Tables

Table 1
RESCUE

Rescuers must be adequately protected from exposure before entering a contaminated area in order to avoid injury. When a chemical is unidentified, worst-case assumptions concerning toxicity must be assumed.

ARRIVAL AT SCENE

- Upon arrival at the scene, an initial assessment of the situation should be made and the size of the incident should be determined.

Rescuers must **NOT**:

- Enter a contaminated area without using a pressure-demand self-contained breathing apparatus and wearing full protective clothing;
- Enter an enclosed space unless they are trained members of a rescue team and follow correct procedures;
- Walk through any spilled materials;
- Allow unnecessary contamination of equipment;
- Attempt to recover shipping papers or manifests from contaminated area unless adequately protected;
- Become exposed while approaching a potentially contaminated area;
- Attempt rescue unless trained and equipped with appropriate personal protective equipment (PPE) and protective clothing for the situation.

QUICKLY ESTABLISH AN EXCLUSION OR HOT ZONE

- Assume that anyone leaving the exclusion zone is contaminated and should be assessed and decontaminated, if necessary.
- Do not remove non-ambulatory casualties from the exclusion zone unless properly trained personnel with the appropriate PPE are available and decontamination has been accomplished.

INITIAL TRIAGE OF CASUALTIES (SORTING AND PRIORITY)

One unconscious casualty

- Give immediate treatment to the unconscious casualty only, and
- Send for help.

Several unconscious casualties

If there is more than one unconscious casualty:

- Send for help, and
- Give appropriate treatment to the worst casualty in the priority order of:
  1 Casualties who have stopped breathing or have no pulse (see **table 2**).
  2 Casualties who are unconscious (see **table 4**).

Casualty is unconscious but breathing

If the casualty is unconscious or cyanotic (bluish skin) but breathing, connect to portable oxygen.

Neck or back trauma

Apply neck and back support before moving casualty if there is any question of neck or back trauma.

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Priority: Airway, Breathing, Circulation (A-B-C)

Initial management of **A**irway, **B**reathing and **C**irculation (A-B-C, see **table 2**) is all that should be undertaken while there is potential for further injury to the casualty or to response personnel.

Gross decontamination

If the casualty is contaminated with chemicals, gross decontamination should be performed.

- Cut away or remove all suspected contaminated clothing, including jewellery and watches.
- Brush or wipe off any obvious contamination.
- Care should be taken to protect open wounds from contamination.
- Every effort should be made by personnel to avoid contact with potentially contaminated casualties. Rescuers should wear protective clothing, if necessary.
- Cover or wrap casualty to prevent spread of contamination.

Removal of casualties from exclusion zone

Once gross decontamination has been performed, the casualties should be removed from the exclusion zone.

- If casualties can walk, lead them out of the exclusion zone to an area where decontamination and further evaluation can take place.
- If casualties are unable to walk, remove them on stretchers. If stretchers are unavailable, carefully carry or drag casualties to an area where decontamination and further evaluation can take place.

DECONTAMINATION

Decontaminate from head down

- Take care not to introduce contaminants into open wounds.
- Decontaminate exposed wounds and eyes before intact skin areas.
- Cover wounds with a waterproof dressing after decontamination.

For external contamination, begin with the least aggressive methods

- Limit mechanical or chemical irritation of the skin.
- Wash contaminated area gently under a stream of water for at least 10 minutes, and wash carefully with soap and warm (never hot) water, scrubbing with a soft brush or surgical sponge.

Reduce level of contaminants

- Remove contaminants to the level that they are no longer a threat to casualty or response personnel.
- Isolate the casualty from the environment to prevent the spread of any remaining contaminants.

Contain runoff; bag contaminated clothing

- If possible, contain all runoff from decontamination procedures for proper disposal.
- Ensure that all potentially contaminated casualty clothing and belongings have been removed and placed in properly labelled bags.

