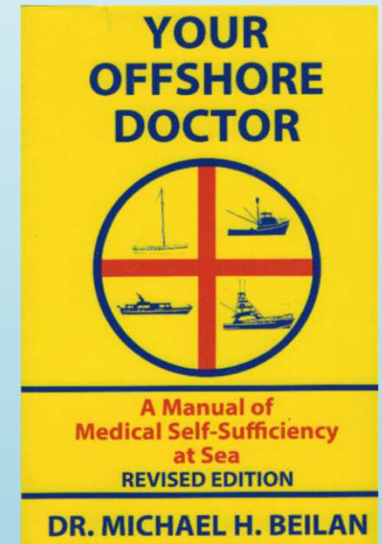


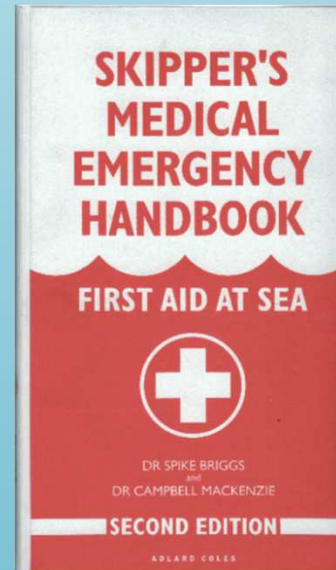
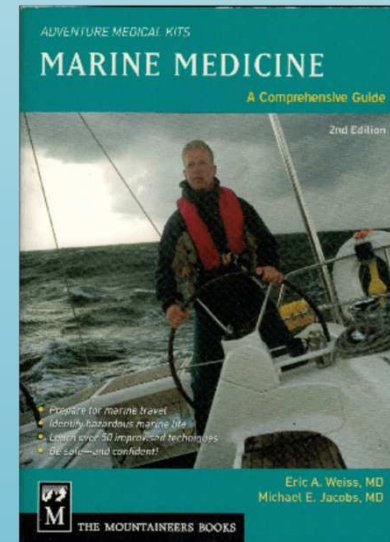
Injuries

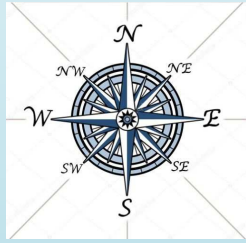


Medical Care at Sea

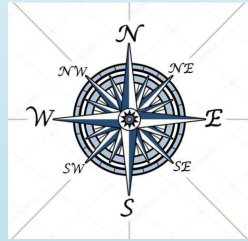


Accidents

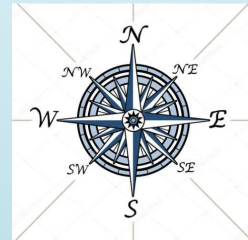




Accidents

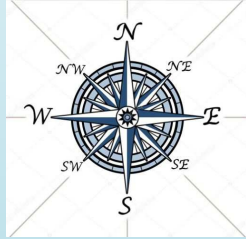


Would you consider this a boating accident?



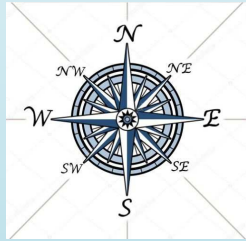
Traditionally, the definition of an accident has implied that something undesirable occurred that was unanticipated and thus probably uncontrollable

in other words, an unpredictable encounter between a human and the environment



Accidents are no officially longer referred to as
“accidents”

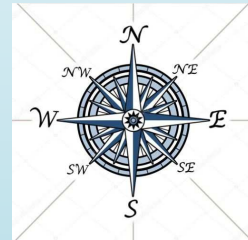
They are referred to by the CDC as
“Unintentional Injuries”



Unintentional Injury Deaths in the U.S. for Ages 1-44 from 1981-2020

The leading causes of death for unintentional injury include:

unintentional poisoning (e.g., drug overdoses),
unintentional motor vehicle traffic,
unintentional drowning, and
unintentional falls.



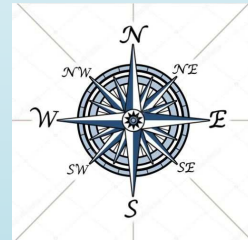
If we label all of life's unpleasant surprises as accidents, then we come to perceive ourselves as the playthings of fate and we cultivate a philosophy of carelessness and irresponsibility. On the other hand, if we look for causes and hold ourselves accountable for the mishaps in our lives, we become people of resource and confidence, increasingly able to control the direction of events. If these conclusions are as true, it matters very much how we define the word accident.

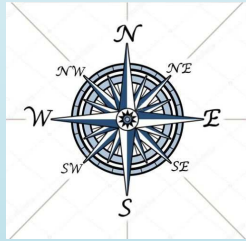


2021 EXECUTIVE SUMMARY

They obviously missed the memo

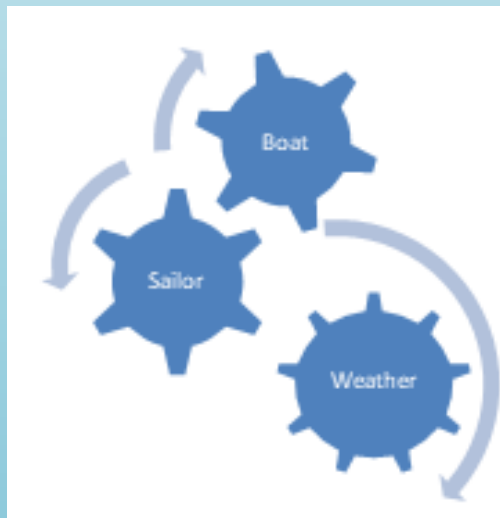
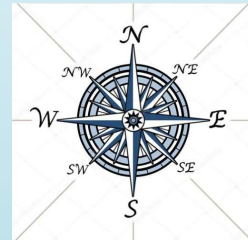
- In calendar year 2021, the Coast Guard counted 4,439 accidents that involved 658 deaths, 2,641 injuries and approximately \$67.5 million dollars of damage to property as a result of recreational boating accidents.
 - The fatality rate was 5.5 deaths per 100,000 registered recreational vessels. This rate represents a 15.4% decrease from the 2020 fatality rate of 6.5 deaths per 100,000 registered recreational vessels.
 - Compared to 2020, the number of accidents decreased 15.7%, the number of deaths decreased 14.2%, and the number of injuries decreased 17.2%.
- Where cause of death was known, 81% of fatal boating accident victims drowned. Of those drowning victims with reported life jacket usage, 83% were not wearing a life jacket.
- Where length was known, 3 of every 4 boaters who drowned were using vessels less than 21 feet in length.
- Alcohol use is the leading known contributing factor in fatal boating accidents; where the primary cause was known, it was listed as the leading factor in 16% of deaths.
- Where instruction was known, 75% of deaths occurred on boats where the operator did not receive boating safety instruction. Only 16% percent of deaths occurred on vessels where the operator had received a nationally-approved boating safety education certificate.
- There were 188 accidents in which at least one person was struck by a propeller. Collectively, these accidents resulted in 24 deaths and 191 injuries.
- Operator inattention, operator inexperience, improper lookout, machinery failure, and excessive speed ranked as the top five primary contributing factors in accidents.
- Where data was known, the most common vessel types involved in reported accidents were open motorboats (47%), personal watercraft (19%), and cabin motorboats (13%).
- Where data was known, the vessel types with the highest percentage of deaths were open motorboats (44%), kayaks (15%), and pontoons (10%).
- The 11,957,886 recreational vessels registered by the states in 2021 represent a 1.01% increase from last year when 11,838,188 recreational vessels were registered.



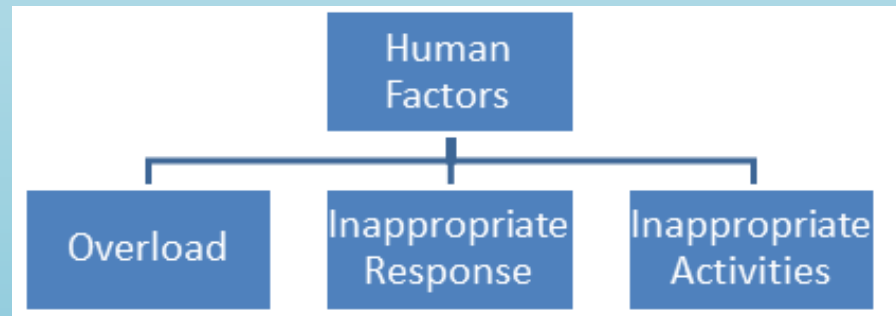


- Wear your PFD. With newer models, there is simply no excuse.
- Limit alcohol.
- Pay attention and always have a lookout.
- Don't take to the water without at least basic boating instruction.
- Get enough sleep.

