Giant Stride

The NEW Diver's Guide to Safe Diving

BEST PRACTICES

- Predive prep
- Underwater health
- Diving etiquette

DAN® SOUTHERN AFRICA

Your Commitment to Safe Diving

Whether you're a newly certified diver or still in training, it's never too early to commit to being a safe and responsible diver. Perhaps you've practised – and surely you know about – the "giant stride" method of entering the water from a stable platform, such as a dock or large boat. As you continue to take "giant strides" in your mastery of diving, consider this guide your "stable platform" – an introduction to key concepts and an ongoing resource to hone your skills.

The underwater world is unlike anything you've ever encountered. It is vast and exciting and full of colourful creatures and spectacular scenery. But there's a lot to learn before embarking on any adventure; it's our pleasure to guide you through your adventures in diving.

Giant Stride

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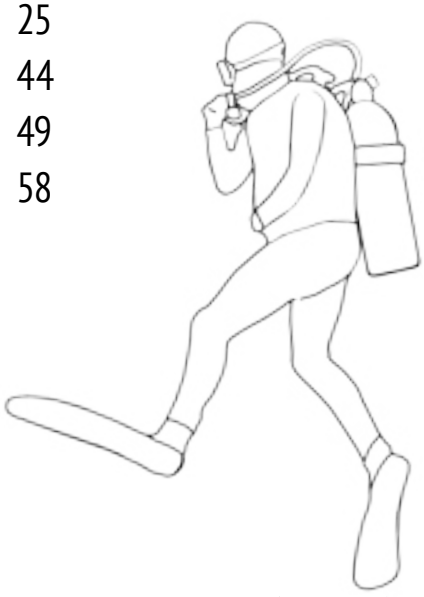

Your Dive Equipment

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BECAUSE YOU RELY ON YOUR GEAR

Your gear is your underwater life-support system; it helps you manoeuvre, protects you from the elements and assists you in emergencies. Your gear must fit you well and be suited to the type of diving you intend to do. Most importantly, you should understand your gear and know how to properly assemble, maintain and use it.

Quality considerations

The quality of your equipment is important. When buying gear, you should look at performance and maintenance ratings, rather than deciding just on the basis of cost. There are lots of factors to weigh. Are you choosing a very basic pair of fins or a top-of-the-line buoyancy compensator (BC), also known as a buoyancy control device (BCD)? Are you interested in warm-water or cold-water diving? Will you stick to recreational diving or do you want to try cave diving? The type of diving you intend to do dictates what kind of equipment you should buy. Although the basics will likely stay the same, certain elements might vary.

Talk to your instructor, visit your local dive shop, shop around, talk to your dive buddies, and check online resources (including websites and scuba-related chat forums), dive clubs and local diving sites. Observe what other divers are using and ask why they like it. Who knows? You might make new buddies along the way!

Fit and comfort

Properly fitting gear can aid your underwater performance in many ways. If your gear fits well, it becomes part of your body, not something you have to constantly think about and adjust. Gear that fits you and that meets your needs allows you to focus on more important things — such as your buoyancy, your buddy and the amazing marine life around you.

Being familiar with, and comfortable in, your gear will also improve your peace of mind. In case an emergency does arise, the right equipment will help keep you calm, comfortable and in control — while ill-fitting equipment can introduce additional complexity to a crisis.

Try on gear before you use it. Not every shop carries every type of equipment or every brand of gear. But it's important to make sure that each piece you buy (or rent) meets your needs. Try the gear on and don't be afraid to ask about brands that a given shop may not carry.

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When it's best to buy

Owning your own gear contributes to your safety in several ways. Gear you buy is more apt to fit just right, and you're more likely to become familiar with how it's configured and how to use it.

The cost of equipment sometimes keeps novice divers from investing in new gear up front. Generally speaking, the higher an item's quality, the more it costs. Don't compromise on safety – make sure to invest in the right equipment that will keep you safe underwater. Even if you decide to rent some larger pieces, there are a few basic items you'll surely want to own, including a mask, snorkel and fins.

> Don't compromise on safety – invest in equipment that will keep you safe underwater.

There are dozens of manufacturers; some specialise in specific types of equipment and some are generalists. Deciding what to buy can be overwhelming. Take your time, discuss your options and do your homework. Renting until you're sure what you want is a reasonable way to go.

If you plan to dive close to home several times a year, it may be wise to invest in much of your own equipment. But if you're likely to dive only a couple of times a year, especially at international destinations, it may not be cost-effective to buy gear such as weight systems or cylinders.

As you continue to dive, you'll develop your own preferences, deciding which pieces of equipment it makes sense to own. Based on where you dive, how often you dive and the type of diving you do, you may find that buying more of your gear makes diving more convenient. But most importantly, owning your gear gives you a margin of comfort and safety.

Factors to consider in renting

If you're not ready to purchase all your own gear, renting offers a great way to sample different styles and brands of equipment. Renting will give you time to discover your equipment likes and dislikes before you invest in your own. Renting may also be a good idea if you're planning a trip to a distant dive destination and don't want to carry all your gear with you; resorts often offer a variety of rental options, which may or may not be included in your base fee. However, keep in mind that renting a full kit about 10 times costs roughly as much as buying it.

Many dive shops offer a variety of rental options. The quality of rental equipment will differ, so research the dive shop, visit it if you can and look closely at what's available. Make sure you rent the right equipment for the type of dive you plan to make. For example, if you'll be wearing a wetsuit for shore diving, make sure you have booties with thick soles to protect the bottoms of your feet from rocks and shells. Or if you rent a wetsuit for a cold-water dive, remember that a surfing wetsuit won't provide adequate thermal insulation.

Before each dive, call ahead to make sure the shop will have the equipment you want on the day you need it — and reserve it if possible. This will ensure that the shop won't be out of your size or preferred brand, even if they have to outfit several students for a diving course.

Even if you choose to rent gear at your destination, you'll still want to bring a few items of your own, as outlined in this chart:

Items widely available for renting	Items that may or may not be available for renting	Specialty items to consider renting
Wetsuits	Masks	Cutting tools
Drysuits	Snorkels	Surface marker buoys
Gloves, hoods and booties	Fins	Light
Cylinders		
BCs/BCDs		
Regulators		
Weights and weight systems		

> Renting will give you time to discover your equipment likes and dislikes.

Keeping your gear in good repair

It's essential for your safety, perhaps even your life, to inspect your equipment regularly for wear and tear. Different items have different maintenance schedules. Periodic professional servicing is important, but so is routine care, cleaning and proper storage. For example, you should regularly check straps and buckles for tears or cracks; inspect zippers for broken teeth; examine your drysuit, wetsuit, BC/BCD and other dive apparel for frayed areas and signs of wear that could lead to leaks; and evaluate your regulator and cylinder for physical and functional problems. Taking care of your gear will help it last longer and ensure that it performs as you expect it to. This chart outlines recommended procedures for various kinds of gear:

Item(s)	Before you dive	After you dive	Storage	Professional servicing
Mask, snorkel and fins	Keep well organised to minimise the risk of their being kicked, stepped on or tripped over.	Rinse and dry well.	Pack and store carefully, so that they're not crushed by heavier gear.	Not applicable.
BC/BCD	Test before you dive.	Rinse the outside and flush the bladder with fresh water. Hang to dry.	After drying, partially inflate jacket for storage.	Have it professionally inspected annually; remember the low-pressure hose and dump valve.
Regulator	Test function as soon as you set up your gear.	Rinse and clean while still connected to cylinder and pressurised. Leave out to dry.	Keep dust cap in place and secured. Store in a regulator bag.	Service at least once a year.
Wetsuit, boots, gloves and hood	If necessary, lubricate zippers.	Rinse, turn inside out and hang to dry. If wetsuit has an unpleasant odour, use wetsuit shampoo in post-dive rinse.	Store in the shade, as neoprene is susceptible to UV damage.	Not applicable.
Dive computer	Check battery icon.	Rinse and dry.	Store in a dry, cool, ventilated area.	Service every one to two years, or per the manufacturer's recommendation.
Cylinder	Handle with extreme care, as a pressurised cylinder presents a risk of explosion. Secure tightly for transportation.	Rinse thoroughly and let dry. Regularly remove tank boot to prevent a build-up of salt and debris.	Never drain completely of gas. Reduce pressure to the lowest reading on the pressure gauge. Keep a clean, dry dust cap on cylinder valve.	Make a visual inspection once a year. Perform a hydrostatic test every five years.

Assembling a "Save-A-Dive" kit

Virtually every diver will eventually experience the frustration of a snapped buckle, a jammed zipper, a blown O-ring or a broken strap. It's not a matter of if but when you'll need a backup kit. Every diver can benefit from carrying a basic "Save-A-Dive" kit that includes spare parts, simple tools and other essentials.

The contents of such kits are not universal and will vary depending on the type of diving you do and the gear you use. The contents of your kit may even change from dive to dive, such as if you decide to try night diving or travel to a new dive site. Your "Save-A-Dive" kit can also be as simple or as complex as you choose.

Having a repair kit with you at all times will serve you well, but it's even better to minimise your need to use it by properly maintaining and servicing your gear and staying mindful of potential hazards.

Save-A-Dive Kit
(Suggested items)

- Batteries
- Clasps
- DAN-SA Member card
- Defogger spray
- Duct tape and waterproof adhesive/sealant
- Fin buckle/straps
- Lighter
- Mask strap or extra mask
- Multi-tool
- O-ring kit
- Regulator mouthpiece
- Snorkel keeper
- Weight belt/buckle
- White trash bag
- Cable ties and bungee/shock cord
- Zipper wax

Preparing for first-aid needs

From bumps and bruises to stings and scrapes, diving involves its fair share of injuries. If you are informed and prepared, you'll be able to manage such situations much more competently. Always carrying a first-aid kit is a key step in being prepared. The items your kit should include will vary depending on your experience, where you dive and what kind of diving you do.

There are many commercially available first-aid kits customised to various diving needs. These ready-made kits generally include a reasonable array of supplies and can be upgraded and augmented according to your particular circumstances. Commercial kits are also typically well organised and easy to use.

But no matter where you get your kit or what's in it, make sure you know how to use it. Put use-by dates on all medications to ensure their efficacy. Also remember to check your kit before every dive trip to make sure your supplies are fully stocked and fresh.

See page 17 for a list of items to include in your first-aid kit.

> Always carrying a first-aid kit is a key step in being prepared.

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Dive computers

Dive tables and computers are key to helping you manage your decompression risk. If you dive using tables, make sure to bring a depth gauge and watch that you can attach to your BC/BCD. Even if you dive with a dive master, you should calculate your risk based on your dive profile, not someone else's.

If you choose to use a dive computer, it's important that you know how it works. Dive computers are generally easy to travel with, so if you have one you should bring it with you. This will ensure that you have a computer you understand.

If you'll be renting a computer, plan ahead. Most dive computers available for rent are basic, easy-to-use models. But it's always best to contact the shop or resort beforehand to find out what kind of computers they offer. That will give you time to learn about a device before you dive with it.

Five key features of your dive computer

1. No-decompression limit (NDL): The amount of time remaining at the current depth without the need for decompression stops.
2. Current depth: Dive computers dynamically respond to the changes in pressure and allow you to track your depth/time profile more accurately.
3. Dive time: The display may indicate the amount of time that has passed or the remaining time left in your dive.
4. Breathing gas: Risk of DCS is calculated based on the theoretical amount of nitrogen your body absorbs, so make sure that what you're breathing is what your computer thinks you're breathing.
5. Ascent rate: The optimal ascent rate allows the body time to safely eliminate absorbed nitrogen. Exceeding a safe ascent rate will signal your computer's alarm.

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Planning Your Dives

BECAUSE PREPARATION BEGINS AT HOME

Researching your dive site, planning your dive and preparing to respond to emergencies are all components of prudent dive planning. The safe diver understands that preparation for diving begins long before you arrive at your dive site.

The foundation of safe diving is a good emergency assistance plan (EAP). DAN-SA's emergency on-call staff answers hundreds of calls each year. Not surprisingly, many calls involve situations that could have been managed with a sound EAP.

Developing an Emergency Assistance Plan (EAP)

The heart of an EAP is a list of essential considerations and a framework for performing key functions should an incident occur. Being a responsible member of the diving community means you and your dive buddies should create and review an EAP prior to any dive excursion. A comprehensive EAP can be divided into three sections: prevention, preparation and response.

Prevention

Paying attention to the factors that commonly cause dive emergencies can help prevent crises altogether. The best way to handle an incident is to keep it from happening. These are factors to consider:

- Physical fitness: Diving requires aerobic fitness, strength, flexibility and muscular endurance. Your physical fitness should be commensurate with the demands of your dive environment.
- Medical fitness: You need to consider both chronic medical conditions and short-term health issues. Congestion increases the risk of ear or sinus barotrauma, and travelling divers often face gastrointestinal problems that can affect their general health and stamina. Be honest with yourself; if you feel less than 100% healthy, postpone your dive.
- Mental fitness: Many people with everyday anxieties, fears or other psychological difficulties can dive safely. However, if for any reason, at any time, you or a buddy feels unprepared to enter the water, call off the dive.
- Training: Make sure you are trained for the type of dive you are about to do and practise your basic skills, such as mask clearing, buoyancy and air sharing skills, regularly. Take a refresher if you feel uncomfortable or have not been diving in six months or more.
- Equipment maintenance: Divers must understand the capabilities and limitations of their own and their buddy's equipment. Have your gear inspected regularly, get trained in its use and maintenance and incorporate enough time to familiarise yourself with your buddy's gear before you dive.
- Dive planning: Learn about any hazards, specific skills required or other unique aspects of your dive site. Consider hazardous marine life, currents, temperature and the potential for rapid changes in weather or sea conditions.