SUMMARY OF TREATMENT OF CASUALTIES

- Assign highest priorities to Airway, Breathing, Circulation (ABC) and then decontamination.
- Complete primary and secondary assessments as conditions allow.
- Obtain information on chemical(s) to which the casualty has been exposed from shipping papers, labels or other documents.
- If there are multiple casualties, direct attention to the most seriously affected individuals first.
- Treat symptoms and signs as appropriate and when conditions allow.
- Obtain **RADIO MEDICAL ADVICE** when conditions allow.
- Perform invasive procedures only in uncontaminated areas.
- Reassess the casualty frequently, because many chemicals have latent physiological effects.
- Delay preventive measures until the casualty is decontaminated.

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TRANSFER TO SHIP'S HOSPITAL

Casualties who have been stabilized (airway, breathing and circulation) and decontaminated can be transported to the ship's hospital for further evaluation.

Further advice: **see appendix 1.**

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Table 2
CPR (CARDIO-PULMONARY RESUSCITATION)

Basic life support comprises the ‘‘A-B-C” steps which concern the airway, breathing, and circulation respectively.

Basic life support is indicated for:

- **A**irway obstruction
- **B**reathing (respiratory) arrest
- **C**irculatory or cardiac arrest.

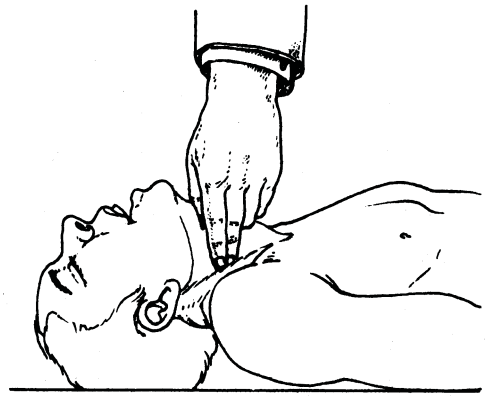
Any inadequacy or absence of breathing or circulation must be determined immediately.

Assessment of breathing

- Tilt the head firmly backwards with one hand while lifting the neck with the other hand to relieve obstructed breathing.
- Pull the tongue forward.
- Suck or swab out excess secretions.
- Clean any vomit from the mouth and back of the throat. Remove any loose dentures.
- Listen and feel for any movement of air, because the chest and abdomen may move in the presence of an obstructed airway, without moving air. The rescuer’s face should be placed close to the casualty’s nose and mouth so that any exhaled air may be felt against the cheek. Also the rise and fall of the chest can be observed and the exhaled breath heard.
- Look, listen and feel for five seconds before deciding that breathing is absent.

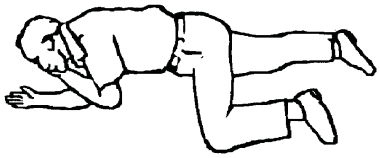
Assessment of heart function

- Check for a pulse. The best pulse to feel in an emergency is the carotid. Feel for five seconds before deciding it is absent. If it cannot be felt or is feeble, there is insufficient circulation.



Full advice on **CPR: see appendix 2.**

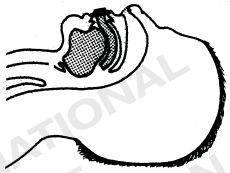
Signs and symptoms	Treatment
Breathing, heart is beating, unconscious	• Place casualty in the recovery position.



• Remove any loose dentures.
• Clean any vomit from the mouth and back of the throat.

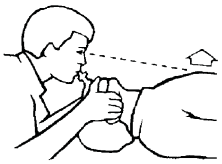
Further advice on the **unconscious casualty: see table 4.**

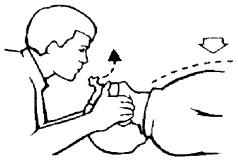
• Once a clear and open airway is established, insert a Guedel airway: **see appendix 3.**



Not breathing but heart is beating	• Begin artificial respiration; mouth-to-mouth or mouth-to-nose respiration

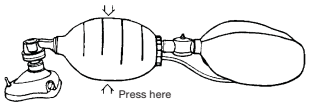
• Give four quick breaths and continue at a rate of 12 inflations per minute.
• Chest should rise and fall. If it does not, check to make sure the casualty's airway is clear and open.