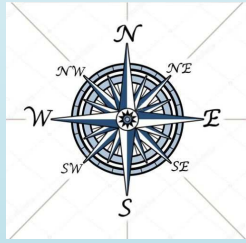
How should we analyze Accidents / Unintentional Injuries?



Systems Analysis

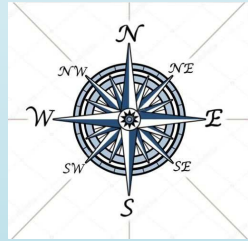


Human Factor Analysis



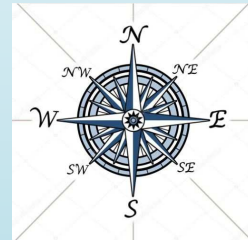
Injuries

Trauma (macrotrauma) — this is what most people think of when they think of injuries. They are by nature acute rather than chronic. There is a specific episode of trauma with tissue damage. These are the **contusions (bruises)**, **lacerations**, **fractures**, and **concussions** with which we are all familiar.

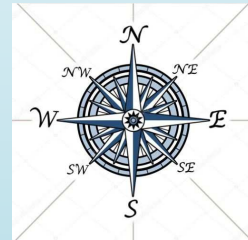


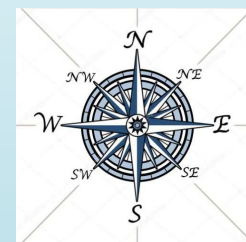
Trauma also includes injury to the **soft tissues (muscles, tendons, ligaments)** and often goes under the name “**strain and sprain.**”

To be precise, a **strain** is an injury to a muscle or tendon—tendons attach muscle to bone—or both. Typical signs and symptoms include pain and muscle weakness. There may or may not be visible bruising over the muscle. Generally, the muscle or tendon overstretches, causing the injury. There may be a partial or even a complete tear of the muscle or tendon. One example would be a pulled hamstring or hamstring strain



A **sprain**—also known as an injured or torn ligament—is damage to one or more ligaments in a joint, caused when the joint is taken beyond its normal range. An example would be a sprained ankle. Sprains vary from mild, which require a few days’ rest, to those that require surgical intervention, like a complete ACL tear. Often, a neck or low back injury will be referred to as a “strain and sprain” injury. The diagnosis really means “you seem to have injured your back muscles or ligaments, but it doesn’t look like a disk out of place and there is no nerve injury like sciatica”.

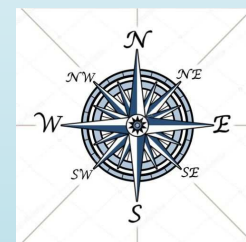




Overuse (microtrauma) — this occurs when a structure of the body (e.g., muscle or tendon) is exposed to repetitive, cumulative stress. Over time, the reparative efforts of the body are overwhelmed by the ongoing tissue breakdown. Other names include *cumulative trauma disorder* and *repetitive strain injury*. Microtrauma can include microtearing of the muscles, connective tissue, tendons, bones (stress fractures), and even the disks of the spine. The overuse syndrome occurs when the body part is overused without sufficient time for healing.

Entrapment neuropathy (compression neuropathy or trapped nerve) — caused by direct pressure on a nerve. It is another form of overuse or microtrauma, but the microtrauma is directly related to nerves rather than to muscles or ligaments. Nerves can be pinched or compressed when they travel through narrow areas created by muscles, tendons, and bone. Symptoms include pain, tingling, numbness, and weakness. The presence of tingling and numbness tells you that you are probably dealing with a nerve injury. Sciatica is a nerve compression in the low back that causes back pain that may radiate down the leg.





Boating Injuries By Class

(1) Recreational boating and cruising



(2) Big boat racing (America's Cup and ocean racing)

(3) Olympic-class sailing (including windsurfing)

Rouvillain and colleagues (2008) performed a study of cruising sailboat injuries. They interviewed 100 consecutive sailboats arriving in Martinique. Inclusion criteria required them to be French-speaking subjects and to live aboard at least half the year. Eighty percent of sailors interviewed had made at least one transoceanic trip. Ninety percent were single-hull sailboats. Since the questionnaire was answered after the events had taken place, the number of injuries was probably underestimated.

Total of **56** injuries were reported.

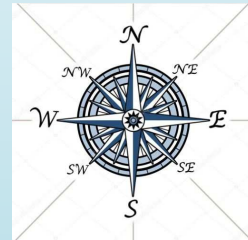
Head and neck injuries 7 cases (13 %). One head injury was due to a fall in the companionway, the other when a winch handle kicked back. The boom was responsible for four cranial traumas, three of which were associated with an accidental jibe.

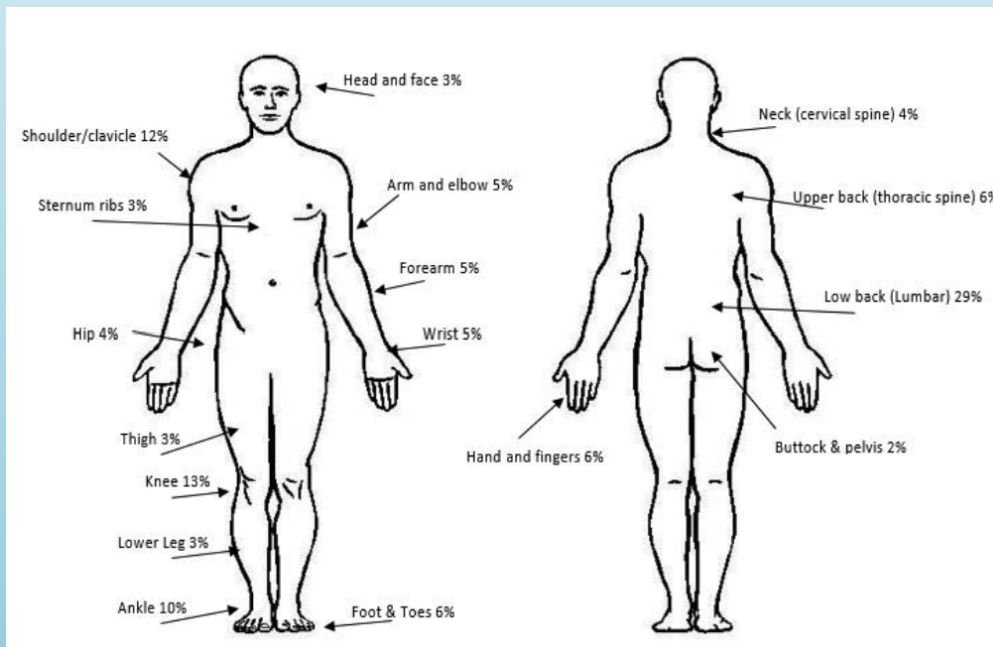
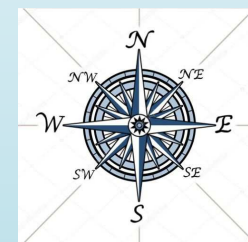
Chest trauma 8 chest traumas (14 %): six rib cage bruises and two rib fractures. All the above injuries were due to loss of balance associated with a sudden shift of the boat (sailor falling in the companionway or cockpit).

Upper limb injuries 20 cases (35 %) Of these, 70 % involved the hand, including three injuries from a knife while cleaning fish. Two occurred pulling anchor, two pulling rope, and one each due to an accidental closure of the deck cover, rope injury, and bladed weapon attack.