Preparation

Despite all efforts to prevent them, incidents still happen. The better prepared you are to handle them, the better the outcome will be. Here is how to prepare:

- Know the local resources: Make a written list of the facilities and emergency resources near your dive site, including hospitals, clinics, search-and-rescue providers and transportation or evacuation services. Injured divers should always be taken to the closest medical facility, as not all hyperbaric chambers are equipped to receive injured divers directly. Call DAN-SA only after you have contacted local emergency personnel.
- Get first-aid training: Make sure your first-aid, cardiopulmonary resuscitation (CPR) and oxygen-administration skills are up to date. If you have not had a chance to complete such training, make sure to identify who in your group – perhaps a dive master, dive buddy or medic at the dive site – is trained.
- Carry emergency supplies: It is critical to keep your first-aid kit well stocked and current. You should also ensure that you have enough oxygen to care for at least one injured diver until medical personnel can arrive. Obviously, remote locations will require more oxygen.
- Share information: Tell your buddy about your allergies, medical conditions and insurance coverage and whether you are a DAN-SA member. If you are uncomfortable sharing personal information, write it down, seal it in an envelope and let your buddy know where it is. Always let someone on shore know where you are and when to expect you back.
- Stay alert: Be an alert diver. Know that even when a diver does everything right, bad things can happen. Do not be caught off guard when they do. One level head can create calm in the midst of chaos.

Dive Training

As you gain increasing in-water experience, you'll discover that some kinds of diving interest you more than others. You might want to try enriched air, you might find yourself drawn to shipwrecks or you might be tempted to capture your dives on video. Divers are by nature adventurous, and we encourage you to explore these and other opportunities – but only after you've acquired proper training.

Not only does additional training give you the skills and knowledge to continue exploring, but it will also connect you with other divers who have shared interests, expanding your dive-buddy network. Whenever you begin building new skills, keep these guidelines in mind:

- Build experience gradually: The value of experience can't be overstated. To truly prepare for more advanced diving, it's best to slowly and methodically increase the complexity and task loading of your dives. Remember to dive according to your experience, not your certification.
- Keep refreshing your skills: Divers with limited experience, including those returning to the sport after a long absence, are potentially at a greater risk of experiencing a dive incident. It's important to practise regularly and hone your skills and to take time to familiarise yourself with new equipment before you get in the water. Sign up for a refresher course if you've been out of the water for six months or more, or if you're feeling uncomfortable for any reason.
- Seek first-aid training: DAN-SA recommends that all divers complete a CPR and first-aid course so that they have sufficient skills and confidence to assist in or manage an emergency situation. Whether you seek dive-specific training or general training, you'll find first-aid courses offered by a number of organisations, including DAN-SA. For a listing of DAN-SA courses developed by dive-medicine physicians and scuba-diving educators, visit http://dansa.org/courses.htm
- Continue your education: Diving is contagious. Continuing your education beyond an open-water course helps you identify areas of interest that you may not have anticipated. Join a local dive club to learn from others and share your passions. Participate in beach and underwater clean-ups. The more skilled you become, the more you'll enjoy your dives.

Whatever form of continuing education you pursue – classes, books, magazines, blogs or conversations with other divers – remember that continuing to learn about and respect the underwater environment makes you a better diver and a safer one.

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Calling the DAN-SA Hotline

When should I phone the DAN-SA hotline?

- All diving emergencies
- Non-diving medical emergencies
- Diving medical information, such as fitness to dive, medication, and travel medical advice and enquiries
- Travel notifications and advice
- Diving medical examiner contact details
- International medical centres or doctors who want to confirm DAN-SA memberships

What do I need to have ready?

- The caller and/or patient's name and contact number
- The nature of the emergency
- The patient's DAN-SA membership number, if applicable or known
- The patient's medical aid information (many medical aids also provide international travel benefits)
- The patient's travel insurance information, if applicable

! If the caller is not at the scene, at least one local contact number should be provided in order to reach the person that is in need of assistance, or those who are in charge of their care.

What happens after I have logged the emergency?

DAN-SA makes a conference call to one of the on-call diving medical officers (DMOs) when an emergency call is received and the nature of the event has been established. The DMO will provide specialist diving medical advice regarding how and what should be done immediately and will also make decisions concerning the further management of each case, depending on the situation.

Will I get evacuated by air?

Aeromedical resources, such as helicopters and air ambulances, cannot be dispatched unless authorised by the DMO. It may take longer to activate an air ambulance than it would take to mobilise emergency medical services via a ground ambulance. Several factors, aside from costs, will determine aeromedical evacuation.

The availability of transport
Is an air ambulance or a helicopter available?

The nature of the injury
How urgently does the patient need advanced life support and should they be moved to intensive care?

The location of the patient
What are the optimal logistical considerations for efficiently and safely moving the patient to a place where they can receive medical assessment and appropriate medical care, with appropriate medical support, during the transfer?

Various aspects regarding the landing zone or airport
Are these appropriate for a helicopter or a fixed-wing air ambulance? Are these open, particularly at night? What are the customs or immigration requirements? What are the implications of getting the patient to the landing zone or airport, or the crew to the patient?

i The DAN-SA hotline provides emergency medical assistance to injured divers. We encourage you to call early, even when you are uncertain, rather than wait until the situation has become critical as the opportunity to assist becomes more restricted.
DAN-SA EMERGENCY HOTLINE: 0800 020 111 (SA) or +27 828 10 60 10 (int.)

PLANNING FOR SUCCESS

Checklist #1 – Deciding where to go

For many divers, part of the appeal of diving is the opportunity to go where others may not have gone before and see incredible underwater marine life others may never see up close. Scuba diving involves an element of danger, and DAN-SA wants to make sure your diving adventures are as safe as possible. A large part of safety is having a contingency plan. If you know what to expect before you get to your dive site, you can make sure you're prepared with the correct gear and the correct EAP.

Learn as much as possible in advance about any place you plan to dive. Check online for relevant websites, local dive shops and scuba-related discussion boards. While you may choose to research local attractions, history or food, make sure you look into the following factors:

- **Weather:** The first thing you should do is check the weather at your dive site, as it can affect your experiences both above and below the surface. Does the location get frequent afternoon storms during the summer? Does the temperature change significantly over the course of a day? Remember that weather on the coast can be dramatically different from that just a kilometre or two inland.
- **Water:** Ask about water conditions at your dive site — specifically water temperature and whether you are diving in fresh water or salt water. The water temperature will vary with the season and the depth of your dive and water will feel cooler than air of the same temperature because your skin releases heat into water much faster. Be aware of your comfort at different temperatures and get a thicker wetsuit or wear more layers if necessary. Regarding salinity, remember that salt water makes you more buoyant than fresh water, so you may need more weight for an ocean dive.
- **Currents:** Of all the obstacles a diver encounters, currents are among the most underestimated and most physically demanding. Currents can increase the

amount of air you use, carry you far from your dive boat, shore entry point or intended depth and exhaust you. Before a dive, you can refer to the South African Navy Hydrographic Office tidal and current charts at sanho.co.za/tides/tide_index.htm If your research suggests that you may face currents, review how to use your signalling device before you get in the water. If you're suddenly caught in a current and it's too strong to swim against, don't fight it. Get positively buoyant, dumping weight if necessary, and inflate your safety sausage as soon as possible. Ride out the current until it subsides, or navigate parallel with the beach until you're out of the current. If you have to make a decompression stop during your ascent, inflate your safety sausage from below the surface. By alerting others to your location from underwater, they can track you while you off-gas, relieving you of the choice between getting lost or risking DCS.

- **Visibility:** Weather, currents, time of day, bottom composition, ocean life and a host of other factors can all influence visibility (often called "viz"). When you ask about a site's visibility, make sure to check out both "where" and "when." That is, don't just look for a place with great visibility; also ask what time and depth offers the best underwater views.
- **Marine life:** You may want to research local marine flora and fauna out of sheer interest, but there are also practical reasons to do so. Knowing what hazardous wildlife you might encounter will help you avoid contact with noxious species, ensure that you have the correct items in your first-aid kit and teach you how to manage injuries should they occur. Also, familiarising yourself with local marine life will help you learn how to protect the natural habitat. Divers are visitors to the underwater world and we must learn how to behave ourselves appropriately when we're there.
- **On-site resources:** Part of your predive checklist should be ensuring that your dive location has all the necessary emergency and first-aid equipment — such as emergency communications (good cell phone reception, a marine radio, a satellite phone, etc.), first-aid supplies and emergency oxygen equipment. There's no need to pack your own oxygen unit if there's one at your site, but you shouldn't dive without one available.

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DID YOU KNOW?

Depending where you dive, rules differ. The site can regulate everything from what gear you can use to what hours you can dive. Before you go, ask these questions:

- Does my training match dive site requirements?
- What equipment is allowed?
- What are the site's access requirements?

Checklist #2 – Choosing what to bring

The following packing checklist is not comprehensive. It's intended to provide a base so you can customise a list suited to the specifics of your trip. Once you finalise your own checklist, make two copies – one for packing to go and one for repacking at the end of your trip. These are the basics you should consider:

Essentials

- ❒ Certification card (C-card)
- ❒ DAN-SA membership card
- ❒ Medical aid and/or travel insurance card
- ❒ Cell phone/radio with charger and waterproof bag
- ❒ Hat
- ❒ Nutritious snacks
- ❒ Sunscreen
- ❒ Water
- ❒ _____
- ❒ _____

Gear

- ❒ BC/BCD
- ❒ Booties/fins
- ❒ Cutting tool or dive knife
- ❒ Dive computer
- ❒ Exposure suit
- ❒ Gear bag
- ❒ Gloves
- ❒ Hood
- ❒ Lights
- ❒ Mask
- ❒ Reels
- ❒ Regulator
- ❒ Snorkel
- ❒ Surface signal
- ❒ Cylinder(s)
- ❒ Weights
- ❒ Whistle
- ❒ _____
- ❒ _____

Specialised equipment
(optional)

- ❒ Camera and other photography equipment
- ❒ Diver propulsion vehicle (DPV)
- ❒ Oxygen unit
- ❒ Rebreather
- ❒ Speargun
- ❒ _____
- ❒ _____

"Save-A-Dive" kit

- ❒ Batteries
- ❒ Clasps
- ❒ Defogger spray
- ❒ Duct tape and waterproof adhesive/sealant
- ❒ Fin buckles and straps
- ❒ Lighter
- ❒ Mask strap or extra mask
- ❒ Multi-tool (including an adjustable wrench and hex key)
- ❒ O-ring kit (including O-rings for high- and low-pressure hoses, an O-ring pick and silicone grease)
- ❒ Regulator mouthpiece
- ❒ Snorkel keeper
- ❒ Weightbelt or buckle
- ❒ White dustbin bag (or another white working surface)
- ❒ Cable ties and bungee cord/shock cord
- ❒ Zipper wax
- ❒ Dive tables
- ❒ _____
- ❒ _____

First-aid kit

Basics

- ❒ Nitrile (hypoallergenic) gloves
- ❒ CPR barrier (orinasal device or face shield)
- ❒ Tweezers
- ❒ Safety pins
- ❒ Scissors
- ❒ Soap (or antiseptic solution or wipes)
- ❒ Insect repellant
- ❒ First-aid guide

Dressings and bandages

- ❒ Adhesive bandages
- ❒ Gauze pads and rolls
- ❒ Triangular bandages
- ❒ Elastic bandages
- ❒ Medical tape

Accessory items

- ❒ Vinegar
- ❒ Sterile saline solution
- ❒ Irrigation syringe
- ❒ Hot and cold packs

Medications

- ❒ Prescription medication
- ❒ Malaria medication (where applicable)
- ❒ Aspirin
- ❒ Panado
- ❒ Neurofen
- ❒ Scopex/Buscopan
- ❒ Cyclizine/Valoid/Stugeron
- ❒ Imodium
- ❒ Eno
- ❒ Swimseal/Aqua Ear/Vosol ear drops
- ❒ Nasal decongestant
- ❒ Mylocort/Biocort/Dilocort cream
- ❒ Anthisan cream
- ❒ Antibiotic ointment
- ❒ Rehydration sachets
- ❒ _____
- ❒ _____

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Checklist #3 – Performing a final check

When you arrive at your dive site, it's important to follow a regular predive ritual. Doing so will reduce the likelihood of experiencing an emergency due to equipment problems or other preventable circumstances. As you and your buddies establish a predive ritual, make sure it includes the following elements:

- **Inventory:** Take a formal or informal inventory of the first-aid and oxygen equipment at your dive site. Whenever you board a dive boat, take a look at the first-aid supplies and emergency oxygen equipment before you depart.
- **Verbal review:** Review your dive plan and contingencies, your hand signals (especially your breathing-gas management signals) and common emergency procedures (such as weight removal, out-of-air management and buddy separation).
- **Buddy check:** Configure, assemble and check your own and your buddy's equipment. While there are several acronyms divers use to jog their memories, a commonly used one is BWRAF (and its associated mnemonic, "burger with relish and fries"), which helps divers remember what to check before entering the water. This is what the letters stand for:
  - *BC/BCD:* Operate all inflation and deflation valves to ensure that your BC/BCD can accept and release air. Test the oral inflator. Operate all dumps to ensure that air can be dumped quickly. Check that straps have no slack and are lying flat.

