would be from 55 degrees to 70 degrees Fahrenheit.”

That may not seem cold, but the average body temperature is 98.6 degrees Fahrenheit — so it's an almost 30-degree difference that can literally take your breath away.

“If you take that involuntary gasp for air when you’re under water (after jumping in), you’re going to aspirate, or swallow water, which can lead to panic and can start the drowning process,” said Newman.

This type of shock can also create conditions for a heart attack.

“The body starts pumping adrenaline, which creates changes in the blood vessels in your heart — anyone at risk for heart disease can have a heart attack,” Stanton said. “It can also put people who experience arrhythmia of the heart at risk, and people may not know if they have that condition.”

If you’re able to catch your breath — which is difficult enough to do — the second phase of cold water shock is cold incapacitation — which causes your muscles to eventually stop working.
“In 50-degree water, you might have as little as 10 to 15 minutes of manual dexterity, where you should try to get back on your boat or signal for help in some way. If the water is cold, it’s only a matter of time before you lose control of your arms and legs,” Newman said.

Cold water shock or incapacitation is likely why so many boaters, fishermen, hunters and others drown so quickly, research has shown.

People living in northern regions of the country or in areas with large, rapid flowing rivers are more at risk, said Dr. Peter G. Wernicki, a member of the American Red Cross Scientific Advisory Council.

In 2008, the Coast Guard-funded National Water Safety Congress ran a research project to look into what happens to the body in the first few minutes of exposure to cold water.

As part of the project, Cold Water Boot Camp USA, eight volunteers jumped into 45-degree water. All experienced cold water shock — initial gasp and hyperventilation. After a few minutes, the volunteers couldn’t move their arms or legs; they were suffering as cold incapacitation set in.

“Most people think of hypothermia (drop in body temperature) when they think of cold water, but the reality is that if you don’t have a life jacket, you will not live to experience hypothermia — you’ll drown or go unconscious first,” Newman said.

How to stay safe in cold water:

1. **Dress for the temperature.**
   For paddle boarding or surfing, wear a wet suit and always attach to your board.

2. **Wear a life jacket.**
“A life jacket buys you time — and that’s the key takeaway here,” Newman said. “It buys you time to catch your breath, to rescue yourself and to wait for rescue.”

3. Walk in slowly to better acclimate to cold water temperatures.
Any temperature of water that your body is not accustomed to poses a threat. The surface of a body of water is usually warmer than the temperature of that water a few feet below. Even if you dip your toe in and it feels OK, don't risk quickly submerging your body.

4. If you start shivering or your limbs start to feel stiff, get out of the water immediately.
Even if you're ordinarily a great swimmer, the cold water can immediately debilitate you, warned Stanton

Articles Of Interest:

- **Accidental Hypothermia In Adults**
- **Patient Case: Survived after 20 Minutes Underwater**
- **Man Presumed Dead After Being Found 'Frozen Solid' On Side Of The Road Recovers To Become Living Medical Miracle**
- **10 Humans And Animals That Got Frozen But Survived**
- **‘A Miracle’: Infant Survives Floating In Missouri Pond After Dad Says He Drowned Her**
- **Swim-Credible! Salt Mouth, Float Bloat, Sea Ulcers... And Even If You Finish, You Might Drop Dead!**

**Dr. Gordon Giesbrecht – FAQs**

**TOPICS**

- **Cold Injury Guidelines (Alaska)**
- **Cold Water Boot Camp**
- **Published Research**
- **Vehicle sinking in water**
- **Where do I get a center punch for my car window**
- **Vehicle Disabled in Winter (PDF)**
- **Video Files**
- **Written Material**

**VIDEO FILES**

Q: Is it possible to have access to your instructional videos and can I use them for educational purposes.

A: Yes. The videos referred to here can be used for educational purposes only.