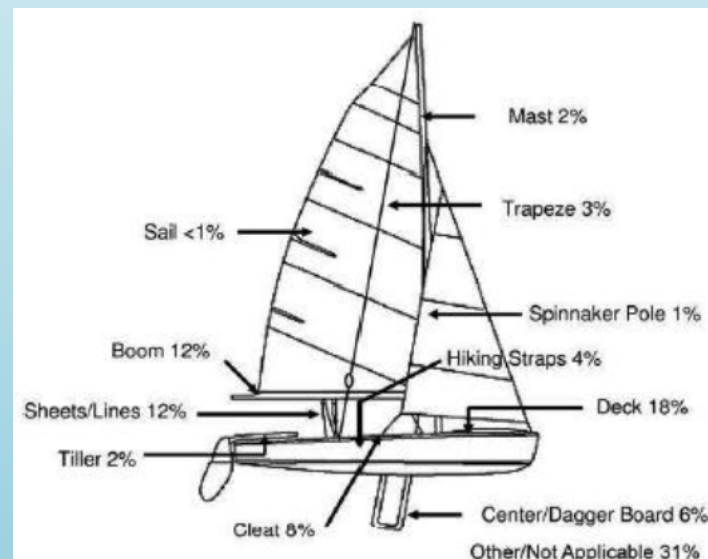
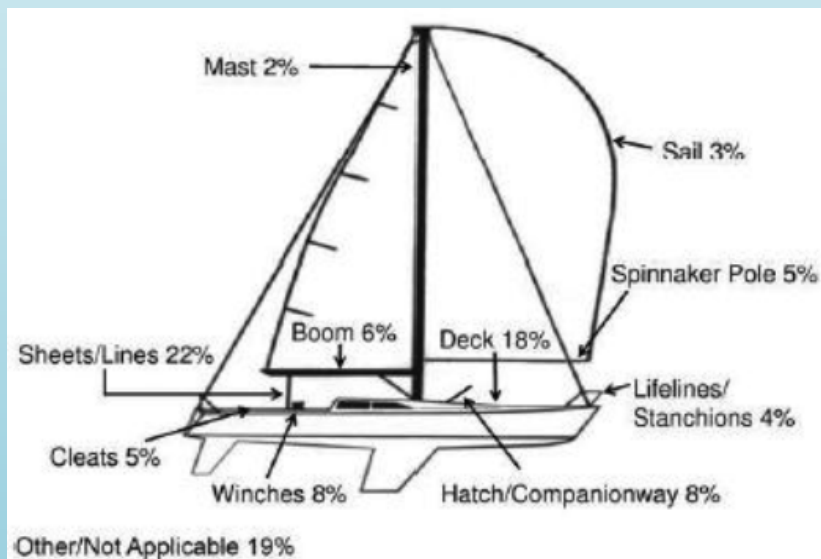
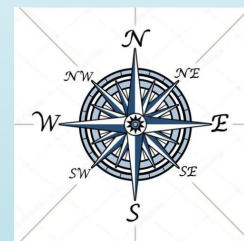
Lower limb injuries 20 cases (35 %) seventeen involving the ankle and foot, thirteen associated with bare feet. There were three cases of sciatica: one case caused by a fall in the cockpit, and the other two cases occurred after raising the anchor. The injuries occurred in the following areas of the boat:

Deck	53 %
Cockpit	25 %
Companionway	13 %
Kitchen	4 %
Other	5 %

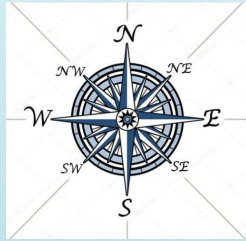




Tan et al surveyed injuries at the Sailing Federation World championships 2014. Since 2000 when 49er, 49erFX and Nacra 17 were introduced there has been a rise in the number of injuries. These newer classes are faster and less stable.



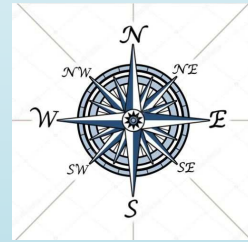
From Nathanson 2010



First Aid

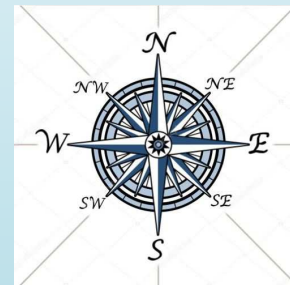
a.k.a.

Medical Care Offshore



Do I need all that? Well, then what do I need?

If you are “In Charge” or “Responsible” then you are authoring the voyage narrative* and you need to answer the following questions (like any good narrative).....



- WHO?* Who is aboard? Does anyone have a special medical history? Meds?
- WHAT?* What resources are aboard? Does anyone have medical training?
- WHEN?* How much lead time before embarkation? Time for CPR or BLS training?
- WHERE?* Daysailing?, Local Cruising?, Blue Water / Global?
- HOW?* Do you get help? - VHF?, SSB?, Satellite phone?, Telemedicine via computer?

* And you do want a happy ending





9322

THE SHIP CAPTAIN'S MEDICAL GUIDE

COMPILED BY

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MEDICAL OFFICER OF HEALTH FOR THE PORT OF LONDON, AND
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MEDICAL INSPECTOR OF THE BOARD OF TRADE
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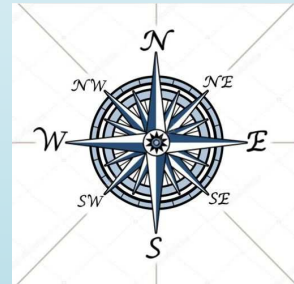
LONDON

SIMPKIN, MARSHALL, HAMILTON, KENT & CO. LTD.

1906

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Price 2s.



Original edition was
published in 1868

This is the 14th edition
1906



The Ship Captain's MEDICAL GUIDE

22nd Edition

Suffocation (Asphyxia)

Suffocation is usually caused by gases or smoke:

- remember that dangerous gases may have no smell to warn you of their presence;
- do not enter enclosed spaces without the proper precautions;
- do not forget the risks of fire and/or explosion when dealing with inflammable gases or vapours;
- get the casualty into the fresh air;
- give artificial respiration if not breathing;
- chest compression may be required if the heart stops;
- when breathing is restored, place in the unconscious position;
- oxygen may be administered later if carried on board.



Figure 1.32

Strangulation

- Immediately remove the cause;
- treat as for suffocation above;
- give protective supervision if there is any reason to suspect that the injury was self-inflicted.

Choking

Choking is usually caused by a large lump of food which sticks at the back of the throat and obstructs breathing. The person then becomes unconscious very quickly and will die in 4 to 6 minutes unless the obstruction is removed.

Choking can be mistaken for a heart attack. A person who is choking:

- may have been seen to be eating;
- cannot speak or breathe;
- will turn blue and lose consciousness quickly because of lack of oxygen;
- can signal his distress (he cannot speak) by grasping his neck between fingers and thumb. This is known as the 'Heimlich sign' and, if understood by all personnel, should reduce the risks involved in choking (Figure 1.32).

Up to five firm slaps on the back, between the shoulder blades, may dislodge the obstruction. If not:

If the casualty is conscious, stand behind him, place your closed fist against the place in the upper abdomen where the ribs divide and grasp your fist with the other hand. Press suddenly and sharply into the casualty's abdomen with a **hard quick** upward thrust, five times if necessary. If unsuccessful continue in cycles of five back blows to five abdominal thrusts. (Figures 1.33 and 1.34).

If the casualty is unconscious, place him face upwards, keeping the chin well up and the neck bent backwards. Kneel astride him, place one hand over the other with the heel of the lower hand at the place where the ribs divide. Press suddenly and sharply into the abdomen with a hard, quick upwards thrust. Repeat several times if necessary (Figure 1.35). When the food is dislodged remove it from the mouth and place the casualty in the unconscious position.