- *Weights:* Make sure your weights are secure and review all release mechanisms. When you and your buddy check each other's gear, make sure to familiarise yourselves with each other's weight systems.
- *Releases:* Determine where all your and your buddy's releases are located, how they come unfastened and whether they're properly secured.
- *Air:* Breathe air through your regulators to ensure that it is fresh and dry. Test the operation of your primary and secondary regulators at least three times. Both should allow you to breathe comfortably and shouldn't "free-flow" when purged. Be sure the air-pressure gauge doesn't drop during the breathing test. Check all hoses for damage.
- *Final okay:* Do a final head-to-toe check. Ensure that hoses are clipped to the diver neatly and are in the correct configuration. Make sure the diver has fins, a mask and any other accessories (reels, knife, compass, emergency signalling equipment, etc.) needed for the dive. Correct anything else that appears amiss.

Diving Etiquette

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BECAUSE DIVING IS A SOCIAL SPORT

Good diving etiquette is important in building and maintaining trust with your diving companions. Your training may have covered basic dos and don'ts, but it never hurts to have a refresher. Whether you're taking a giant stride off the back of a boat or making a shore entry, here are some tips on appropriate diving behaviour and dive-buddy etiquette to make sure you put your best fin forward.

General guidelines

Fortunately, there's considerable overlap between safe diving and courteous diving. Following these tips will make you both a congenial dive companion and a safer diver:

- **Know your dive preferences:** What's your dive style? Do you fin fast or slow? Do you want to look around or take pictures? It's important to be sure you're comfortable with the dive plan and aren't pressured into diving outside your limits. You don't want to put your dive buddy or dive master in a potentially dangerous situation. Be comfortable openly discussing your goals and limits before a dive so you and your buddy can plan accordingly.
- **Discuss your dive location:** Confer about the choice, but be flexible. Be sure to check weather conditions, currents, etc. If possible, check on local events that may affect travel to the dive site or how busy the dive site will be. If you're diving off a boat with set destinations, make sure your skill level meets the requirements for the dives. But be aware that the dive professionals or boat captain may change locations after evaluating the dive site;

don't complain — the change may be for safety reasons. Feel free to ask questions politely, however.

- **Don't talk during the briefing:** The briefing may include information on flora and fauna or the location of emergency supplies. You may feel confident about your skills and believe you don't need a refresher on how to share air or perform hand signals. However, ignoring the briefing is disrespectful and distracting to other divers who are trying to listen, so you're potentially putting yourself and others in danger.
- **Check your breathing gas:** If you're diving with someone else, be clear about how many tanks you need for the dives you are planning to do. Having improperly filled cylinders (underfilled or with the wrong breathing mix, for example) or not enough cylinders (if your dive location doesn't have an air fill station) requires altering or cancelling dives. Check your air pressure when you pick up your cylinder. If you're using nitrox, check the percent mixture before you leave the shop.
- **Remember that diving isn't a competition:** It's important to keep track of your breathing gas consumption, but there's no value in bragging about it. Divers breathe different volumes of gas for a variety of reasons. Be respectful of other divers' usage.
- **Be mindful of your environment:** Be aware of your surroundings and respectful of other divers — both underwater and on the surface. Dive resorts and dive boats often designate dry areas. Don't place wet gear in or walk with wet gear into these areas. If other divers are relaxing in a common area, keep your noise level down. Whether you're diving locally or internationally, be conscious of cultural nuances and respectful of other divers' physical limits.

> Be aware of your surroundings and respectful of other divers.

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- **Use correct terminology:** Like any sport, scuba has its own lingo. For example, you should understand the difference between air, gas and oxygen in relation to diving. Air is 21% oxygen, 78% nitrogen and 1% other inert gases, while breathing gas may refer to nitrox, heliox, some other mix or air. Oxygen is used for decompression at shallow depths and should be used only by divers trained in decompression diving. Other often-misused terms are “goggles” and “flippers”; goggles are for swimmers and flippers are for dolphins.
- **Manage your time:** Whether you’re shore diving or boat diving, you should show up as scheduled. Give yourself enough time to prepare, dress and assemble your gear, as you don’t want to feel rushed — that can create stress that may affect your performance. Generally, it’s best to be neither the first nor the last one ready. One tip is to watch the instructor or crew, and suit up when they do.

Equipment guidelines

Handling your equipment carefully is part of being a courteous (and safe) diver. Here's what to keep in mind:

- **Keep your equipment together:** Bench space for shore diving is often limited and elbow room on a boat even more so. Keep your equipment confined to your designated space so everyone has room to don and remove gear; you'll also be less likely to lose gear or grab someone else's equipment accidently. Keep in mind that a rocking boat can make balance challenging; keep gear out of walkways so it doesn't impede passage. Space concerns should also guide how much gear you bring with you. If you know space will be tight, consider bringing fewer dive toys.
- **Place heavy objects on the ground:** You've probably heard an instructor call out, "Don't leave your cylinder standing up!" While gearing up, it's important not to place heavy objects like weight belts on elevated surfaces. An unexpected bump can flip a standing cylinder onto its valve and damage it or cause a heavy item to fall and break the gear (or foot!) it lands on.
- **Hone your buoyancy:** Maintaining optimal buoyancy helps you manage your breathing gas consumption and affects your trim. Holding onto another diver can be problematic. If that individual isn't prepared or able to assist you, it may create anxiety, affect that person's buoyancy or manoeuvring capability or inadvertently drive the other diver into marine life.
- **Maintain proper trim:** Keeping your fins slightly up reduces downward thrust during finning. Maintaining proper trim reduces fin impact with the bottom, preventing silting and unintentional contact with marine life. Good trim also minimises your swimming effort by reducing drag and improves your buoyancy, mobility and air consumption.
- **Use the right rinse bucket:** Many dive operations provide fresh water for rinsing masks, cameras and other gear. Check which buckets are for which gear. Don't introduce your spit or defog solution into a bucket used for expensive camera equipment. If you spit into your mask instead of using a defogger, use a cup or your hand to take water from the rinse bucket to clean your mask. Also, no one wants your wetsuit in the water used to rinse regulators.
- **Take out what you brought in:** Be sure to gather all your belongings and clean up after yourself. It's common courtesy to take your trash with you or deposit it in containers provided by the dive operator. Remember, trash left behind may make its way into the water.

DID YOU KNOW?

Wearing too much or too little weight can affect buoyancy and cause divers to work harder to maintain proper trim, increasing gas consumption. Maintaining proper trim, buoyancy control, and efficient and minimal movements will likely improve air consumption.

Buddy guidelines

There are also some tips aimed specifically at getting along well with your fellow divers:

- **Be a good buddy:** Buddy diving is a co-operative system intended to provide divers with a safety buffer. While all divers should be capable of taking care of themselves in and out of the water, the concept behind the buddy system is to have an extra set of eyes to monitor equipment and skills and an extra set of hands ready to provide support in case of emergencies, such as out-of-air events or entanglements.
- **Co-ordinate your communications:** Not all divers are trained by the same agency, and not all agencies have the same hand signals. Co-ordinating communications is part of a good dive plan; for example, review basic hand signals (such as "out of air") and discuss at what air pressure you intend to turn back. Specify your level of comfort in the water, your goals for the dive and what side you want to dive on (for ease in locating your buddy). Make sure you and your buddy are open about your limitations, plans for the dive and any potential concerns (such as having a camera).
- **Let anyone call off a dive:** Whether it's before, during or near the end of a dive, any diver should feel comfortable calling a dive for any reason. Researching the site, having a clear plan and communicating your dive style are all important in ensuring safety. This guideline is more rather than less important among buddies who already know each other and have established roles within the relationship, such as parents and children, partners or siblings.
- **Be a courteous photographer:** Whether you're in a class or on vacation, be aware that not everyone wants to be on your Facebook page or in your Twitter feed. Within reason, ask or warn people before you take pictures. It gives them a chance to opt out, turn away, smile — or photobomb your shot!

Underwater Health

BECAUSE YOUR WELL-BEING IS PARAMOUNT

The human body wasn't designed for an aquatic environment, so it's important to understand how pressure affects your bodily functions. Learning the fundamentals of underwater physiology can help divers make informed decisions during dive planning. Proper dive planning and risk management will improve your safety and reduce your chance of a serious accident.

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Fitness to dive

Your fitness to dive is your individual capacity to safely perform scuba. Calculating fitness to dive requires assessing the environmental conditions at your dive site, the type of dive you plan to make, the equipment you're using and your diving experience. The medical literature covers physiological, psychological and medical matters pertaining to diving health, and consensus guidelines have come out of that research. Proper dive training should include both physical and mental preparation. A fitness-to-dive philosophy must consider a multitude of factors, all of which will ultimately minimise your risk of experiencing an incident.

Why fitness to dive is important: Though diving is primarily a leisurely recreational sport, it requires a level of fitness that can be achieved only through physical training. Both strength and endurance are needed to ensure that you can manage the range of effort diving can demand. For example, would your physical ability allow you to undertake a long surface swim in a strong or changing current? Would you be able to participate in buddy assistance or even rescue? These are strenuous tasks that require preparation and fitness. All divers are advised to establish regular fitness routines that include strength, cardiorespiratory and flexibility components.

Evaluating fitness to dive: All dive students complete a medical questionnaire before beginning an open-water course. The physical requirements of the open-water swim-skills test can serve as a good baseline to assess your endurance, but you should continue to monitor your fitness and get periodic medical evaluations, especially as you age and/or your health changes.

Divers with pre-existing medical conditions face particular challenges. However, many conditions that used to be considered incompatible with safe diving have been re-evaluated. For example, it may be safe for some individuals with certain forms of asthma who have normal lung function tests to dive as long as the condition is properly monitored and appropriate diver support is provided. Many divers with other chronic diseases are allowed to dive but they must make wise choices and abstain from diving in conditions

that may test their capacities and provoke unwanted health complications.

But if you ever have cause to question your fitness to dive – if a dive makes you anxious, for example, or pushes your physical limits or mental readiness – reflect on the situation and decide if you need further training. Impartial self-evaluation leads divers to set better personal dive boundaries, manage their risk and reduce their likelihood of an accident.

Where to learn more: Emphasising fitness to dive is not aimed at keeping people out of the water but at finding ways they can safely participate in diving. For more information on fitness to dive, visit dansa.org

The remaining sections of this chapter will give you an introduction to the most important health ramifications of diving.

There's a section on your ears because pressure-related ear and sinus trauma is the most-often-reported diving injury. There's a section on decompression sickness (DCS) because it's fairly common in its milder forms and can have serious consequences in its more severe forms. There's a section on your heart because DAN research has shown that a third of all diving fatalities are caused by acute cardiac events. There's also a section on other conditions that affect enough divers to be of wide interest.

> Impartial self-evaluation leads divers to set better personal dive boundaries

DID YOU KNOW?

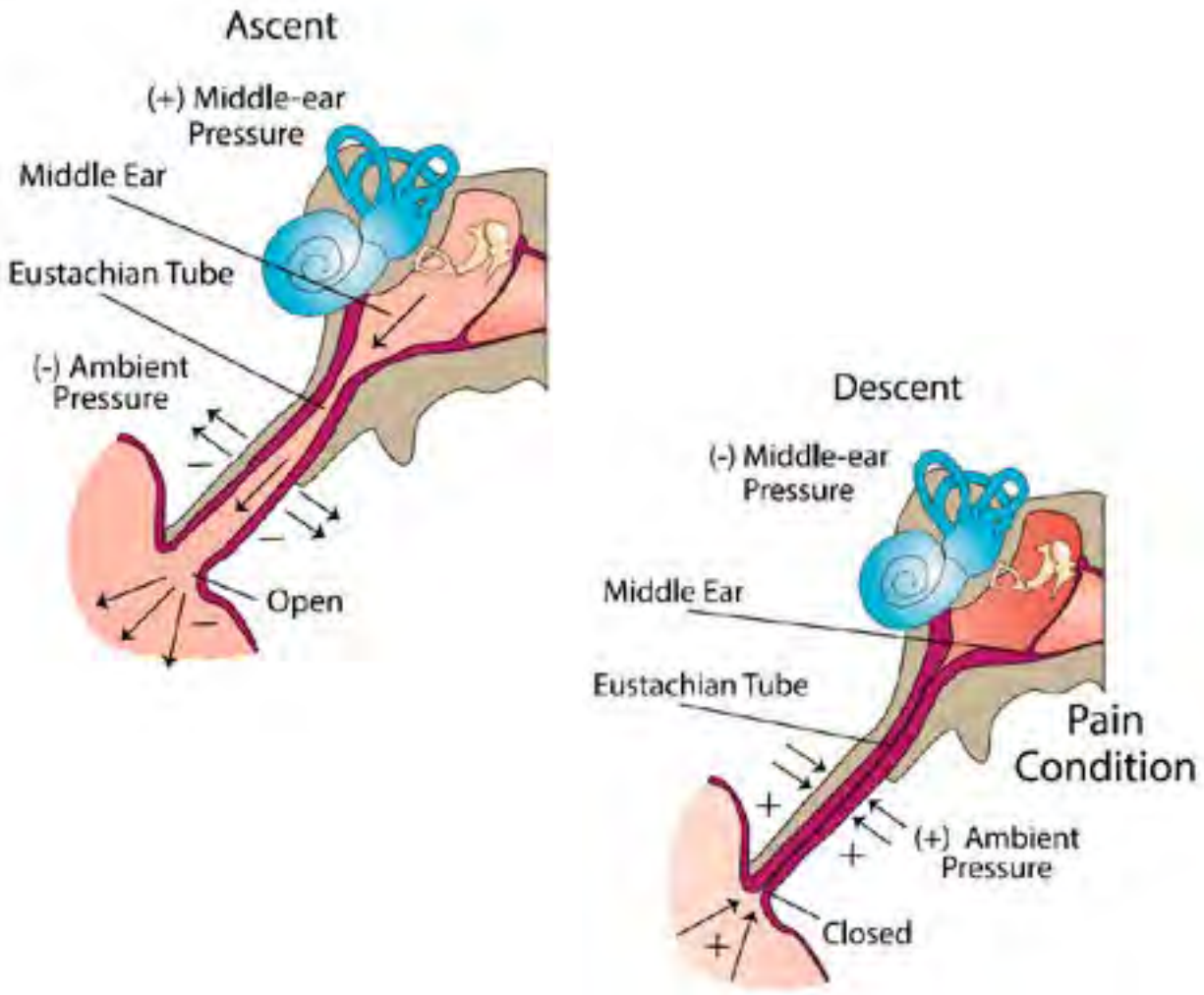
Diving is not considered regular exercise

If you exercise regularly at an intensity that keeps your heart rate above 70% of maximum for more than 90 minutes a week, it is a good bet that you are physically fit enough to dive recreationally under a variety of conditions. Diving itself, however, typically does not constitute regular exercise.