You can access the following 3 video files done for the Discover Channel Canada:

1) Cold Water Survival – Strategies for survival if you fall through the ice ([High Res - 150 MB](#))
2) You’re Out, Now What? How to survive a night in the forest after losing your snowmobile through the ice ([High Res - 136 MB](#))
3) Getting That Sinking Feeling - The importance of proper outerwear to keep you afloat and alive when snowmobiling ([High Res - 123 MB](#))

You can also ask for a free DVD of our Cold Water Boot Camp, Reality Video at [http://www.coldwaterbootcamp.com](http://www.coldwaterbootcamp.com)
For other resources, please check out our web page http://www.umanitoba.ca/kinrec/giesbrecht.

**WRITTEN MATERIAL**

**Q:** Do you have any written material on cold water physiology, safety etc.

**A:** Yes. You can download several short papers from our web page (scroll to bottom) http://www.umanitoba.ca/kinrec/giesbrecht

You may also be interested in our recent book *Hypothermia, Frostbite and Other Cold Injuries*, which can be accessed Mountaineer Books

**PUBLISHED RESEARCH**

**Q:** Have you published any scientific work in the area of cold water physiology and safety.

**A:** Yes. You can download a PDF listing selected references.

**VEHICLE SINKING IN WATER**

- A vehicle crash into water has the highest mortality rate of any type of single-vehicle accident.
- Eight to 10% of all drownings in North America occur in vehicles.
- Usually, there is time to survive but you must act quickly and correctly.

We have completed more than 80 vehicle submersions with people in them.

**What not to do:**
- If you touch your cell phone you will probably die!

You have about **1 minute to exit** through your window before water pressure prevents opening the windows. All your cell phone call will do is waste valuable time. The rescue personnel cannot get to you within one minute anyway.

**What you should do:**
- If your vehicle ends up in water, REMEMBER: **DO NOT PANIC** and
- **Seatbelts** – Get your seatbelts off immediately, NO DELAY
- **Windows** – Lower or break your window. You may need a centre punch to break your side windows – see below for purchase information
- **Children** – Get your small children in the front seat with you
- **Out** – Get out through the window. Push your children out first!

**How long will the vehicle “float”?**

Although a vehicle may be visible for a few minutes, you can only escape during the first minute or so.

We consider that the vehicle is **FLOATING** only until the water reaches the bottom of the side windows (about **1 minute**). At this point you can still roll down the windows. After that the vehicle is **SINKING**.

The water pressure will press the window against the door frame, making it impossible to open it. It **does not matter how long this period is**. Even though the vehicle is visible, it is a tomb with windows and doors that cannot be opened.

Finally, the vehicle is **SUBMERGED**. Even though it is under water, all the air will not have escaped yet. Thus you will still not be able to open the doors or windows. Now you would have to wait for the vehicle to fill completely with water before the pressure equalizes and the door can be opened.
Unfortunately, unless you are Houdini, you will probably have drowned by then.

**One final principle:**

**Use the window, not the door.** Because the water level is higher outside than inside, the pressure makes it VERY DIFFICULT, IF NOT IMPOSSIBLE, to open the door. If you could get the door open, water would rush in and the vehicle would plummet to the bottom. You may be caught in the door, which will then slam shut, and you will certainly trap anyone else who is still in the vehicle.

WHERE CAN I GET A CENTRE PUNCH FOR EXITING MY SINKING VEHICLE?

This device can be found at many Safety Supply retailers.

In Winnipeg this device can be purchased from:

- **Reliant Safety Equipment Inc.**
  1708 St. James St., Winnipeg
  Tel. (204) 582-0734

  Or

- **ABC Fire and Safety Equipment Ltd.**
  9-846 Marion St., Winnipeg
  Tel (204) 233-6083

Please note that I do not have any commercial interests in the Res-Q-Me manufacturers or retailers. I recommend it because it is small, effective and can be hung in an obvious, accessible location without being unsightly.

COLD INJURY GUIDELINES (ALASKA)

In 2002, a panel of experts was convened in Sitka, Alaska to review and revise the "State of Alaska Cold Injuries Guidelines". This revision was approved by the State Legislature and published in 2003. [Download PDF](#).