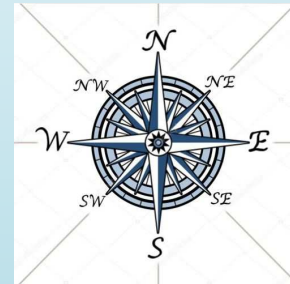
Figure 1.33



Figure 1.34

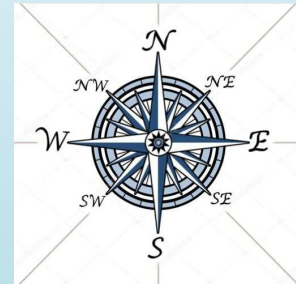
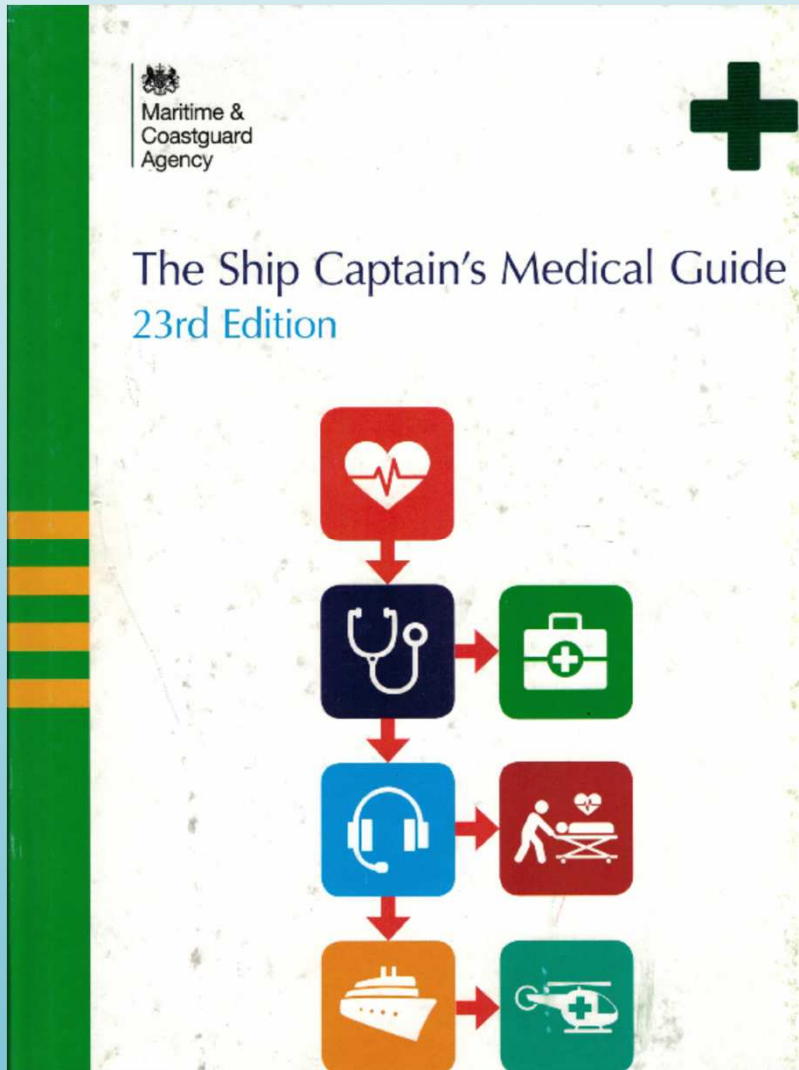


Figure 1.35



22nd edition
Published 1999

Pdf is available
for download



This is the latest edition published in 2019 and available for sale. However, before you rush out and purchase it, see below.

An early American (non-governmental) text which contains First aid /Medical Information.

Written by R.H. Dana, Jr. author of “Two Years Before the Mast” a wonderful account of mid-nineteenth century seamanship.

“Every vessel of one hundred and fifty tons or upwards, navigated by ten or more persons in all, and bound on a voyage beyond the United States, and every vessel of seventy-five tons or upwards, navigated by six or more persons in the whole, and bound from the United States to any port in the West Indies, is required to have a chest of medicines, put up by an apothecary of known reputation, and accompanied by directions for administering the same. The chest must be examined at least once a year and supplied with fresh medicines.”

Richard Henry Dana, Jr., *The Seaman's Friend*; Containing A Treatise on Practical Seamanship (Mineola, N.Y. 1997), p. 210. This citation draws on the Acts of Congress for July 20, 1790, section 8, and March 2, 1805, chapter 45, as referenced by Dana in his 1841 edition of *The Seaman's Friend*.

THE
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CONTAINING

A TREATISE ON PRACTICAL SEAMANSHIP,
WITH PLATES;

A DICTIONARY OF SEA TERMS;

CUSTOMS AND USAGES OF THE MERCHANT
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LAWS RELATING TO THE PRACTICAL DUTIES OF
MASTER AND MARINERS.

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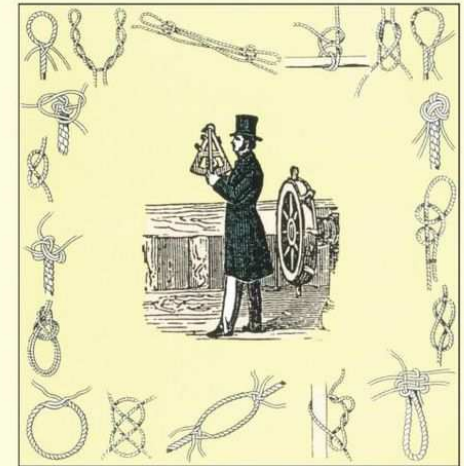
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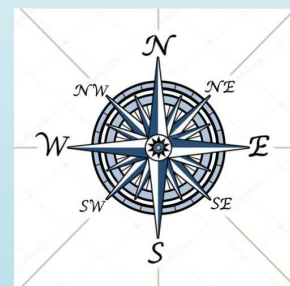
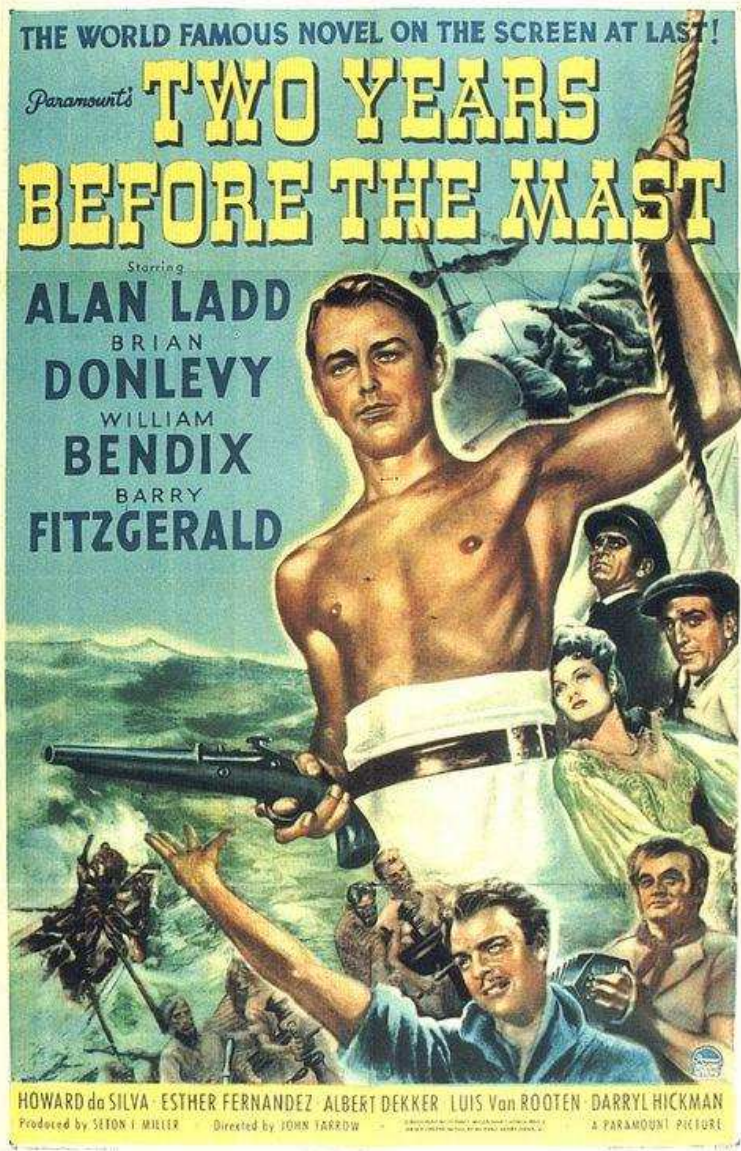
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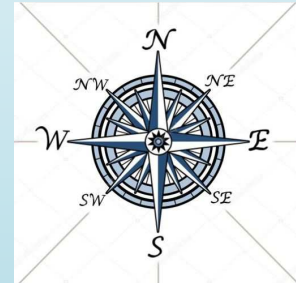
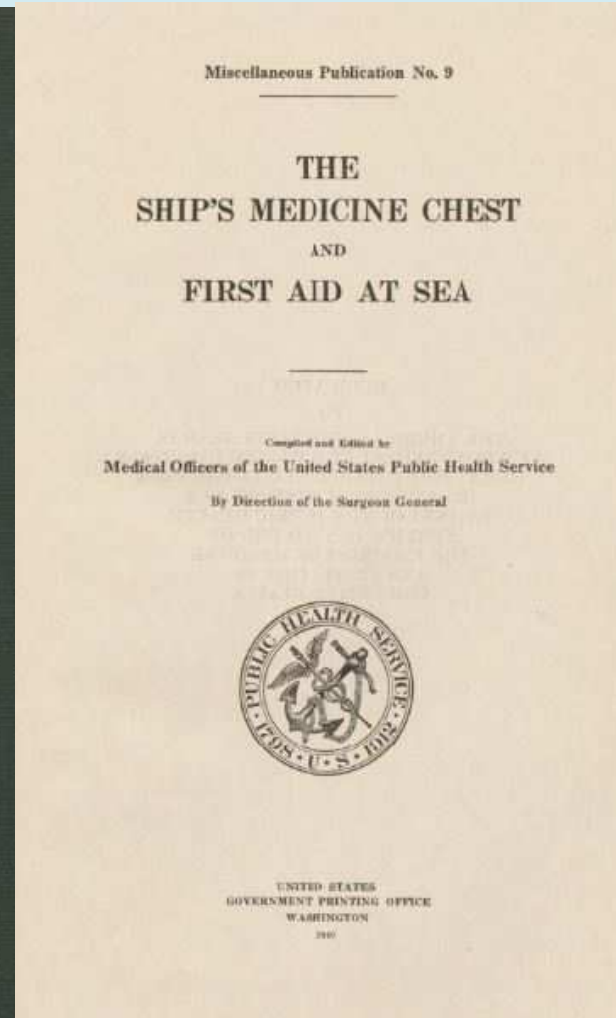
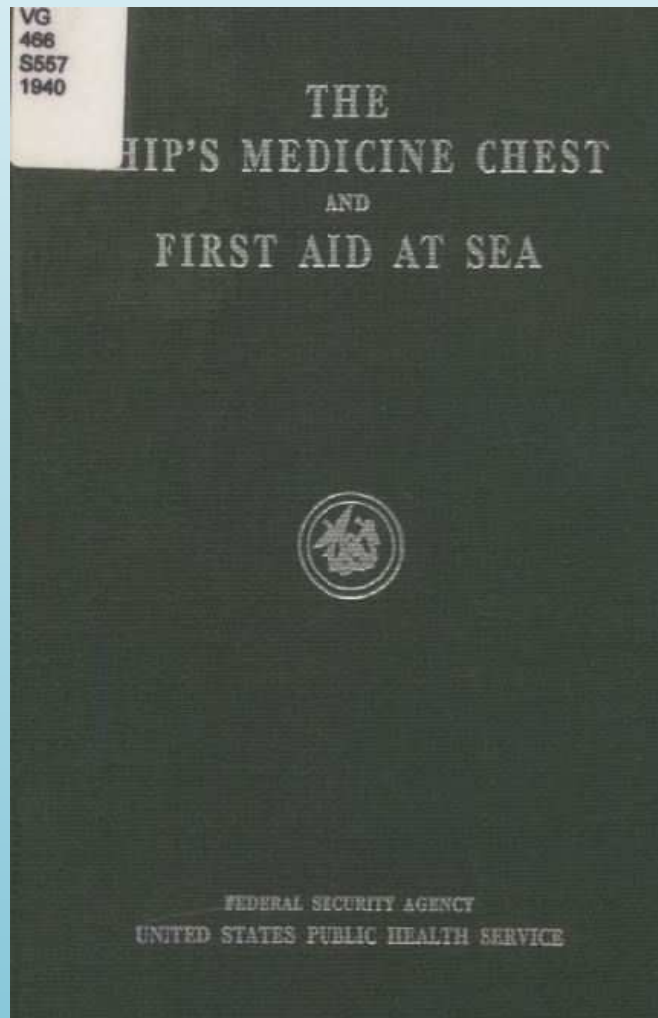
Richard Henry Dana, Jr.