Keeping your ears healthy

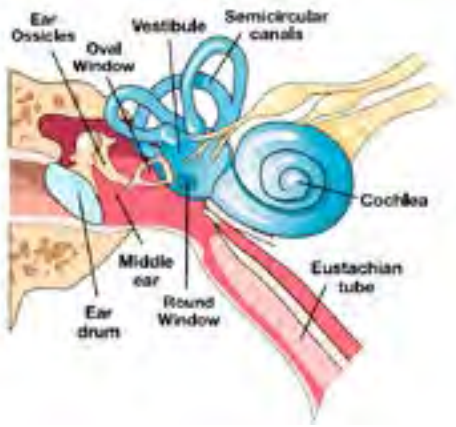
Whether you're breathing compressed gas or freediving, changes in ambient pressure (pressure in the environment around you) will affect your ears. The delicate structures responsible for hearing and balance are not designed for the stresses associated with diving. Equalising your middle-ear pressure is essential to avoid damaging your ears.

Equalisation occurs when the pressure in your middle ears matches the ambient pressure. The purpose of pressure-equalising techniques is to open up your Eustachian tubes (or auditory tubes), which are the ducts connecting the back of your throat (or nasopharynx) to your middle ears, as shown in the diagram below.



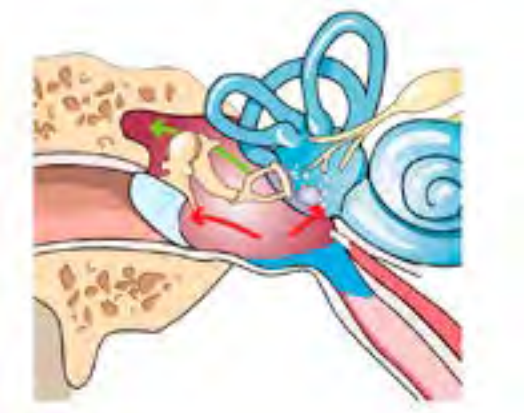
Most divers are able to equalise their middle ears without major difficulty by using one of a variety of techniques — from jaw movement to the Valsalva manoeuver. Failure to equalise properly during descent or ascent can result in substantial pain and risk of injury. Here are a few problems to be aware of:

- **Inner-ear barotrauma** is a tearing or perforation of the delicate membranes leading to the inner ear. It's a serious condition that requires medical attention and, frequently, surgical intervention. It can cause damage to the inner-ear hearing structures (the cochlea) and balance structures (the vestibular canals). This can result in either complete or high-frequency hearing loss, vertigo or tinnitus (ringing in the ears).



- **Middle-ear barotrauma** is the most common pressure-related injury. If the Eustachian tubes are blocked or inflamed (like the common cold), the ear is unable to equalise, causing the eardrum to stretch to the breaking point. On descent, compression of air causes the eardrum to bow inward, while on ascent, expanding air causes it to flex outward. This can result in pain or vertigo.
- **Outer-ear barotrauma** is caused when something blocks the ear canal (such as a too-tight hood, ear wax or non-vented ear plugs), creating closed air space. During descent, more gas must be added to this space; otherwise, increasing pressure in the surrounding tissues will fill the canal with blood and fluid.

- **Reverse squeeze**, also called block, is a condition in which gas becomes trapped in the middle ear on ascent. It can sometimes be managed by descending slightly and then re-attempting a slower ascent. If this fails to work, a diver has little choice but to risk injury while continuing the ascent as slowly as possible given the circumstances. Reverse squeeze can be prevented by avoiding diving while congested.



- **Alternobaric vertigo** arises from unequal pressure in the left and right middle ears, usually because the pressures are equalising at different rates. Failure to equalise symmetrically can cause the brain to erroneously perceive the difference in pressure as movement. Dizziness and vertigo may occur before the threshold for pain is reached. In severe cases, symptoms may include nystagmus (involuntary rhythmic movement of the eyes), nausea and vomiting. AV may also be accompanied by a feeling of fullness, tinnitus and muffled hearing in one or both ears.

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Equalisation techniques

- Valsalva manoeuver (pinch your nose and blow): This is the method most divers learn. Pinch your nostrils (or close them against your mask skirt) and blow gently through your nose. The resulting overpressure in your throat usually forces air up your Eustachian tubes.
- Passive (requires no effort): This typically occurs automatically during an ascent.
- Voluntary tubal opening (tense your throat and push your jaw forward): This calls for tensing the muscles of the soft palate (the soft tissue at the back of the roof of your mouth) and the throat while pushing the jaw forward and down as if you're starting to yawn; your jaw muscles pull your Eustachian tubes open. This requires a lot of practice, but some divers learn to control those muscles and hold their tubes open for continuous equalisation.
- Toynbee manoeuver (pinch your nose and swallow): With your nostrils pinched or blocked against your mask skirt, swallow. This pulls open your Eustachian tubes, while the movement of your tongue, with your nose closed, compresses air against the tubes.
- Frenzel manoeuver (pinch your nose and make the sound of the letter "K"): Close your nostrils and close the back of your throat as if you're straining to lift a weight. Then make the sound of the letter "K." This forces the back of your tongue upward, compressing air against the openings of your Eustachian tubes.
- Lowry technique (pinch your nose, blow and swallow): This is a combination of Valsalva and Toynbee; while closing your nostrils, blow and swallow at the same time.
- Edmonds technique (pinch your nose and blow and push your jaw forward): While tensing your throat muscles and soft palate and pushing your jaw forward and down, do a Valsalva manoeuver.

If you have trouble equalising

Some divers may occasionally have difficulty equalising, while others may have persistent difficulty. A re-evaluation of your equalisation technique may be a good idea if you have a hard time clearing. To avoid difficulty, be aware of and accommodate acute nasal and sinus problems, as they can lead to inflammation of the delicate tissues in your nose, sinuses and ears. Take your time – some divers simply equalise slowly; it's important not to feel pressured or rushed, nor to rush other divers. Equalise early and often. Seek medical evaluation if you experience difficulty equalising every time you dive.

DAN-SA medics often get asked if decongestant use is appropriate for divers. Decongestants relieve congestion temporarily but can mask ongoing problems. In addition, using decongestants for four or five days may result in what's called rebound congestion, making it more difficult to equalise. But if your physician gives it the "OK", decongestant use may be helpful.

If you've pushed your limits, be alert for ear barotrauma symptoms. Fullness in the ear, ear pain and tinnitus (noise in the ear) after diving are not normal and if you experience these symptoms you should be checked by a physician. Persistent vertigo after a dive is an emergency, and you have to be evaluated as soon as possible. Barotrauma damage and inner-ear DCS damage have similar symptoms, but the treatments are very different. Recompression helps in cases of DCS but can worsen barotrauma. For more information, see http://www.diversalertnetwork.org/health/ears

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Equalisation tips

Listen for the "pop"

Before your dive, make sure that when you swallow you hear a "pop" or "click" in both ears. This tells you both Eustachian tubes are open.

Start early

Several hours before your dive, begin gently equalising your ears every few minutes.

Equalise at the surface

"Pre-pressurising" at the surface helps get you past the critical first few feet of descent. It may also inflate your Eustachian tubes so they are slightly bigger.

Descend feet first

Studies have shown a Valsalva manoeuver requires 50% more force when you're in a head-down position than when you are in a head-up position.

Look up

Extending your neck tends to open your Eustachian tubes.

Use a descent line

Pulling yourself down an anchor or mooring line helps control your descent rate. A line also helps you stop your descent quickly if you feel pressure, before barotrauma has a chance to occur.

Stay ahead

Equalise often, trying to maintain a slight positive pressure in your middle ears.

Stop if it hurts

Don't try to push through pain. If your ears begin to hurt, ascend a few feet and try equalising again.

Avoid tobacco and alcohol

Both tobacco smoke and alcohol irritate your mucus membranes, promoting more mucus that can block your Eustachian tubes.

Keep your mask clear

Water up your nose can irritate your mucus membranes, which then produce more of the stuff that clogs.

Understanding decompression sickness

One of the hazards associated with the pressurised underwater setting is decompression sickness (DCS), also known as "the bends." It's important for all divers to know about DCS manifestation and management, risk factors that may predispose them to the condition and preventive steps that can minimise their chances of developing it.

What causes DCS: The increase in ambient pressure during descent causes the body's tissues to take on more inert gases (such as nitrogen). A controlled ascent allows the nitrogen to move from the tissues and blood to the lungs, where it can be exhaled. DCS can occur when ambient pressure drops faster than the nitrogen is eliminated, leading to gas coming out of solution and forming bubbles. A good analogy is what happens when you take the cap off a bottle of cold drink and bubbles form. The body can tolerate some gas bubbles, but if they enter sensitive tissues a range of DCS symptoms can occur.

Your dive computer and DCS: Dive computers have become an important piece of dive gear and a primary means of regulating dive profiles. A dive computer dynamically monitors your depth and time underwater. Yet despite following the instructions provided by their dive computers, divers can still develop DCS. But this does not make it "undeserved" or "unexplained", which are both misleading terms.

Dive computers (and tables) are based on mathematical models that measure a dive profile (or pressure-time-ascent exposure) to predict the rate of on- or off-gassing for the average diver for a given breathing gas. Remaining dive time — and, if necessary, decompression stops — are suggested based on the exposure.

For most divers in normal circumstances this provides reasonable safety. However, factors like hard exercise, cold or lack of rest the previous night may change your on- and off-gassing or make you more susceptible to decompression sickness. Thus, you have to learn how to make adjustments in such situations. Basic adjustment is to stay at a depth for a shorter time than what your computer indicates is the acceptable time, pad your safety stop or use nitrox as a breathing gas and keep your computer settings on air.

DID YOU KNOW?

There are two fundamental phases of every dive: the descent and bottom phase, when gas uptake occurs, and the ascent and stop phase, when gas elimination generally occurs.

Risk factors for DCS: The most significant risk factor is your dive profile, which is determined by your depth, time at depth (pressure) and rate of ascent. Some degree of exposure intensity is necessary to cause DCS, no matter what other predisposing factors are present. Exercise increases the body's demand for oxygen. This results in vasodilation (widening of the blood vessels) which increases blood flow to deliver more oxygen to the tissues that need it and, while diving, more nitrogen as well. Minimising exercise intensity and avoiding overheating during a dive can prevent excessive nitrogen on-gassing. Excellent buoyancy control, proper hydration and adequate rest can also reduce your risk. Remember that your dive computer is a tool designed to estimate your risk, but you are the one who must manage your risk. See page 36 for more information on risk factors.

What is the difference between DCS and DCI?

Decompression sickness (DCS)

DCS is a disease caused by freed gas (bubbles) in a diver's tissues and circulation that occurs when the amount of at-depth dissolved gas in a diver's tissue exceeds the capacity of the tissues to hold gas at the new, lower ambient pressure. Symptoms may include itching, rash, joint pain, muscle aches or sensory changes such as numbness and tingling. More serious symptoms include vertigo, muscle weakness, paralysis or disorders of higher cerebral function, including memory and personality changes. See "Type 1 DCS" and "Type 2 DCS" on page 59.