• Do not use mouth-to-mouth respiration if the casualty was exposed to cyanides, organophosphates or radiation to prevent rescuer from being exposed.

Meanwhile, install bag-valve-mask and oxygen supply for continued controlled ventilation. Give oxygen unless there is a danger of fire or explosion.



Further advice on **oxygen administration: see table 3.**

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Signs and symptoms

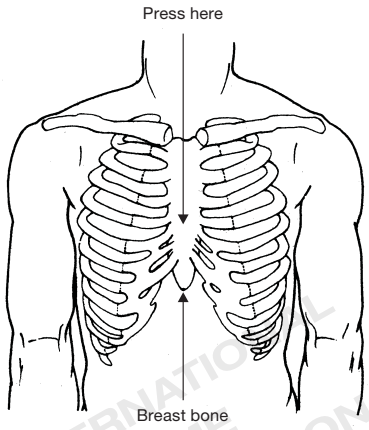
Breathing and heart have stopped

Treatment

- Begin CPR immediately. If possible, use two rescuers. Don't delay. One rescuer can do the job.

  Locate the pressure point (lower half of breast bone: about 4 cm from the tip of the breast bone).

  Depress breast bone 4 to 5 cm (80 to 100 times per minute).



If one rescuer:

15 heart compressions and 2 very quick lung inflations.

If two rescuers:

5 heart compressions and 1 lung inflation.

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Table 3
OXYGEN ADMINISTRATION AND CONTROLLED VENTILATION

Oxygen is necessary for life. Some intoxications may interfere with normal oxygenation of the blood or tissues. In particular, oxygen can be lifesaving to casualties who have inhaled smoke and other toxic gases but it needs to be given with all speed. **Basic training is required to administer oxygen.**

Diagnosis

- There is difficulty in breathing with an increased rate at first (over 30 per minute). Later it may become slow and stop.
- The pulse is rapid, usually over 100 per minute.
- There is blueness of the skin with purple lips and tongue.
- The casualty may be agitated at first but become apathetic, with muscular weakness. Unconsciousness may follow this.
- The pupils of the eyes will react to light at first. If they become large and do not react to light, life is in danger.

LACK OF OXYGEN IS AN EMERGENCY

Treatment

- Give oxygen by means of a face mask. It makes assisted or controlled ventilation possible. It is better to have the casualty well oxygenated with controlled artificial respiration than to have him poorly oxygenated from breathing spontaneously.
- Place a mask over the nose and mouth. It is essential that the face mask is held firmly in place so as to avoid leakage.

- Check that the equipment is correctly assembled according to the manufacturer's instructions and that sufficient oxygen is contained in the cylinder (a cylinder of 2.5 L capacity, filled under a pressure of 200 bar, delivers 500 L oxygen).

Full advice on **oxygen administration**: **see appendix 3.**

The commonest emergency requiring medical assistance on board is **toxic gas inhalation from fires or specific toxic gases**. Combustion in fires on board may well involve substantial release of carbon monoxide and hydrogen cyanide. In these cases, oxygen should be given at a flow rate of 8 L per minute.

In life-threatening conditions, such as lung oedema or circulatory failure, oxygen should also be given at a flow rate of 8 L per minute.

Warning: Smoking, a naked flame or light or fires must not be allowed in the same room during the administration of oxygen because of the risk of fire.