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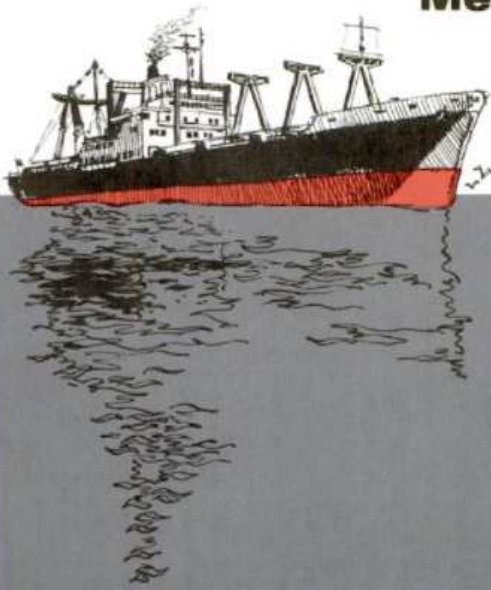


First edition of this US
“Ship’s Medicine Chest”
was published in 1881



Pictured above is the 1940 edition

The Ship's Medicine Chest and Medical Aid at Sea



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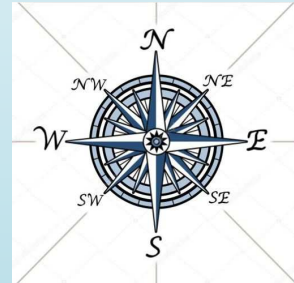
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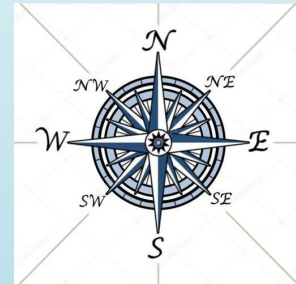
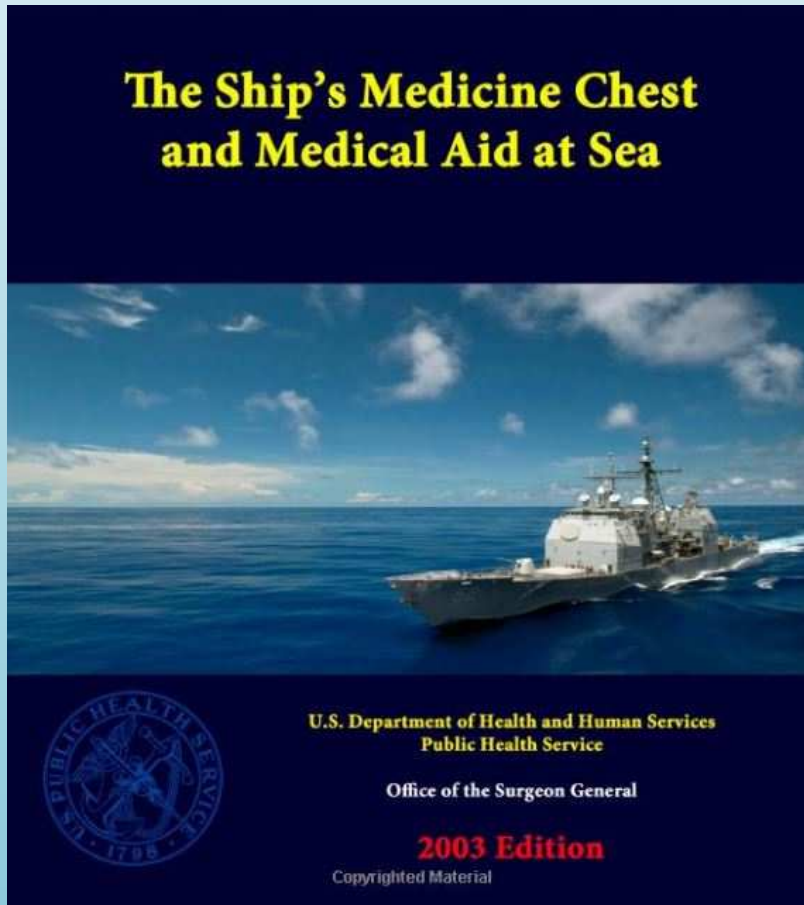
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Robert Russell, M.D.
Maine Maritime Academy
Castine, Maine 04421



This edition of *The Ship's Medicine Chest and Medical Aid at Sea* continues a tradition that extends back for more than a century. **The first edition of this book was published by the Marine Hospital Service, forerunner of the United States Public Health Service, in 1881.**

This is the 1987 revision. I was on the editorial board at that time.