Decompression illness (DCI)

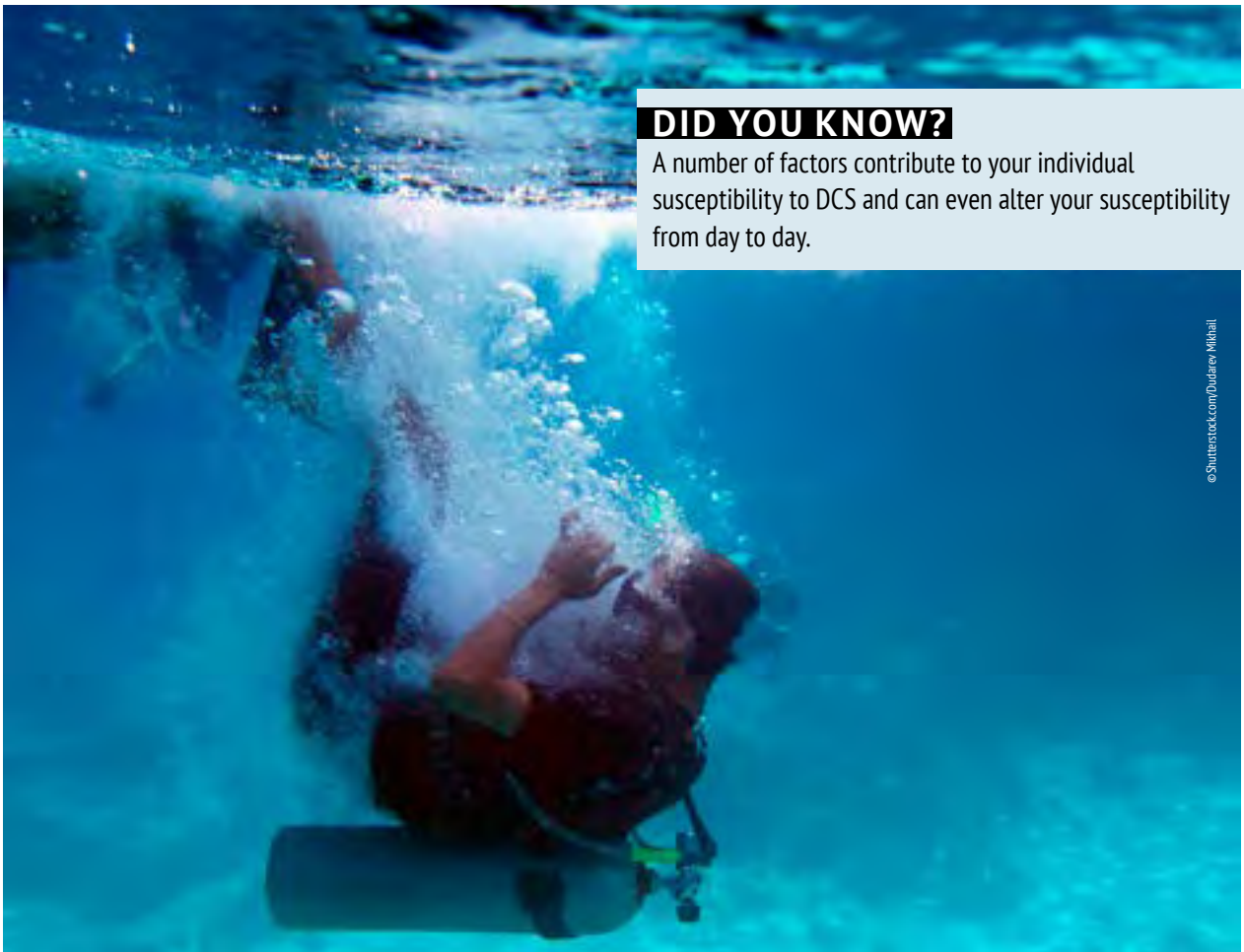
DCI encompasses both decompression sickness (DCS) and arterial gas embolism (AGE). The term DCI is used because the signs and symptoms of DCS and AGE can be similar and because recompression is the treatment for both.

Arterial gas embolism (AGE)

AGE is a condition caused by gas in the arterial circulatory system originating from lungs. In divers, this may result from a rapid ascent without exhalation, which causes overexpansion of the lungs and pulmonary barotrauma. The organ most often affected by gas emboli is the brain; usual signs and symptoms include rapid onset of stroke-like symptoms immediately or within minutes upon reaching the surface. An AGE may occur in water as shallow as five feet after taking one breath of compressed gas followed by a breath-hold ascent.

Common DCS risk factors

- Workload: The timing and intensity of any exercise during a dive impacts gas uptake and elimination. During your descent and bottom phase, keep your exercise intensity as low as possible to reduce gas uptake. During your ascent and stop phase, mild exercise (less than two to three times resting effort) with very low joint forces is optimal. Any exercise, especially involving high joint forces (such as running), should be avoided as long as possible after a dive.
- Thermal stress: During your descent and bottom phase, a cool or thermoneutral state will minimise your inert gas uptake. Avoid cold, but do not go overboard with heating. Exerting yourself as little as possible during this phase is beneficial. During your ascent and stop phase, a relatively warm state promotes inert gas elimination, reducing overall decompression stress.
- Breathing gas: The particular breathing gas mixture you use, and how you use it, can play a role in the development of DCS. A mixture known as enriched air nitrox, or simply nitrox, is increasingly popular for recreational diving. The percentage of oxygen in the mix is higher, reducing the nitrogen fraction. That means there's less nitrogen uptake at any given depth. Diving nitrox requires additional precautions and training.
- Patent foramen ovale (PFO): This is a congenital medical condition characterised by an opening between the left and right atriums of the heart. A large PFO may increase the risk of DCS in divers who develop significant bubble loads. But the correlation between PFO and DCS isn't clear, since the frequency of PFO in the population is fairly high, while DCS is relatively rare.
- Hydration: Sound hydration is important for good health, in general and in diving, but your dive profile, thermal stress and exertion level are far more important risk factors for DCS.
- Sex: There's little evidence in the literature that sex plays a role in DCS. Some studies suggest women have a slightly elevated risk, but making safer choices can compensate for any slightly elevated physiological susceptibility.
- Age: Advancing age is sometimes thought to increase DCS risk; however, rather than increasing susceptibility to DCS, age may instead lower recovery rates after DCS hits.



DID YOU KNOW?

A number of factors contribute to your individual susceptibility to DCS and can even alter your susceptibility from day to day.

How to avoid DCS

Fortunately, all the measures that diminish your likelihood of DCS also enhance your overall diving safety:

- To minimise on-gassing, cut back your depth and time exposure. Consider diving with nitrox on air tables (or set your computer to air). Beware of nitrox's maximum operating depth.
- To maximise off-gassing, avoid square-profile diving and practice multilevel diving instead. Add safety stops and appropriate surface intervals.
- Understand your dive computer and how to use it.
- Acquire enough knowledge so you appreciate the hazards of diving and likely solutions.
- Attain sufficient skill, particularly regarding buoyancy control, so all your dives can be conducted as planned.
- Practise good buddy selection, so your plans and actions are compatible with those of your diving companions and with safe diving practices.
- Maintain good communication with your buddies and address problems quickly, when they're likely to be most manageable. Informed and thoughtful collective action by all divers in a group helps ensure a good outcome.

No single element is the critical factor when it comes to DCS. Thoughtful divers will educate themselves about potential risks and how to minimise them. Proper training will help you recognise and respond to symptoms if they do occur. For more information, see http://www.diversalertnetwork.org/health/decompression

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Diving and your heart

Being aware of your heart health and maintaining an appropriate level of physical fitness should be an essential element of your dive planning. If you maintain good physical fitness and seek appropriate health screenings, your risk of suffering a cardiovascular event will be greatly reduced.

Diving can stress the heart and circulatory system, creating excess demand for oxygen to which your heart must respond. A healthy heart and proper conditioning will help you adapt to the demands of pressure, workload and exercise. But if you have cardiovascular problems or limited exercise capacity, the blood shifts caused by immersion or sudden bursts of intense exercise can push the limits of your cardiovascular capacity. These are among the matters to consider regarding your heart as you dive:

Effects of immersion

Immersion in water can affect the cardiovascular system by redirecting more blood to your chest. This increases pulmonary circulation and forces your heart to substantially increase its output, raising your risk of a cardiac event, especially if age or disease have decreased your heart's capacity for elevated blood output. If the heart's pumping action begins to fail, fluid backs up into the lungs. This impairs the lungs' ability to oxygenate your blood and to remove carbon dioxide and nitrogen. It also results in increased pressure in the vessels of the lungs, which can cause fluid to pass through the capillary walls into the lungs' gas-filled spaces; this can cause a condition known as immersion pulmonary oedema. The redirection of blood due to immersion occurs because of two mechanisms:

- The hydrostatic pressure of immersion creates a pressure gradient that drives blood and fluid from your legs to your chest.
- The cooling effect of water causes a vasoconstriction (constriction of the blood vessels) and re-directs blood from skin circulation to your core to prevent this.

Presence of heart disorders

The condition of your heart, including its valves, muscles and electrical wiring affects its ability to pump blood and certain disorders can reduce its functional capacity. Such disorders may be congenital (present from birth) or acquired later in life; either congenital or acquired heart conditions may be diagnosed early on or may not be evident until they have been present for some time. These are among the heart disorders that can affect diving:

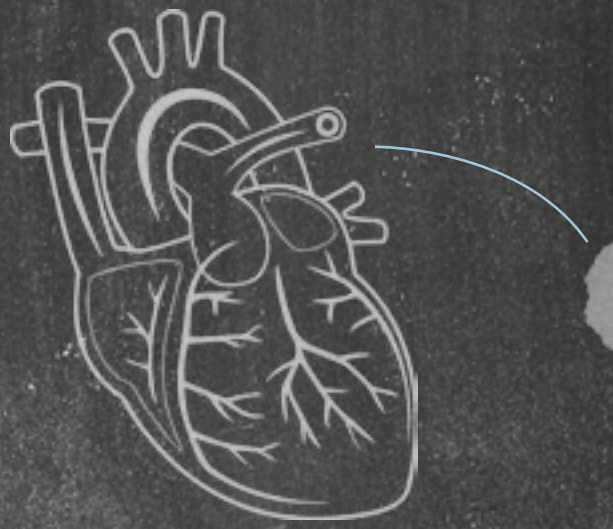
- Aortic stenosis and mitral regurgitation: These are the two most common valvular disorders in older adults. Their symptoms vary, depending on which valve is affected and on the condition's type and severity, but can include chest pain or shortness of breath.
- Mitral valve prolapse: Also known as "click-murmur syndrome" or "floppy-valve syndrome", this is due to excess connective tissue in the heart's mitral valve, so part of the valve protrudes into the left ventricle during every contraction.
- Patent foramen ovale (PFO): PFO is a fairly common, congenital, generally benign condition characterised by a hole between the heart's left and right atriums.
- Atherosclerosis: This is a build-up of cholesterol and other fatty deposits along the inner walls of the arteries. Atherosclerosis can occur in different parts of the body. Cerebrovascular atherosclerosis, for example, affects the brain; peripheral artery disease (PAD) the limbs; and coronary artery disease (CAD) the heart itself. CAD can result in a myocardial infarction, or heart attack.
- Ischemic heart disease: This condition is characterised by an inadequate supply of blood to the heart muscle. It's almost always caused by CAD and is the most common form of heart disease.
- Arrhythmias: The heart's electrical system controls the rate at which it beats — about 70 times per minute or roughly 100 000 times a day. Irregularities in its function can be caused by heart disease and can in turn further damage the heart. The term arrhythmia (or dysrhythmia) refers to any of several disturbances of the heart's normal rhythm. Serious arrhythmias, such as ventricular tachycardia and many types of atrial arrhythmia, are incompatible with diving. The danger for someone who develops an arrhythmia during a dive is losing consciousness while underwater. Anyone with a cardiac arrhythmia must seek evaluation by a cardiologist before engaging in diving.

Your physical fitness

Diving in favourable conditions requires little exertion, making it easy to assume that diving is safe and effortless. But during any dive, perilous conditions can arise that may require vigorous exercise at a moment's notice. This can stress your cardiovascular and respiratory systems. Those with limited exercise capacity may be pushed to their limits by diving — to the point of serious injuy and even death. Divers should be aware of their risk factors for cardiovascular disease and of measures they can take to mitigate those factors. Performing regular physical conditioning, including both aerobic and strength training, is ideal.

DID YOU KNOW?

By 2050, it is estimated that the prevalence of atrial fibrillation in Africa will be greater than in any other region of the world.



Physical Activity Recommendations

Adults need two types of regular activity to maintain or improve their health – aerobics and strength training. The World Health Organisation recommends that adults aged 18–64 should do at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. Muscle-strengthening activities should be done on two or more days a week. Physical activities are commonly classified by intensity into one of the following four categories:

1. Sendentary behaviour

Sedentary behaviour refers to activities that do not substantially increase one's heart rate or energy expenditure above the resting level; included in this category are activities like sleeping, sitting, lying down and watching television. Such activities involve an energy expenditure of 1.0 to 1.5 METs.

2. Light-intensity physical activity

Light physical activity – which is often grouped with sedentary behaviour but is, in fact, a distinct activity level – involves an energy expenditure of between 1.6 and 2.9 METs and raises the heart rate to less than 50% of one's maximum heart rate. It encompasses such activities as slow walking, deskwork, cooking and washing dishes.

3. Moderate-intensity physical activity

Physical activity that increases the heart rate to between 50% and 70% of one's maximum heart rate is considered to be of moderate intensity. For example, 50-year-olds have an estimated maximum heart rate of 170 beats per minute (bpm), so the 50% and 70% levels would be 85 bpm and 119 bpm. That means a moderate-intensity activity for 50-year-olds is one that keeps their heart rate between 85 bpm and 119 bpm. By contrast, 30-year-olds have an estimated maximum heart rate of 190 bpm, making a moderate-intensity activity one that raises their heart rate to between 95 bpm and 133 bpm.