For other State of Alaska Emergency Medical Services Unit Downloads, visit: [http://www.ems.alaska.gov/ems/downloads/](http://www.ems.alaska.gov/ems/downloads/)

COLD WATER BOOT CAMP

Free download of [CWBC presentation (PDF)](#) for educational use.

**Sponsor News**

**Introduces a Ropeless Fishing System Utilizing Acoustic Release Technology**

EdgeTech, the leader in high resolution sonar imaging systems, acoustic release systems and underwater technology, is excited to announce the introduction of our new Ropeless Fishing System. The EdgeTech Ropeless Fishing System with embedded acoustic release technology was developed to eliminate vertical lines connecting a surface buoy to bottom fishing gear. The system was designed from the ground up with the input of fishers with the intent of alleviating possible whale entanglement and other negative effects of seafloor-to-surface fishing and trap lines.

The EdgeTech Ropeless Fishing System was designed for the rough and tumble handling of shallow water and small boat operations. Expanding the extensive line of reliable acoustic release products and utilizing the same proven Push-off Release Transponder (PORT) technology, the EdgeTech system is perfectly suited for those applications that require
a robust, yet shallow water, acoustic release enabled ropeless fishing package.

The unit can be deployed in water depths down to 500 meters and handle a load of 500 pounds while remaining underwater for up to one year (two years on lithium batteries).

With its unique nickel aluminium bronze alloy construction, it can withstand even the harshest shallow water environments providing corrosion resistance like none other. The system, when communicating with a fishing-vessel-installed acoustic deck box, will provide shipboard operators information such as position, battery life and tilt status, release confirmation and temperature.

The EdgeTech Trap Tracker application for Android and IOS platforms records all data, plots the trap and trawl locations on a marine chart and uploads the positions real time to a Cloud data base so that other fishers can see where trawls are located to avoid setting over another fishers trawls.

The system will tolerate harsh handling on the vessel and unfavourable conditions under the water. The acoustic coding structure allows for over 1 billion unique codes making it the most secure acoustic release ever produced. The EdgeTech Ropeless Fishing System will enable fishing operations in areas and conditions probative without such technology.

For more information please visit: www.edgetech.com

Mitcham Industries Announces Contract Award for Innovative MA-X Technology

THE WOODLANDS, Texas, Nov. 25, 2019 /PRNewswire/ — Mitcham Industries, Inc. (Nasdaq: MIND) ("Mitcham" or the "Company") announced today that its Klein Marine Systems unit has recently received a contract from a leading autonomous underwater vehicle (AUV) manufacturer to install its innovative MA-X technology on a next generation system for evaluation by the U.S. Navy.

MA-X represents a high quality, cost-effective gap-filler solution that has long been sought by the industry. Traditional side scan sonar imaging creates a nadir gap in the center of the image. By removing this gap, MA-X eliminates the need for overlapping survey lines time to achieve 100% coverage. For the operators of AUV's, this translates into extended mission duration, or shorter time to cover the same area. One of the key discriminators of MA-X, particularly for the defense sector, is the ability to produce high-quality imagery of the nadir area that is comparable to the traditional side scan. This allows for the data acquired from MA-X to be fed directly into existing automatic target recognition ("ATR") software allowing for automated detection and recognition of targets of interest.

Guy Malden, Co-CEO of Mitcham, commented, "We are very excited to be a part of this important U.S. Navy program. We expect the continued acceptance of this technology to rapidly expand our product offerings for the underwater vehicle market. MA-X is another example of the
innovation that Mitcham is committed to bring to the industry."

About Mitcham Industries
Mitcham Industries, Inc. provides technology to the oceanographic, hydrographic, defense, seismic and security industries. Headquartered in The Woodlands, Texas, Mitcham has a global presence with operating locations in the United States, Canada, Singapore, Malaysia, Hungry, Colombia and the United Kingdom. Mitcham's worldwide Marine Technology Products segment, which includes its Seapam and Klein Marine Systems units, designs, manufactures and sells specialized, high performance, marine sonar and seismic equipment. Through its Equipment Leasing segment, Mitcham believes it is the largest independent provider of exploration equipment to the seismic industry.