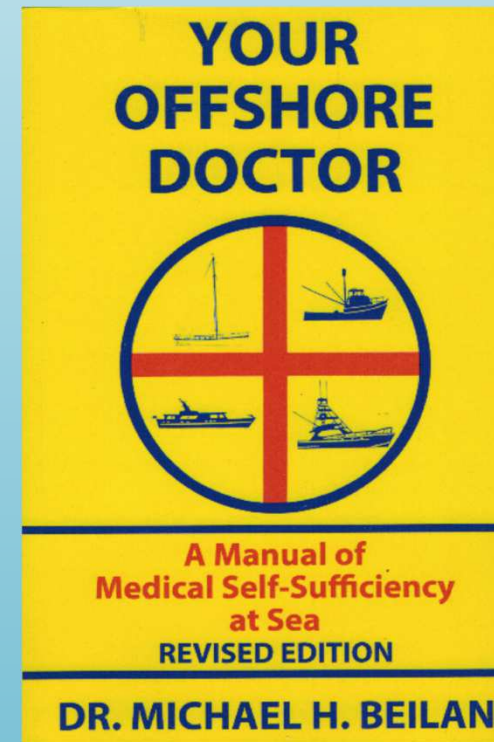
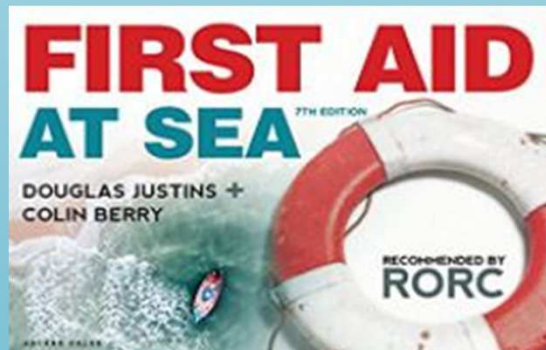
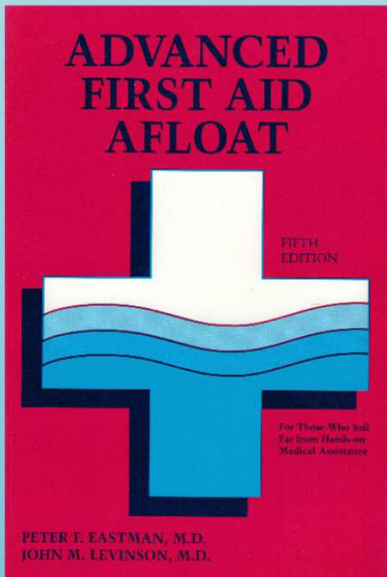
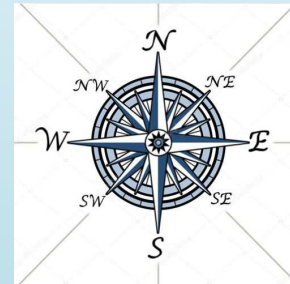
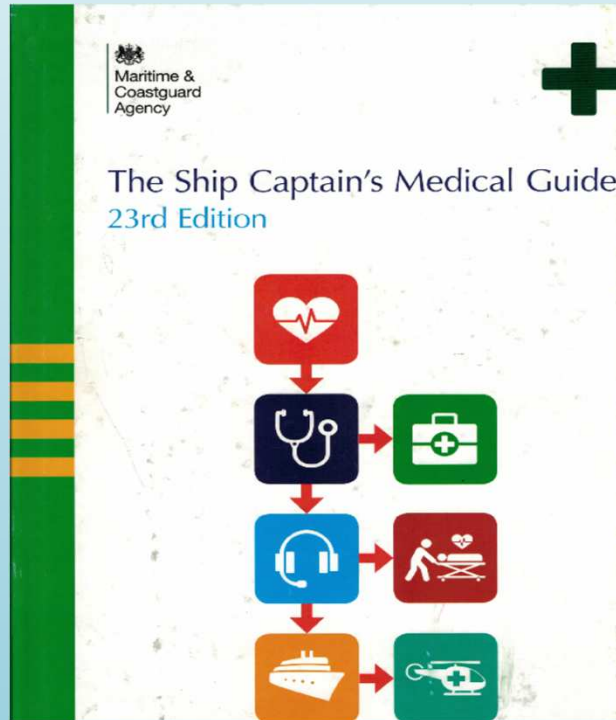
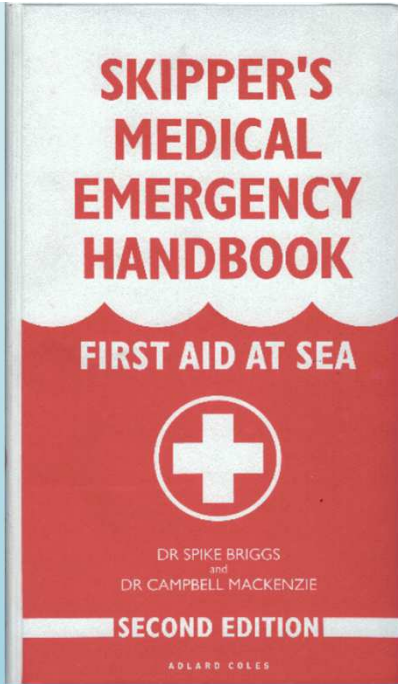
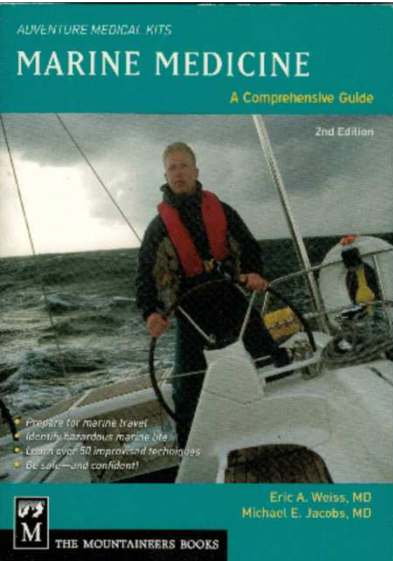


This edition of The Ship's Medicine Chest and Medical Aid at Sea may be the last.

The US Navy now has the "Virtual Naval Hospital" with access to an entire library and real time communication with medical personnel.

So do you, if you are willing to shell out (big) bucks.

2003 is the latest and possibly last US edition



YOUR OFFSHORE DOCTOR



**A Manual of
Medical Self-Sufficiency
at Sea**
REVISED EDITION

DR. MICHAEL H. BEILAN

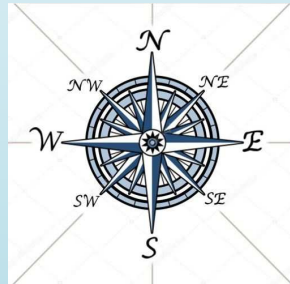
Dr. Beilan was an Emergency Room physician before spending 10 yrs circumnavigating with his wife (extra credit in my book for that!)

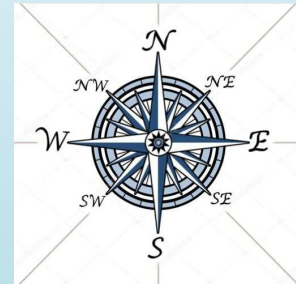
It was revised in 2017. For sailors with no medical background, it is the most approachable & readable.

His recommendations (including those for the contents of the medical kit) are broken down as follows:

1. Day Sailing / Coastal Cruising (immediate access to professional medical attention)
2. Coastal Cruising (within 1-2 days of professional medical attention)
3. Offshore Cruising (access greater than 2 days)

He also includes an extensive list of travel medicine contacts as well as internet and telemedicine contacts





Compact size and easy to use spiral bound format.

Tabbed contents at the top of each page make identification of topics straightforward.

Illustrations are limited and most importantly so is the information.

BLEEDING & SHOCK BREATHING DIFFICULTY DROWNING & HYPOTHERMIA COMMUNICATIONS MEDICAL CHECKLIST **FRACTURES & SPRAINS**

Fractures & Sprains

SPECIFIC FRACTURES

Ankle: An ankle fracture may be indistinguishable from a bad sprain. First aid treatment is the same for both. Immobilise in the neutral position with the foot at right angles to the leg. Rest and elevation of the leg are vital.

Back (spine): See neck.

Cheekbone: Requires specialist care but is rarely serious.

Clavicle (collar bone): Support the arm in a sling. (See Illustration 1.)

Compound fracture (broken bone pierces skin): Control bleeding. Clean with antiseptic solution, dress, splint, elevate, give antibiotics. **DO NOT** poke around at the site of a compound fracture – danger of infection. (See Illustration 2.)

Fingers and hand: Elevate and support, but in general leave unbandaged and encourage movement. A damaged finger may be splinted to an adjacent finger.

Foot and toes: Immobilise and elevate.

Jaw (mandible): Beware of associated brain or spine injury. Remove blood and teeth fragments. Leave loose teeth in place. Maintain airway, bandage over head. Commence regular mouth rinses (e.g. antiseptic or salty water). Commence antibiotics. Only fluids by mouth.

Knee: The kneecap may be fractured by a violent direct blow. The ligaments or cartilages of the knee are often damaged by falls or twisting injuries. The knee may be very painful and swollen. Treat as for fracture. (See Illustration 4.)

Illustration 1

Arm sling: for fractures of clavicle (collar bone).

Illustration 2

Compound fracture: clean wound and apply dressing.

Illustration 3

Arm sling: suitable for most arm fractures.

Illustration 4 The strapping **MUST NOT** be too tight

Splint: for fracture of kneecap or lower leg.

Lower arm (radius and ulna): Splint, elevate, support in sling. **DO NOT** bandage too tightly. (See Illustration 3.)

Lower leg (tibia and fibula): Splint using generous padding and strap to the other leg with padding between the legs. (See Illustration 4.)