4. Vigorous-intensity physical activity

A vigorous-intensity activity is one that increases the heart rate to between 70% and 85% of one's maximum heart rate. For 60-year-olds that would be between 122 bpm and 136 bpm; for 25-year-olds it would be between 136 bpm and 167 bpm.

Detailed physical activity recommendations can be found at cdc.gov/physicalactivity/everyone/guidelines

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Age and lifestyle factors

Your heart is affected by aging and by your lifestyle choices. You should consider factors that may increase your risk for cardiac problems and get periodic medical evaluations. Some factors — such as family history, gender, ethnicity and age — can't be changed. Others, including some involuntary health conditions and lifestyle choices, can be modified. Some involuntary conditions — such as high blood pressure, high cholesterol or diabetes — can be controlled with medication, as well as with diet and lifestyle adjustments. Lifestyle risk factors for heart disease include tobacco use, unhealthy dietary choices, physical inactivity and excessive alcohol consumption — all of which can be voluntarily changed. These are among the age and lifestyle factors that can affect your heart:

- Hypertension (high blood pressure): This is a common medical condition in divers and the general population. It means the pressure exerted on the walls of your blood vessels is higher than normal.
- Hyperlipidaemia (high cholesterol): This means the levels of lipids and other fats in your blood are higher than normal. It's determined by measuring three factors: high-density lipoproteins (HDLs), low-density lipoproteins (LDLs) and triglycerides (a type of body fat).
- Overweight and obesity: These conditions are often (but not necessarily) associated with a higher proportion of body fat and can result in extra stress on the heart. They are determined by any of several measurements: body mass index (a ratio of weight to height), waist size, waist-to-hip ratio or skin-fold thickness.
- Metabolic syndrome: This affects how the body uses and stores energy. It's associated with an elevated risk of cardiovascular disease, as well as endothelial dysfunction (abnormalities in the linings of the body's organs and cavities) and chronic low-grade inflammation.

These and other conditions may or may not be compatible with safe diving, depending on their severity and how well you're able to control their effects.

Other Health Considerations

Various other health considerations can affect your fitness to dive. Among such conditions are the following:

- **Diabetes mellitus (DM):** This is a disorder of the endocrine system and is a result of either insufficient production of insulin or resistance by the body's cells to normal (or even high) levels of insulin. People with DM can be affected by either hyperglycaemia (excessively high blood glucose, or blood sugar) or hypoglycaemia (excessively low blood glucose). Hypoglycaemia presents the greatest risk for a diver, as it can cause confusion, sweating, a rapid heartbeat, unconsciousness and even death. Hyperglycaemia can also cause unconsciousness, though usually with a much slower onset. It goes without saying that impaired consciousness underwater can be fatal. Although hypoglycaemia occurs most commonly in Type 1 Diabetes (also known as juvenile or early-onset diabetes), it can also occur in those with Type 2 Diabetes who take oral hypoglycaemic medication. DAN recommends that divers with diabetes check their blood glucose levels at three separate intervals prior to getting in the water as well as immediately after diving and frequently thereafter for 12-15 hours. This will help you make appropriate diving and eating decisions.

DID YOU KNOW?

- According to the *South African Medical Journal*, 10% of South African adults suffer from asthma.
- It is estimated by the International Diabetes Federation (IDF) that around 840 000 people in South Africa have diabetes, 90% of whom have been diagnosed with Type 2 Diabetes.

- **Asthma:** Asthma is a lung disorder caused by excessive contraction of the muscles surrounding the bronchi (the breathing tubes); this results in narrowing of the tubes, or bronchoconstriction. Symptoms include wheezing, chest "tightness," cough and breathlessness. Asthmatic bronchoconstriction can be triggered by allergens, noxious fumes, cold air, exercise and/or respiratory infections – even just a common cold. Diving with asthma is potentially very risky. The two primary concerns are as follows:
  - Scuba diving results in a reduction in breathing capacity due to the effects of immersion and the increase in breathing resistance caused by gases' higher density at depth. If your breathing capacity is already reduced by asthma, you may not have sufficient reserve to accommodate the increased demands of diving.
  - The narrowing of your bronchi and the associated production of excessive mucus can inhibit exhalation during ascent. This predisposes you to pulmonary barotrauma, which can lead to pneumothorax, pneumomediastinum, subcutaneous emphysema and/or an arterial gas embolism.

Accordingly, physicians trained in diving medicine usually recommend that anyone with asthma never dive. However, if you can demonstrate normal breathing function at rest and after strenuous exercise, your risk of diving with asthma may be acceptable.

Basic Health Tips

Adopting a healthy lifestyle early in life can help postpone ailments associated with aging.

Prior to diving, you should take an honest assessment of whether you are medically fit to dive. Be vigilant for signs of acute illness (including congestion) and familiarise yourself with the risks and essential precautions associated with any chronic diseases. When considering your medical fitness to dive, heed the following suggestions:

- **Acute illness** that lasts more than a few days or leaves you feeling exhausted should prompt a delay to diving. Postpone your dive until you are ready to exercise at your pre-illness level. If you have any concerns, or if the illness is of an unusual duration or severity, consult with your physician.
- **Chronic diseases** may affect your fitness to dive and your dive risks even if you perform well in other activities. Some health conditions, especially in advanced stages, may make the risks to you and your dive buddies unacceptably high. In less advanced or more stable medical conditions, divers may continue safe and enjoyable diving with proper guidance from their physician.

During your annual physical exam or following any changes in your health status, consult your physician to ensure you have medical clearance to dive.

> Be vigilant for signs of acute illness.

BECAUSE THE WORLD AWAITS YOU

Whether you're taking a 24-hour flight to Fiji or a 23-minute drive to the shore, diving involves some form of travel. The allure of a holiday at an exotic dive site or the promise of spotting a fish you've never seen before is part of what attracts many divers to the sport. These are some of the factors to keep in mind regarding dive travel.

Equipment considerations

Air travel is diver-friendly, so many divers opt to bring their gear with them to their travel destinations. Airlines permit you to pack your regulator, buoyancy compensator (BC)/ buoyancy control device (BCD), dive computer, masks, fins and snorkels in either carry-on or checked baggage; cutting tools and spearguns must be sheathed and secured if they're packed in checked baggage. In general, travelling by air with cylinders is discouraged.

It's a good idea to carry on your comfort and safety essentials in case your gear is delayed. Having your regulator, dive computer, mask and swimsuit with you can help ensure you don't miss your first scheduled dives, even if your gear bag is lost or delayed. You'll probably also want to carry on any expensive or sensitive photography equipment.

If you decide to check in your diving gear, include a note explaining the equipment in case security personnel open the bag. Taking all these issues into consideration, we recommend how best to travel with your various pieces of equipment:

Carry on
- Regulator
- Dive computer
- Mask
- Swimsuit

Carry on or check in
- BC/BCD
- Fins
- Snorkel

Check in only
- Cutting Tools
- Spearguns
- Cylinders (valves must be removed)

Domestic travel tips

One of the benefits of diving domestically is that it can be more spontaneous and is usually less costly than international travel. Even so, knowing how to get — and stay — prepared for a nearby dive, even if you live just a short ride from the coast, can help make your local trips easier, safer and more enjoyable.

Get prepared
- Create a packing checklist based on your typical dives.
- Maintain your gear so you can grab it and go.
- Assemble a first-aid kit and a Save-A-Dive kit.
- Keep your relevant certifications up to date.

Before you go
- Research the weather, currents and water temperatures at your destination.
- Customise your packing checklist for this specific trip.
- Check — and if necessary replenish — your first-aid kit.
- Tell someone where you are going.
- Remember to bring plenty of water and healthy snacks.

Even a short flight or a road trip of an hour or more can leave you feeling cramped, dehydrated and fatigued, so make sure to stretch and hydrate regularly while you are en route. Don't be afraid to call off your dive or put off your departure until you know you're ready.

International travel tips

When travelling abroad for a dive trip, you can expect to encounter beautiful vistas, exotic ocean life and exciting topside adventures, but you also need to be prepared for the hassles of travel. You can mitigate the difficulties of travelling internationally by getting ready in advance. In the months leading up to your trip, use the following checklist to make sure you're on track:

2 Months before travel

- Ensure your passport is valid for at least six months after your last intended date of travel.
- Determine whether you need a tourist visa.
- Find out whether you need any vaccinations.
- Complete RSTC medical form and have a copy of your physician sign-off if needed.

1 Month before travel

- Check your destination country's laws about your prescription medications.
- Acquire local currency and talk to your bank about international ATM arrangements.
- Find out if there are foreign transaction fees associated with your credit cards.
- Register on ROSA (Registration of South Africans Abroad) on the Department of International Relations and Cooperation's (DIRCO) website, www.dirco.gov.za
  The information travellers register on ROSA allows DIRCO to assist South African citizens in the event of an emergency abroad.

2 Weeks before travel

- Customise your packing checklist.
- Set up a global calling plan.
- Inform your credit card companies of your intention to travel abroad.
- Make sure you have purchased or renewed your travel insurance.

1 Week before travel

- Make two copies each of your passport (a colour copy is preferred), driver's licence, credit cards, itinerary, accommodation confirmation and visa (if you need one). Leave one set of copies with someone at home and pack the second set someplace separate from the original documents. Also scan all of these documents and save them to your Cloud, Dropbox, device, or somewhere where they can be accessed electronically while you are travelling.
- Pack everything you won't need before your trip.

24 Hours before travel

- Check in to your flight and make sure you have an assigned seat.
- Run through your packing list again and make a copy to help you pack for the return trip (so you won't forget your toiletries, chargers, medications, etc.).
- Notify someone of your travel plans.

Local laws

If you're planning a dive trip abroad, an important but often overlooked part of your preparation should be to review your destination's laws. If you break those laws, even unknowingly, you're still subject to that country's penalties. Here's what to check:

- Weapons: Weapons laws vary widely between countries. It's best to avoid carrying even small knives, as they carry big penalties in certain countries. If you intend to pack dive knives or spearguns, make sure you're familiar with the country's laws and protocols surrounding such gear.
- Photography: Often tourists don't think twice about what they're photographing, but in some locations, snapping pictures of government buildings, holy sites or copyrighted landmarks is prohibited. Make sure you know what's off limits. If in doubt, ask before you click.
- Finances: Exceeding your credit limit can be a punishable offense in certain countries, so keep an eye on your pocketbook and immediately report any stolen cards.
- Driving: Before you get behind the wheel, study local road signs and driving laws and confirm that you have the proper documentation to operate a vehicle in that country.
- Prescriptions: Some medications may be prohibited at your destination or in countries through which you travel. Consult with your destination country's embassy well in advance of your trip to find out if you need to acquire approval for your particular drug. Keep your medications in their original containers, bring copies of your prescriptions and carry a signed letter from your prescribing physician.

If you experience legal difficulties abroad, contact your country's local embassy for assistance. For the South African embassy, visit www.saembassy.org

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> Make sure you're aware of any travel-related medical conditions to which you may be vulnerable.

Travel-related medical issues

Divers are generally aware of how to avoid hazardous marine life, how to minimise getting the bends and why it's essential to be honest on your medical questionnaire. But all divers are also travellers, so make sure you're also aware of any travel-related medical conditions to which you may be vulnerable. From common concerns, such as dehydration or traveller's diarrhoea, to much rarer maladies, such as West Nile virus, understanding risk factors, preventive measures and appropriate responses to travel-related medical conditions can help keep you healthier and safer — in and out of the water.

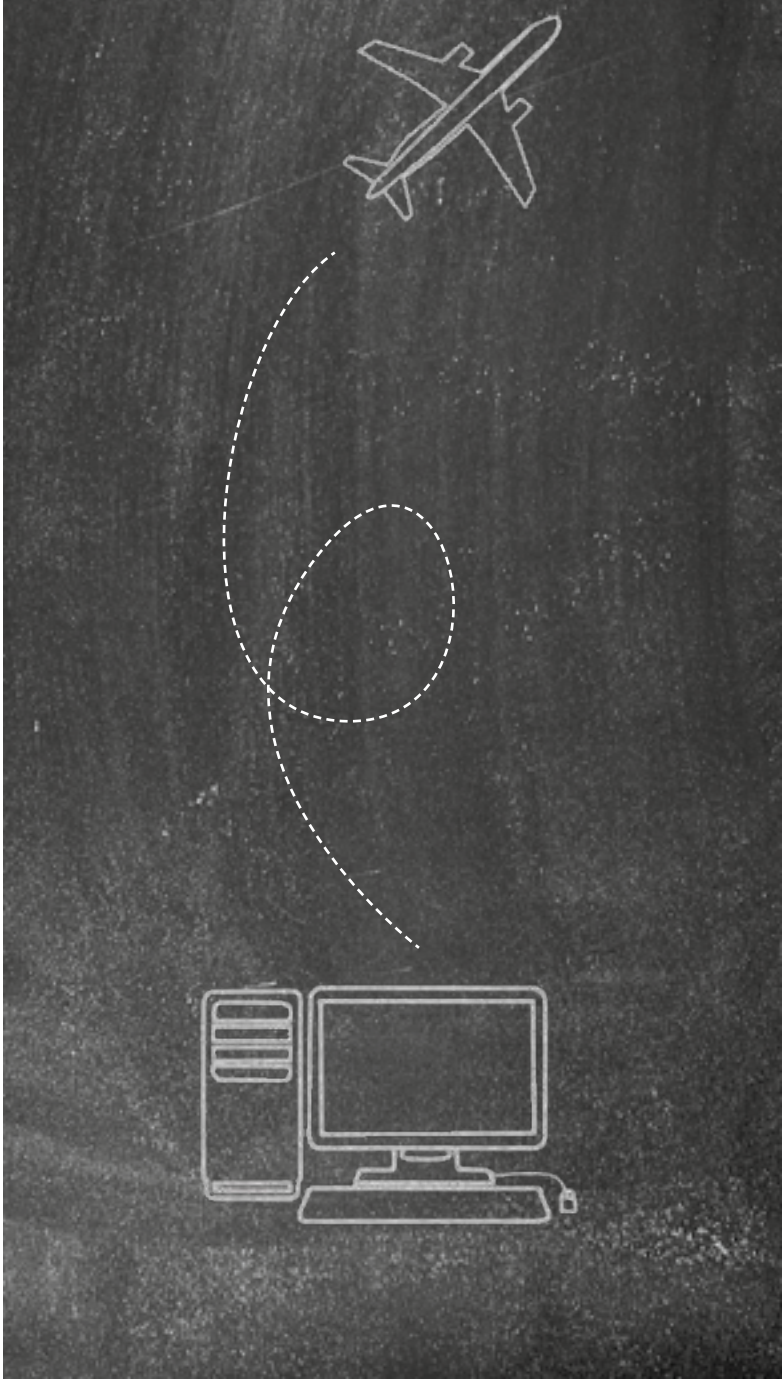
Before you leave home, research what your medical insurance policy covers; if need be, contact your insurance company for details about what expenses are covered and where your policy is valid.