Web Site: http://www.mitchamindustries.com

PSDiver Magazine Issue 123

PSDiver A.S.E. Workshop
Automobile Subsurface Extrication
Learn various methods of removal from a Hasty Recovery when there is a chance for rescue, to rigging options for tow truck hookups and air bag lifting.

Click on the image to launch video!

The PSDiver A.S.E. Workshop (Automobile Subsurface Extrication)

When a vehicle goes into the water, it is rarely an accident. Occupants are not always able to escape; sometimes they are purposefully prevented from escaping. If the entry is witnessed and there is a potential for rescue, this workshop includes how to perform a Hasty Recovery when recovery of the entire vehicle might be quicker than attempting to extract victims from the vehicle underwater.

If rescue is not an option, the workshop offers a range of methods to bring the vehicle to shore. Methods include utilizing traditional tow hooks and equipment to air bag rigging and deployment to lift the vehicle and pulling it to shore by hand.
It can be difficult for teams to learn these or similar techniques. Teams may only have the opportunity to perform these techniques on actual vehicle recoveries and that training potential for the team is almost always lost.

**We Bring Our Own Car!**

Depending on your location, we can solve that problem. We bring a specially designed and environmentally clean vehicle with us.

In the PSDiver ASE Workshop, teams will learn how to **choke, cinch and seize** ... Rigging and Lift Bags. This is an extraordinary team, department or regional training program.

**PSDiver SURVIVAL Workshop**

This workshop focuses on the individual diver, not the search and recovery of anything. We are not teaching divers how to dive. We are not teaching any dive team concepts or skills.

We are going to give you a new perspective on risk management. We will challenge your skills and teach you how to elevate your level of skills mastery.

We will teach you some skills you may have never considered possible and leave you with a new level of confidence and comfort in the water.

If you are tangled, out of air or unable to get air and at depth, how long do you have to make a decision, perform an action or multiple actions before you die? Will you make that discovery on your next dive? What are you willing to do to increase your odds of surviving an underwater emergency?

This workshop is focused on increasing your abilities to survive if a worst case scenario becomes
reality. It is not a “sharks and minnows” program or a training agency specialty. It is the PSDiver SURVIVAL Workshop and is effective for any diver.

The entire workshop is focused on gaining time that could save your life—maybe as little or as much as 5 seconds. What if an additional 5 seconds was the time you needed to save your own life?

This workshop teaches you how to get that time!

Not all emergencies underwater are going to be life threatening but some will.

The PSDiver SURVIVAL Workshop will teach you how to turn some of those emergencies into manageable inconveniences.

Dates, Locations, and additional details and information for our workshops will be posted on all our social media sites and PSDiver.com.

We are working to take away your excuses and we understand the problems of being a volunteer and self-funded. With the help of our corporate sponsors, we have kept the cost of our workshops extraordinarily reasonable for everyone!

For announcements, schedules and locations of the PSDiver SURVIVAL and ASE Workshops - Follow our PSDiver Monthly Facebook Page -- Join our Facebook Public Safety Divers - PSDiver Group -- or visit our web site www.PSDiver.com.

If you would like information on becoming a sponsor or hosting a PSDiver Workshop, or becoming part of the PSDiver Magazine team, email Mark Phillips at Mark@PSDiver.com.
Resources

DAN: Divers Alert Network - Scuba Diving and Dive Safety Association
Medical Information Line 1-919-684-2948
24-Hour Emergency Hotline 1-919-684-9111 to help divers in need of medical emergency assistance for all incidents

ChemTrec – Haz-Mat / Chemical Spill Information
1-800-424-9300.

Centers for Disease Control and Prevention
1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636)

National Suicide Prevention Lifeline
Call 1-800-273-8255 Available 24/365

NAMI: National Alliance on Mental Illness
Help Line 800-950-6264

First Responder Support Network
The mission of the First Responder Support Network is to provide educational treatment programs to promote recovery from stress and critical incidents experienced by first responders and their families.

Crisis Resources

IAFF RECOVERY CENTER
Treatment for successful recovery from substance abuse, PTSD and other co-occurring behavioral health

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