Nose: May cause bleeding or obstruct breathing through nose. Attempt to straighten immediately after the accident if possible. For bleeding nose, see page 5.

Pelvis: May follow major crush injury. **Serious and life threatening.** Treat shock and pain. **Emergency; evacuation.**

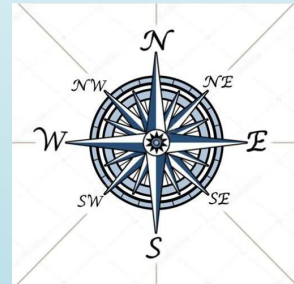
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ADVANCED FIRST AID AFLOAT

FIFTH
EDITION

For Those Who Sail
Far from Hands-on
Medical Assistance

PETER F. EASTMAN, M.D.
JOHN M. LEVINSON, M.D.



The “granddaddy” of independent nautical first aid texts was first published in 1972, and it shows. The current 5th edition dates to 2000.

It is a normal paperback size.

Illustrations are minimal and old.

SKIPPER'S MEDICAL EMERGENCY HANDBOOK

FIRST AID AT SEA



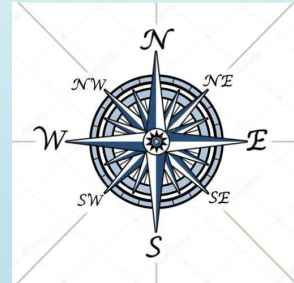
DR SPIKE BRIGGS
and
DR CAMPBELL MACKENZIE

SECOND EDITION

ADLARD COLES

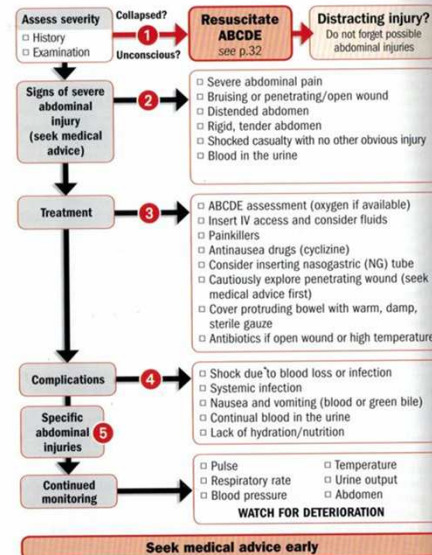
It is a compact, easy to use size.

Illustrations and flow charts are excellent. In fact, if you are the kind of person who likes flow charts, this is your text. Overall, an excellent text.



ABDOMINAL INJURIES

Injury to the organs in the abdomen may not cause symptoms at first and may be overlooked if there are other injuries. The main abdominal injuries are perforation of the bowel, bruising of the internal organs, and internal haemorrhage (often from tears to the liver and spleen). These injuries may result in infection and shock, causing the bowels to stop working. The kidneys are quite well protected, but they may be damaged by penetrating injury or severe blow to the flank.



1 History and examination

- Internal injuries may not be obvious at first, so reassess often if casualty is unwell.
- Remember to look at the back of the casualty.
- Penetrating injuries in the chest below the nipples may penetrate the abdomen.
- Lower rib fractures may damage the spleen or liver.

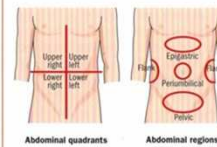
Important points in the history

- How did the accident happen (mechanism of injury)?
- Site and severity of pain?
- Any nausea, vomiting?
- Any blood or bile in vomit?
- Any blood in stool (may be red or tarry black) or urine (may be red or faintly pink)?



Important points in the examination

- Look**
- Abdominal wounds or bruising (look around the back)
 - Abdominal distension
 - Old operation scars (appendix, hernia)
- Feet**
- Any masses in the abdomen
 - Tenderness, rigidity
- Listen**
- Bowel sounds (over lower right side)
- Document** On abdominal chart



2 Signs of severe abdominal injury

- The casualty may be sweaty and cold, from both the effects of pain and blood loss.
- A rigid, tense abdomen is a sign of serious injury.
- Any penetrating wound is serious and may have damaged many internal organs.
- The site and severity of pain gives an indication of which internal organs are damaged (see diagram above) and the possible severity of injury. Remember that people have different pain thresholds and also that the site of pain may be misleading. If in any doubt, monitor the casualty closely for signs of deterioration.
- Bruising of the abdomen may be difficult to see initially. If in doubt, re-examine the casualty every hour or so. Remember to examine the back for penetrating wounds and bruising. Flank bruising may indicate kidney injury.
- The abdomen may look normal at first, then become distended over a few hours.
- Bowel sounds (made by gas and liquid being squeezed around) are heard by listening to the abdomen with a stethoscope. If the bowel stops working, there are no bowel sounds, so silence may be a sign of serious injury. Sometimes, however, bowel sounds may be difficult to hear even in a normal abdomen.



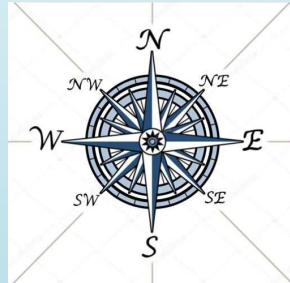
The Ship Captain's Medical Guide 23rd Edition

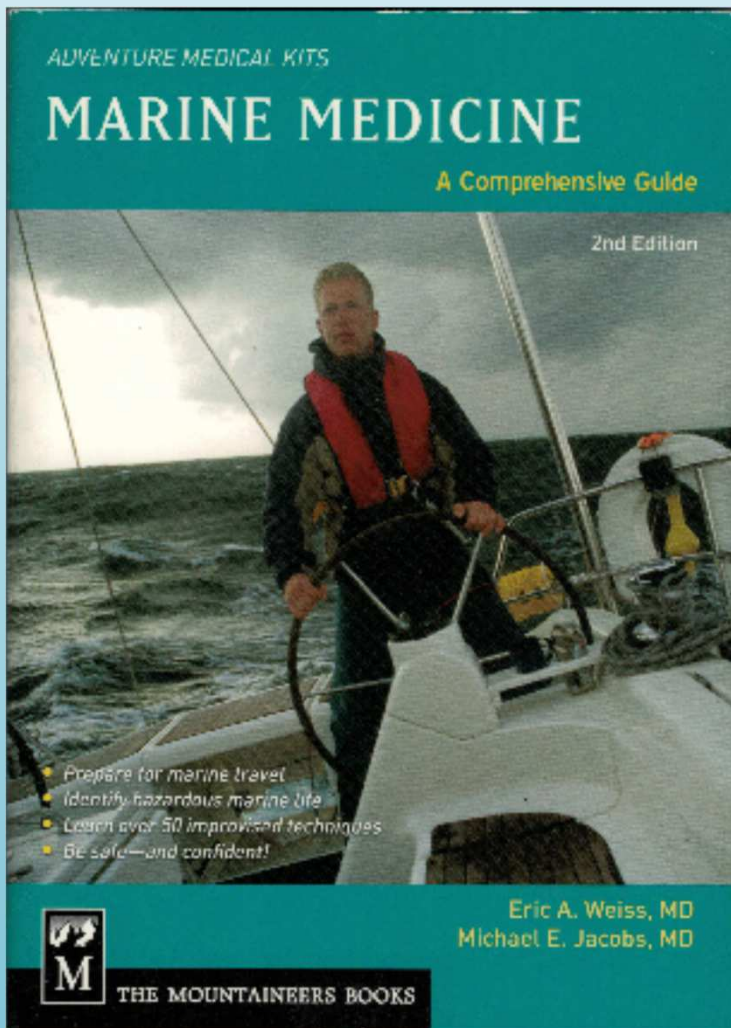


Published 2019, this is officially the 23rd edition.

In reality, it represents the previous book “Skipper’s Medical Emergency Handbook” in a much larger format (8.5 x 12 x 1”) versus (5.5 x 9.25 x 0.6”) although the numbers do not convey the marked difference in handling size and weight. This book is fine for a ship rather than a boat! There are a few changes but for the most part, the same flow charts and illustrations are used – just in larger size.