If you become seriously ill while travelling, either DAN-SA or your country's embassy or consulate can help you find medical care. DAN-SA members have access to emergency evacuation benefits, including medical evacuation. If you experience a fever or flu-like illness while travelling, it's essential to seek medical attention immediately.

DID YOU KNOW?

Flying to a destination near sea level before diving poses virtually no risk. Flying after diving, however, increases decompression stress since the pressure in an aircraft cabin is lower than ground-level atmospheric pressure.

DAN-SA recommends you allow for at least a 24-hour pre-flight surface interval after your final dive. Please remember that any post dive ascent to a higher altitude — even using ground transportation — increases your decompression stress.



Introduction to DAN-SA

BECAUSE YOU'RE ENTITLED TO EXPERT ADVICE

DAN-SA works with divers toward a common goal – making diving safer. DAN-SA is supported by more than 7 000 fellow divers with a further 400 000 international divers supporting DAN worldwide. DAN-SA members benefit from emergency medical advice and assistance, diving research and education.

DAN-SA member benefits

Peace of mind

In case of a diving emergency, DAN-SA members have access to the best worldwide care. The DAN-SA hotline is a 24/7/365 dedicated contact line for all divers in need. Our trained staff and diving medical doctors provide expert and unparalleled assistance in emergency situations or for general dive medicine-related enquiries.

***Alert Diver* (Plus and Master members)**

The *Alert Diver* magazine is an online magazine dedicated to diving medicine and written by DAN experts from all over the world. It provides insight into diving medicine, and the latest in DAN research, safety and training.

Evacuation and travel assistance

DAN-SA members have access to evacuation in a medical emergency when they are on a dive trip or more than 100km from home. Plus and Master members also receive emergency medical expense benefits when they travel outside of their country of permanent, registered residence for a maximum period of three months. Travel notification allows DAN-SA to know when our members travel abroad and to note this on our system. With the information provided by them, we are able to plan potential evacuation procedures and advise our members on the availability of appropriate facilities where they will be diving.

DAN-SA family support
DAN-SA Family Support provides an immediate pay-out to the specified next of kin in the event of an active member's diving-related death. The amount ranges from R15 000 to R25 000.

DAN-SA family membership
DAN-SA offers a diving Family Membership at a discounted rate. These family members must be declared as divers on the relevant application form. The emergency travel benefits can also be extended for free to non-diving family members, including:

- Spouse or legal cohabiter
- Child younger than 18 years
- Child aged 18-23 who:
  - Is enrolled as a full-time student
  - Is not employed on a full-time basis
  - Has the same permanent home address as the parent member

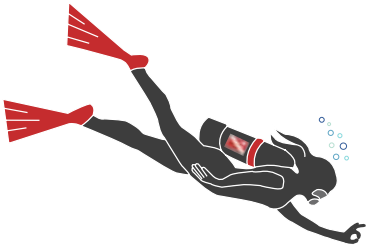
The DAN-SA family
Members are able to network with other divers from all over the world, share diving advice and meet like-minded people who join together in support of dive safety. They can also participate in DAN-SA events and interact on the DAN-SA social media platforms.

Special deals
Members enjoy a host of exclusive member benefits including product discounts. Visit www.dansa.org to find out more.

Participate in diving research programmes
We conduct various research programmes and case studies which divers can take part in. Learn how at www.dansa.org/research

DAN-SA EMERGENCY HOTLINE
0800 020 111 (SA) or +27 828 10 60 10 (int.)

Note: In case of life-threatening situations, call the local emergency medical services first, then call DAN-SA, which functions as secondary coverage. Where possible, expenses must be covered by a member's primary travel or medical insurance. To ensure cover, DAN-SA must be contacted in the event of any covered emergency or loss.



DAN SOUTHERN AFRICA

Rosen Office Park, Matuka Close
Midrand, 1685, South Africa
PHONE: +27 11 266 4900

Whatever your next adventure,
DAN-SA is with you every step of the way.

DAN-SA office

Rosen Office Park
DAN-SA Building
C/O Invicta & Matuka Close
Halfway Gardens
Midrand
1685

0800 020 111(local)
+27 828 10 60 10(international)

DAN-SA regions

Malaria areas
Angola
Comoros
DRC
Kenya
Madagascar
Malawi
Mozambique
Tanzania
Zambia
Zimbabwe
Botswana (partial)
Namibia (partial)
South Africa (partial)
Swaziland (partial)

Yellow fever areas
Angola
DRC
Kenya
Tanzania

Popular dive sites
1 Simon's Town, South Africa
2 Port Elizabeth, South Africa
3 Umkomaas, South Africa
4 Sodwana Bay, South Africa
5 Boesmansgat Cave, South Africa
6 Ponta do Ouro, Mozambique
7 Bazaruto Island, Mozambique
8 Quirimbas Archipelago, Mozambique
9 Mafia Island, Tanzania
10 Zanzibar, Tanzania
11 Mombasa, Kenya
12 Lake Victoria, Tanzania
13 Lake Tanganyika, Zambia
14 Lake Malawi, Malawi
15 Laka Kashiba, Zambia
16 Chinhoyi Caves, Zimbabwe
17 Okavango Delta, Botswana
18 Lake Otjikoto, Namibia
19 Luanda, Angola
20 Comoros
21 Nosy Be, Madagascar
22 Reunion Island
23 Mauritius
24 Seychelles

Hyperbaric chambers
Note: In case of a diving emergency, divers must contact the DAN-SA hotline for evacuation to a hyperbaric chamber.

DAN-SA Training & Education Courses Offered

Contact a DAN instructor in your region to take any of these courses. A full list of instructors is available on the DAN-SA website or by calling DAN-SA on 0860 242 242.

Entry-level courses

Oxygen first aid for scuba diving injuries

As a recreational diver, you can receive training to provide vital first aid that can make a difference to a scuba diver with decompression illness. The DAN Oxygen Provider course provides entry-level training in the recognition and management of possible diving-related injuries, using emergency oxygen first aid.

By taking this course, you will learn to:

- Recognise a diving injury;
- Respond with emergency oxygen first aid; and
- Relay with the emergency medical services (EMS) and DAN.

First aid for hazardous marine life injuries

Serious hazardous marine life injuries are rare. Most divers experience minor discomfort from unintentional encounters with fire corals, jellyfishes and other marine creatures. This course teaches divers to minimise these injuries and reduce diver discomfort and pain.

The course includes a look at how to:

- Identify hazardous marine life;
- Recognise possible injuries caused by hazardous marine life;
- Provide first aid for hazardous marine life injuries; and
- Avoid hazardous marine life injuries.

Automated external defibrillators for scuba diving

(Prerequisite: Basic Life Support)

More than 10% of all dive fatalities are actually caused by cardiovascular disease, according to DAN diving accident and fatality statistics. This course teaches divers and other interested parties to provide care for sudden cardiac arrest which includes the use of an automated external defibrillator (AED).

This course will teach you to:

- Recognise the warning signs of sudden cardiac arrest;
- Administer basic life support and use an AED; and
- Activate the local EMS.

On-site neurological assessment for divers

(Prerequisite: Oxygen First Aid for Scuba Diving Injuries)

Learn how to conduct a neurological assessment on a potentially-injured diver in this course. The information gained in this assessment can help convince a diver of the need for oxygen first aid and help a diving physician determine the proper treatment.

Advanced oxygen first aid for scuba diving injuries

(Prerequisite: Oxygen First Aid for Scuba Diving Injuries and Basic Life Support)

This advanced-level programme is designed to train existing DAN oxygen providers to use the MTV-100 (flow-restricted, oxygen-powered ventilator) or a bag valve mask, while they are providing care for a non-breathing injured diver.

Intermediate courses

Basic life support

The DAN Basic Life Support (BLS) course will not only train divers and non-divers to resuscitate an injured person with a circulatory arrest, but can also prevent a person from getting in that condition. External bleeding, choking and shock can lead to severe circulatory and respiratory problems. The DAN BLS course will prepare you to react in the correct way when accidents happen.

First aid

The DAN First Aid course represents training designed to educate people with a CPR/BLS certification in providing first aid to adult victims with non-immediately life-threatening injuries. Although the course was designed to be taught together with the DAN BLS course, it can also be offered as an extra module to those who already have a DAN BLS or other BLS certification that respects European Resuscitation Council (ERC) guidelines. In a real accident situation, first aid skills are the next step after providing effective BLS.

Advanced courses

Dive medicine for divers

(Prerequisite: Diving Emergency Management Provider and On-Site Neurological Assessment for Divers)

When you want to know more than just basic first aid techniques, Diving Medicine for Divers is your next step. Ultimately, more knowledge and a better understanding of how our bodies react to the pressures and stresses of diving lead to safer divers as we understand our limitations and the limitations of the situation.

Combination courses

Diving emergency management provider programme / DAN diving first responder

Learn the knowledge and skills from several courses in a single approach to diving emergency management. While the Diving Emergency Management Provider course combines the Oxygen, Automated External Defibrillators for Scuba Diving and Hazardous Marine Life Injuries courses, the DAN Diving First Responder course also includes the skills and knowledge from the Advanced Oxygen Provider course. After reviewing the skills and knowledge development portions of this programme, the students participate in an integrated scenario where they get the opportunity to bring together all of the skills they learned in each of the segments into a single scenario.

DAN Training

DAN Training goes digital!
Some courses are now available digitally.

Recognition course

Diving emergency specialist

Continuing education is an important way for divers to continue to hone their diving skills and improve as divers. DAN understands the importance of being an active and involved diver who takes the time to learn about not just new diving techniques, but techniques to care for yourself and others injured in a diving accident.

To recognise this commitment to diving safety, DAN has created a recognition programme called Diving Emergency Specialist (DES). The DES designation is a way to commend divers who have sought out the training they need to be prepared buddies and safer divers. Ask Your DAN instructor or visit the DAN Europe website for more information about this recognition programme.