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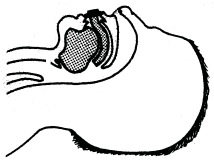
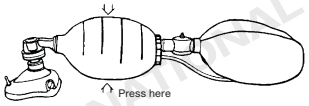
Signs and symptoms	Treatment
Not breathing but heart is beating	• Ensure that a clear airway has been established. • A Guedel airway should be inserted. If insertion of an airway cannot be achieved, the chin should be pulled forward throughout the administration of oxygen. If the casualty has seizures due to the lack of oxygen, administration of oxygen may be difficult but is essential.  • Use a positive-pressure manual operated oxygen resuscitator in accordance with manufacturer's instruction.  • Give oxygen at a flow rate of 8 L per minute. The bag should be squeezed steadily and firmly and released about 12 times a minute. • Always maintain a regular check on the pulse in the neck. The absence of a pulse indicates the need for 15 chest compressions to every two inflations. • If gagging occurs, remove the airway. • Once the casualty is breathing spontaneously, put him in the recovery position.
Breathing is difficult	• Make sure difficulty in breathing is not due to airway obstruction: **see table 2.** • The casualty should be connected to an oxygen-giving set through a simple disposable face mask (non-venturi type) placed securely over the face. • Oxygen should be used at a flow rate of 6 to 8 L per minute. • Oxygen should be continued until the casualty no longer has difficulty in breathing and has a normal healthy colour.

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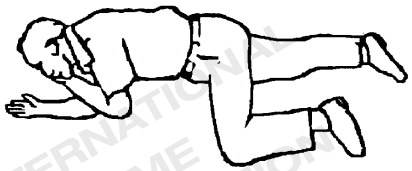
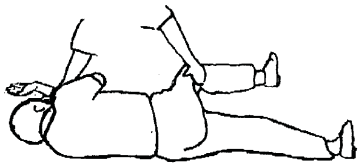
Table 4
CHEMICAL-INDUCED DISTURBANCES OF CONSCIOUSNESS

Chemicals, whether inhaled, ingested or absorbed through the skin, can either depress or excite the brain. In cases of severe poisoning, the casualty may not only be unconscious but breathing may also be depressed or absent. Fortunately, in most cases, symptoms usually resolve rapidly when the casualty is removed from the polluted environment.

Signs and symptoms	Treatment
Drowsy but breathing adequately	• After removal of the casualty from the polluted environment, eye and skin decontamination should be undertaken, if necessary. • After decontamination the casualty should be observed in a place of safety for at least 8 hours. Usually no specific treatment is necessary.
Increasing loss of consciousness but breathing adequately	• Place casualty in the recovery position.  • Remove any loose dentures. • Clean any vomit from the mouth and back of the throat. • Turn casualty face down, head to one side as pictured; no pillows should be used under the head. • Clear out any vomit in the mouth as soon as vomiting occurs. • The casualty must never be left alone or unwatched in case he vomits, has a fit or may fall out of his bunk. • Turn the casualty gently every 3 hours and roll him smoothly from one side to the other.  • The head must always be kept back with a chin-up position when actually turning, and, at no time must the head be allowed to bend forwards with the chin sagging. • If possible, insert a Guedel airway. • **RADIO FOR MEDICAL ADVICE IN ALL CASES.**

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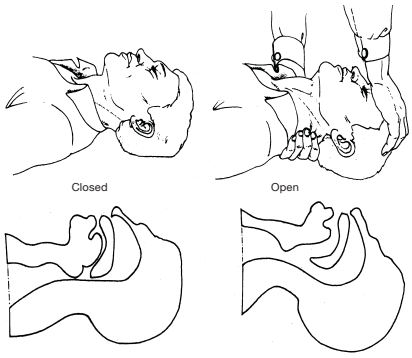
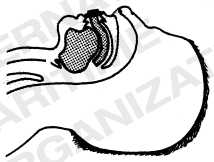
Signs and symptoms	Treatment
Unconsciousness with less than eight respirations of normal depth per minute	• Place the casualty on his back. • Tilt the head firmly backwards with one hand while lifting the neck with the other hand to relieve obstructed breathing.



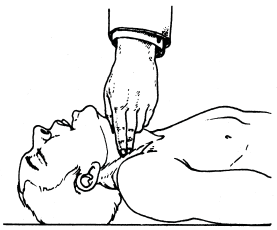
• Once a clear and open airway is established, insert a Guedel airway: **see appendix 3.**



• Administer controlled ventilation.