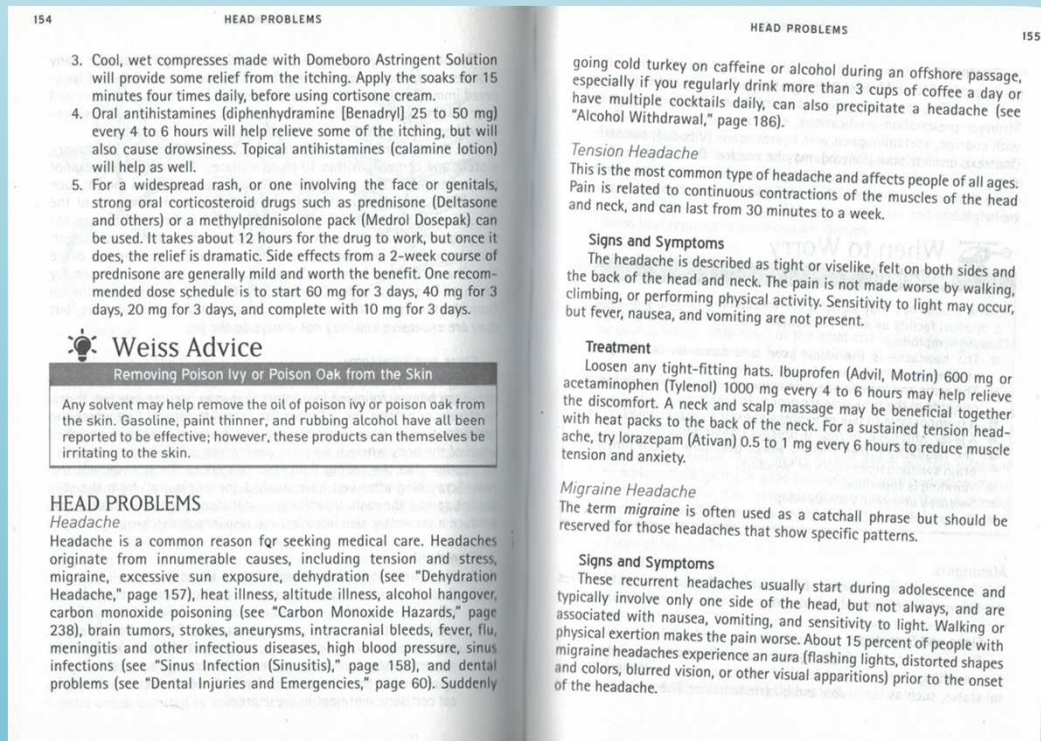
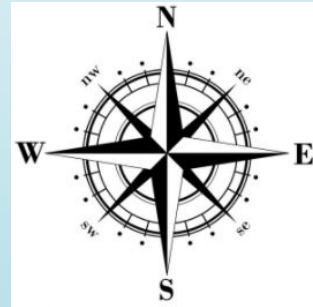
The other change is the addition throughout the book -- “Contact TMAS Early” – Maritime Telemedicine Assistance Service an early telemedicine Program.



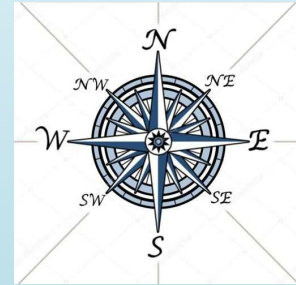


The most thorough text especially if you are a healthcare professional.

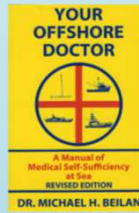
The only downside (or upside) is the size. It is compact at only 4.25 x 6 x 0.75" and was designed to be neatly packed into a medical kit (especially the "Adventure Medical Kit").



Overall Recommendations



Daysailing



Coastal Cruising



Or



Or



+

VHF, SSB, Sat Phone
or
Telemedicine

Blue Water

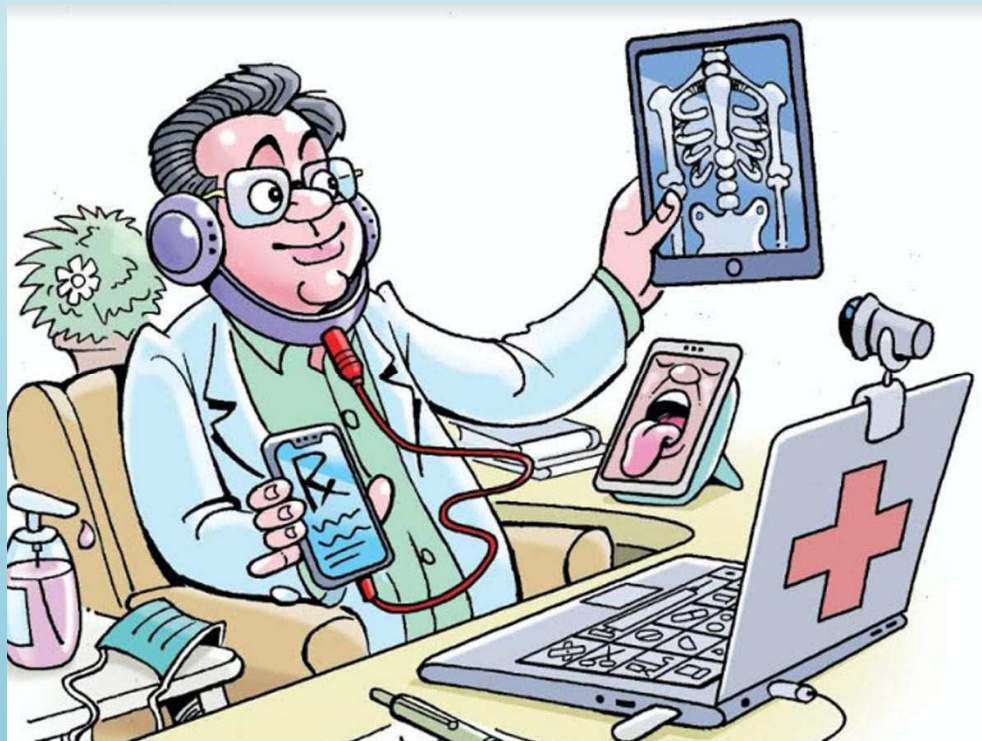
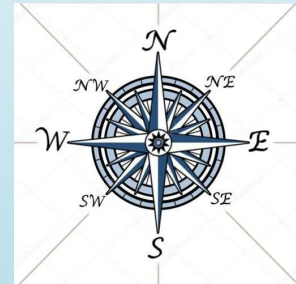


Or



+

Telemedicine

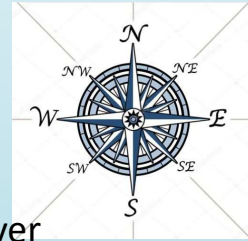


Telemedicine – in one form or another – is clearly in the future for Blue Water sailors.

For Coastal sailors, you may still get by with VHF, (if < 30 miles or so), or SSB or Sat phone.

Either way, you will still need a text to consult.

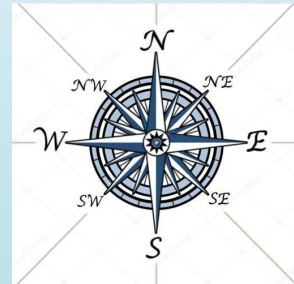
Considerations



1. I have not discussed the contents of a first aid kit as most likely you will follow the guidance of whichever text you choose. They vary from primarily bandages and gauze to fully stocked kits for blue water sailors.



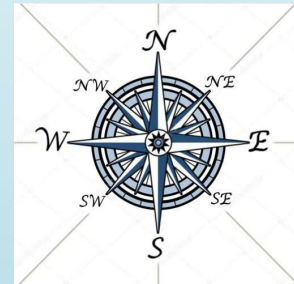
2. The basics of the kit should include everything you need to treat accidents and injuries as those issues will be present in all three situations: Daysailing, Coastal, and Blue Water
3. One potential problem that may drive cruising sailors to a commercial vendor for their first aid kit, is the issue of obtaining prescription medication. In the good old days, one could go to one's family doctor or GP and he (it used to only be a "he") would oblige. Now-a-days that may be more problematic. And double trouble for any controlled substances. And assembling these medications can be fairly to mighty expensive.
4. Going Concierge..... below are two of the most visible MSOS and DigiGone



MSOS Medical Support Offshore \$2500 - \$3500 depending on the level of support. The call center is doctor-staffed in Southampton, England. They have their own pharmacy and can provide custom medical kits. They also provide other levels of “concierge” service similar to DigiGone.



DigiGone's communications kit also contains an array of monitoring devices, as does MSOS's case. *Courtesy DigiGone and MSOS*



DigiGone Five Plus telemedicine kit (under \$20,000) which includes a built in Wi-Fi router, a quad core tablet with a webcam and the ability to connect with the company's Doctor Consult app which alerts a physician at George Washington University's Maritime Medical Access or your preferred telemedicine provider. The kit includes a digital BP cuff, a glucose meter, a digital thermometer, an electrocardiogram, a pulse ox, and electric stethoscope, a USB macro camera, a USB otoscope, and disposable headsets.