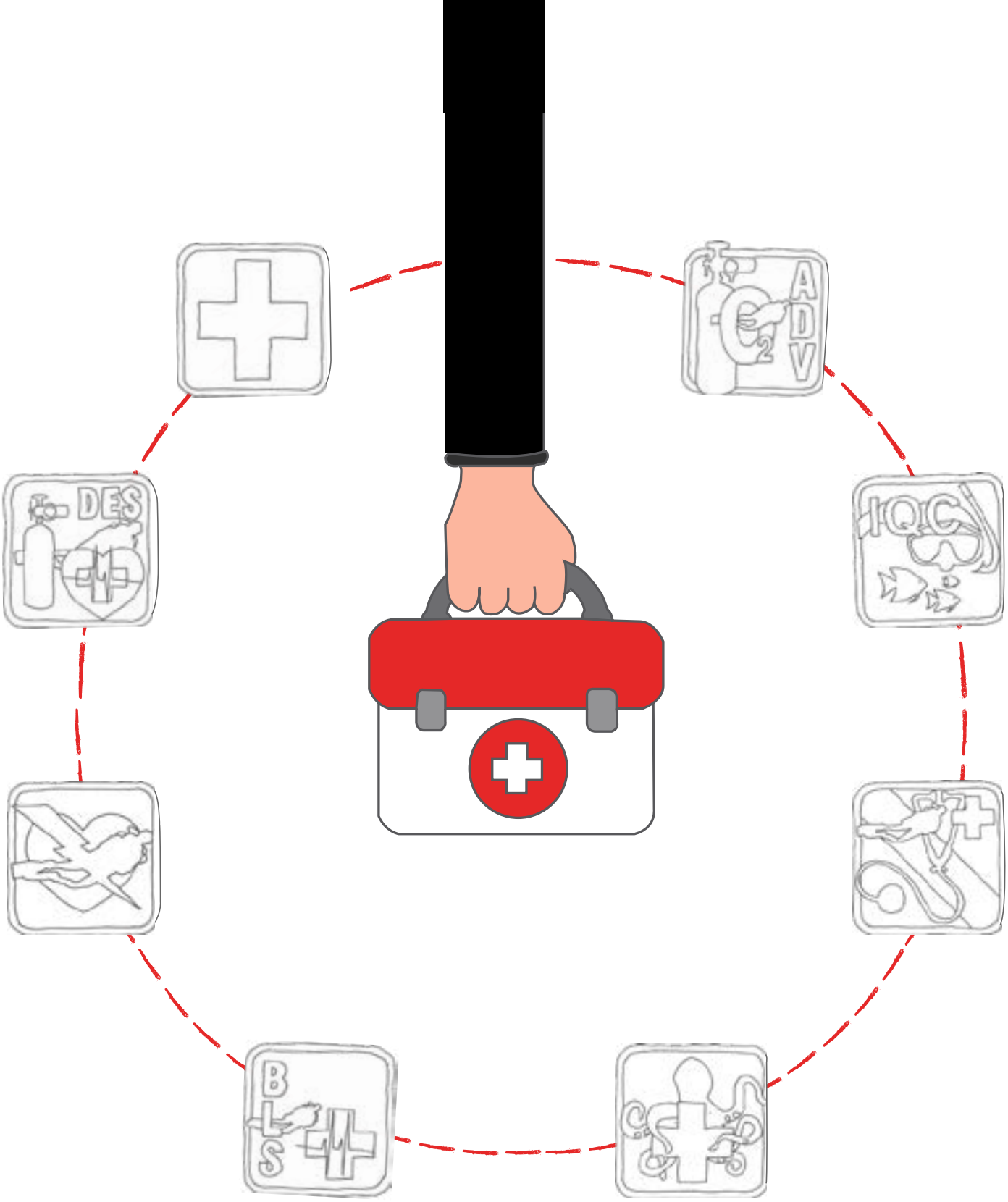
Leadership programmes

Instructor qualification course

To become a DAN instructor, you must complete the DAN Instructor Qualification Course (IQC). Instructor candidates will complete a core module that offers more information about DAN and explains how to teach DAN programmes. Candidates will then complete the course module for each DAN training programme they are interested in teaching.

Instructor trainer workshop

This programme teaches scuba diving instructor trainers to teach the DAN IQC and train DAN instructors. Only DAN staff members and examiners can offer this programme.

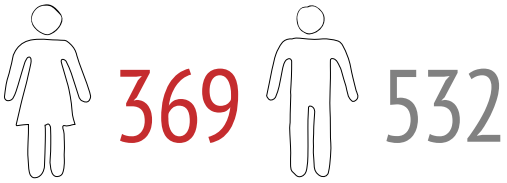


Equip yourself
to handle an emergency

DAN Training
www.dansa.org/training

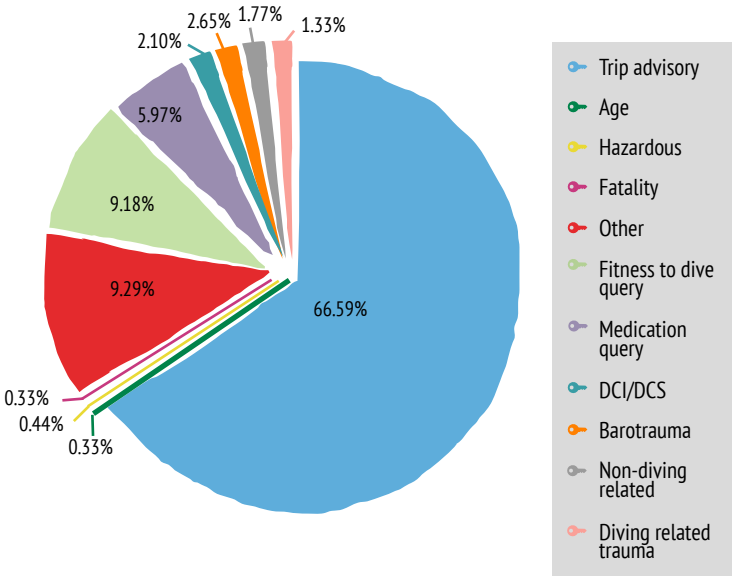
Statistics For 2016

DAN Hotline Gender Usage Split: 2016

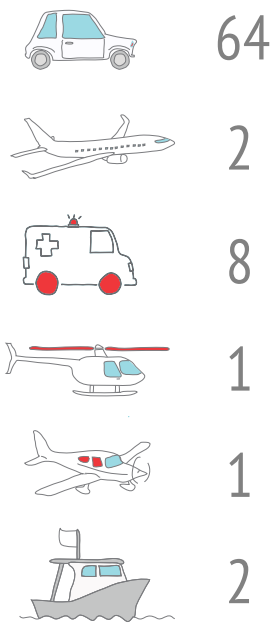


DAN Hotline Cases: 2008 - 2016

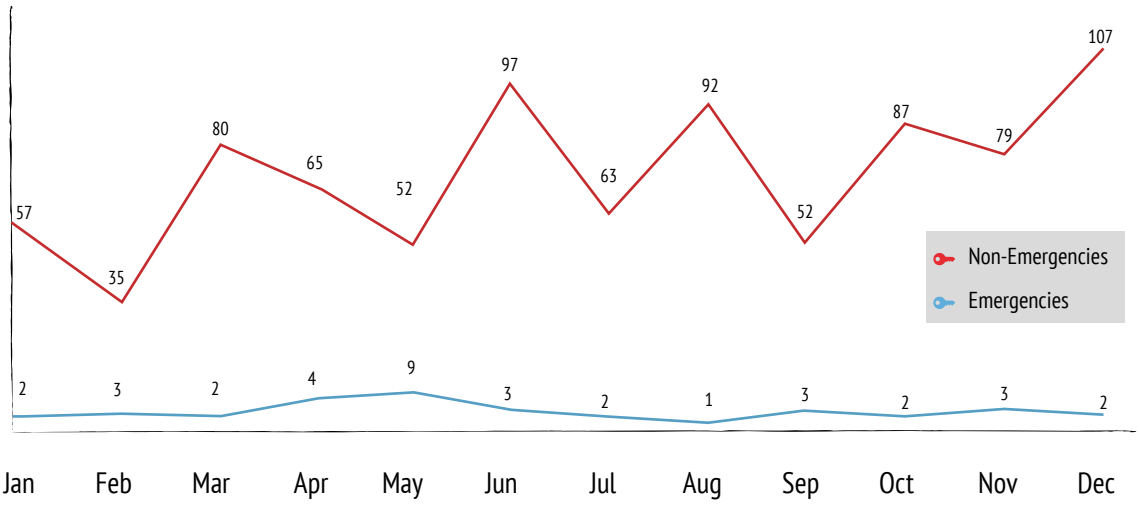
DAN Hotline Sub-categories: 2016



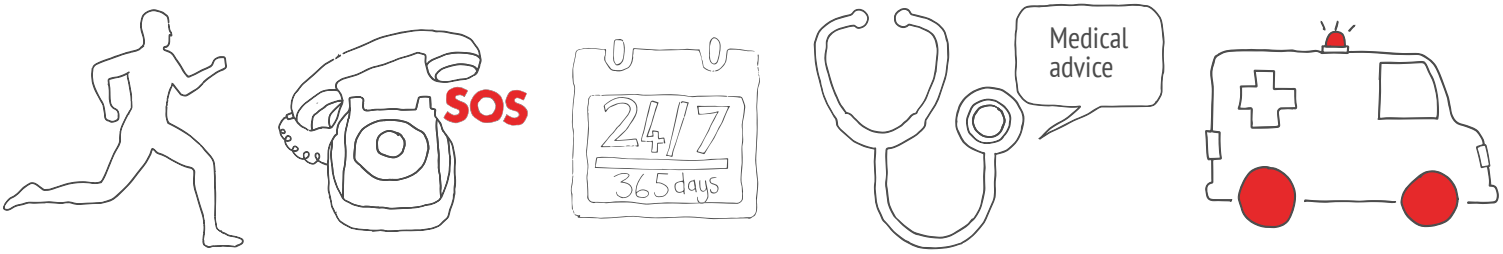
DAN Hotline Transport Method: 2016



DAN Hotline Case Category: 2016



DAN-SA HOTLINE



In a diving emergency, call:

0800 020 111 (local)

+27 828 10 60 10 (int.)

DAN SOUTHERN AFRICA

www.dansa.org

Diving Glossary

BECAUSE LEARNING NEVER ENDS

Here are definitions for some of the terms that you're likely to encounter as you continue your diving education.

Aortic stenosis: A narrowing of the heart's aortic valve, which prevents the valve from fully opening and obstructs the flow of blood from the heart into the aorta and the rest of the body.

Arterial gas embolism (AGE): A condition caused by gas in the arterial circulatory system originating from the lungs. It is often caused by a sudden reduction in ambient pressure, such as a rapid ascent without exhalation. The organ most often affected is the brain; typical signs and symptoms of AGE include rapid onset of stroke-like symptoms within less than 15 minutes after reaching the surface.

Barotrauma (BT): A condition caused by a change in ambient pressure in a gas-filled space; if gas is trapped in a closed space within the body, the gas will be compressed as a diver descends and will expand as a diver ascends. Barotrauma injuries of descent include ear squeeze, tympanic membrane rupture and sinus squeeze. It can affect both breathhold divers and divers breathing underwater from a compressed gas source. Injuries of ascent include pulmonary barotrauma, which can result in an air embolism, pneumothorax or pneumomediastinum.

Breathing gas: Breathing gas, back gas, mix and air all refer to what divers breathe from their cylinders. Breathing gas and back gas are general terms and can include air, nitrox, heliox or some other mixture of diving gases. Mix is a generic term for the particular mixture of gas a given diver is using. Air refers specifically to normal atmospheric gas of about 21% oxygen and 79% nitrogen (roughly the composition of surface-level air). Other gas mixes include nitrox or heliox mixes.

Cnidocyte: An explosive cell on the surface of an aquatic invertebrate known as a cnidarian; these specialised cells contain nematocysts, which are fired upon mechanical stimulation of a small hair-like trigger (called the cnidocil). Also see "nematocyst".

Decompression illness (DCI): A broad term encompassing both decompression sickness (DCS) and arterial gas embolism (AGE). DCI refers to any disease caused by a reduction in ambient pressure. The signs and symptoms of DCS and AGE can be similar, and recompression is involved in the treatment for both.

Decompression sickness (DCS): A form of decompression illness in which dissolved gases come out of solution and form bubbles inside the tissues of the body. It is often caused by a sudden reduction in ambient pressure, such as a rapid ascent without exhalation.

Dermonecrotic: A condition characterised by necrosis, or cell and tissue death, of the skin or dermis.

Dive profile: A set of depth-time-gas points describing a dive. The number of collection points depends on the minimal recording interval of the dive recorder and can vary from one second to one minute. A recording interval of five seconds or less provides sufficient detail for DAN studies of decompression safety.

Envenomation: The process by which venom or toxin is injected into one organism by another via a bite, puncture or sting.

Hydrostatic pressure: Pressure exerted by a liquid at rest, at any given point within the liquid, due to the force of gravity.

Hyperglycaemia: A condition in which blood glucose (sugar) is higher than normal.

Hypoglycaemia: A condition in which blood glucose (sugar) is lower than normal.

Immersion pulmonary oedema: A shift of fluid into the air-filled space of the lungs due to immersion. Factors thought to play a role in the condition include fluid loading, cold stress, suit and breathing system resistance, exercise and high gas density. The net effect is an increase in pulmonary pressure and membrane permeability, which drives fluid out of the bloodstream.

Intense physical activity: Physical activity involving substantial muscular forces and joint loading (the application of forces on joints); it's believed to transiently increase micronuclei activity.

Micronuclei: Micronuclei are the presumed agents of inflation that enhance bubble formation.

Mitral regurgitation: A disorder of the heart's mitral valve characterised by a failure to close properly, allowing blood to leak back out of the left atrium.

Nematocyst: A small structure housing a coiled, lancet-like element through which venom is injected into prey. Also see "cnidocyte."

Pneumothorax: Rupture of lung surface and penetration of gas in the pleural space (the fluid-filled area around the lungs), resulting in collapse of the lung on the affected side.

Pneumomediastinum: Exit of alveolar gas into a space around the heart (but not within the heart or blood vessels), usually as a result of pulmonary overextension; also known as "mediastinal emphysema."

Pulmonary circulation: Portion of the cardiovascular system that carries deoxygenated blood from the heart to the lungs and then returns oxygen-rich blood back to the heart.

Thermal conductivity: Ability of a substance to conduct heat.

Thermoneutral state: A condition when the heat exchange between a substance and its environment is in balance.

Trim: A diver's posture in the water in terms of balance and alignment.

Type 1 DCS: A form of decompression sickness (DCS) characterised by musculoskeletal pain and mild cutaneous, or skin, symptoms such as itching, a mild rash or joint or muscle pain.

Type 2 DCS: More serious form of decompression sickness, characterised by symptoms that typically fall into three categories: neurological, inner ear and/or cardiopulmonary — such as impaired gait, bladder control problems, paralysis, a change in mental status, vertigo, dizziness, vomiting, dry cough or chest pain. These complaints, which are due to high bubble loads in the lungs, can compromise the lungs' ability to function, threatening the affected diver's health, and even life, if treatment is not sought promptly.

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