Further advice on **controlled ventilation: see table 3.**

• Check for a pulse. The best pulse to feel in an emergency is the carotid. Feel for five seconds before deciding it is absent. If it cannot be felt or is feeble, there is insufficient circulation.



• It should be felt after the first minute of artificial respiration and checked every 2 minutes thereafter.

• **If morphine has been administered: see table 13.**

• **RADIO FOR MEDICAL ADVICE IN ALL CASES.**

Prolonged coma with or without breathing difficulty	• **RADIO FOR MEDICAL ADVICE IN ALL CASES.** • Regularly assess that breathing is adequate. Give ventilation support with 8 L of oxygen per minute if the victim does not breathe adequately.

Further advice on **care of unconscious casualties: see appendix 4.**

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Signs and symptoms	Treatment
Toxic mental confusion (agitation, hallucinations)	• If the casualty is difficult to manage, give diazepam 10 mg as rectal solution.

Further advice on treatment of **agitation and hallucinations**: see **table 6.**

Convulsions (seizures, fits)	• Ensure that there are no hard or sharp objects in the vicinity so that the victim will not injure himself. • Give diazepam 10 mg as rectal solution. • **RADIO FOR MEDICAL ADVICE.** • If medical advice is unavailable and seizures continue, give a further 10 mg diazepam as rectal solution after 30 minutes.

Further advice on **treatment of convulsions**: see **table 5.**

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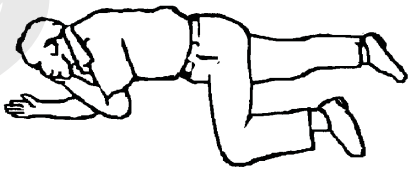
Table 5
CHEMICAL-INDUCED CONVULSIONS (SEIZURES, FITS)

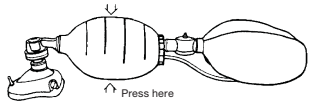
The main risk of convulsions is impaired ventilation (leading to inadequate oxygen supply to tissues). During a convulsion, the casualty may hurt himself. Convulsions may be delayed for hours after exposure to certain chemicals.

Further information on **convulsions: see appendix 5.**

Signs and symptoms	Treatment
Single convulsions of short duration	• Remove the casualty to the ship's hospital. • Prevent the casualty from hurting himself. • Never restrain the casualty forcibly, as this may cause injury. • Ensure that there are no hard or sharp objects in the vicinity so that the victim will not injure himself. • Surround him with pillows, clothing or other soft material. • Protect the airway from being blocked by the tongue or secretions. • After the fit is over, let the casualty sleep it off, as he may be rather confused and dazed when he comes round. Reassure him, and do not leave him until you are sure he is aware of his surroundings, and knows what he is doing. • **RADIO FOR MEDICAL ADVICE.**
Convulsions may also occur in regular heavy drinkers within about two days after sharply decreased alcohol consumption. Other signs, such as hyperexcitability, sleep disturbances, or generalized tremor, may indicate a withdrawal syndrome.	
Frequent or continuous convulsions	• Place casualty in the recovery position.  • Give diazepam 10 mg as rectal solution. • **RADIO FOR MEDICAL ADVICE.** • If medical advice is unavailable and seizures continue, give a further 10 mg diazepam as rectal solution after 30 minutes. • Stabilize the cervical spine with a collar if trauma is suspected.

Further advice on **convulsions: see appendix 5.**

• Give ventilation support with 8 L of oxygen per minute if the victim does not breathe adequately.
• Administer controlled ventilation.



Further advice on **oxygen administration: see table 3.**

• After the fit is over, let the casualty sleep it off, as he may be rather confused and dazed when he comes round. Reassure him, and do not leave him until you are sure he is aware of his surroundings, and knows what he is doing.

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Table 6
TOXIC MENTAL CONFUSION

Exposure to chemicals and solvents, including alcohol and illicit substances, may result in disorientation in time and space. In these circumstances, the casualty will usually develop the signs and symptoms within 15 to 30 minutes of exposure. Sudden cessation of heavy alcohol consumption may also cause toxic mental confusion.

Signs and symptoms	Treatment
The casualty confuses the day of the week, the month of the year or where they are at that moment in time	• There is a risk of loss overboard. The person should be kept under close observation in a locked well lit cabin and given repeated reassurance. • After removal of the casualty from the polluted atmosphere, no specific treatment is usually necessary.
Agitation (mental agitation, aggressive and sometimes violent behaviour)	• If the casualty is difficult to manage, give diazepam 10 mg as rectal solution.* • Repeat, if necessary, 10 mg diazepam 30 minutes later if medical advice is not immediately available and **SEEK RADIO MEDICAL ADVICE**.
Agitation, convulsions Excessive exposure to chemicals may lead to convulsions (fits).	• Protect the airway from being blocked by the tongue or secretions. • Give diazepam 10 mg as rectal solution.* • **RADIO FOR MEDICAL ADVICE.**
Further advice on **treatment of convulsions: see table 5.**	
Hallucinations (hearing voices and/or seeing terrifying images) Sometimes mental illness may confuse the issue. Schizophrenia often results in hearing voices that are not there.	• If the casualty is difficult to manage, give diazepam 10 mg as rectal solution.* • Repeat, if necessary, 10 mg diazepam 30 minutes later if medical advice is not immediately available and **SEEK RADIO MEDICAL ADVICE**. • If there is a history of previous mental illness: **SEEK RADIO MEDICAL ADVICE**.

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* **Note:** If administration of diazepam as rectal solution is not possible, give haloperidol 5 mg intramuscularly. Haloperidol (e.g. HALDOL™) may be available in the ship's ordinary medicine chest.

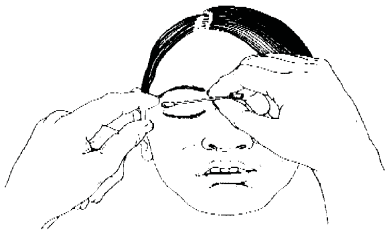
Table 7
EYE EXPOSURE TO CHEMICALS

Chemical splashes involving the eye may cause local irritation, inflammation, pain and, in severe cases, blindness.
TREATMENT IS URGENT

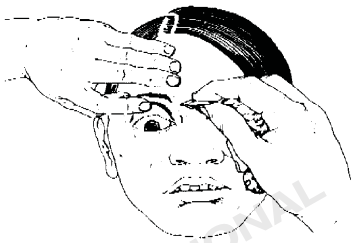
DECONTAMINATION in all cases of eye contact, regardless of symptoms

Eye contamination with solid CALCIUM OXIDE and CALCIUM HYDROXIDE (quicklime; slaked lime)

- To avoid “lime burns”, try to swab particles mechanically from the eye **before washing**.



A cotton bud, match or similar object is held over the closed eyelid.



The eyelid is turned inside out over the cotton bud.

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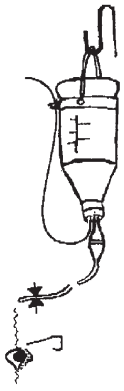
Eye contamination with other chemicals

- **IMMEDIATE** washing of the eye with copious amounts of water.
- Keep the eyelids widely apart as illustrated.
- Remove contact lens.
- Direct water flow from inner to outer corner of the eye. Washing must be done thoroughly for ten minutes, timed by the clock.



- If available, use a 1 L bag of sodium chloride 0.9% with a drip set to irrigate the eye.
- Don’t delay. Use water until drip is ready.

Signs and symptoms	Treatment
	• Anaesthetic eye drops should be instilled in the eye to ensure adequate irrigation of the eye.
Pain, redness and watering of the eye	• If pain is severe, anaesthetic eye drops should be instilled in the eye to relieve pain. • If the eye continues to be painful, give two tablets of paracetamol every 6 hours until the pain is relieved. • **RADIO FOR MEDICAL ADVICE.**

Signs and symptoms	Treatment
Unrelieved severe pain	• If severe pain continues despite 10 minutes irrigation of the eye with water, repeat the eye wash for a further 10 minutes after instilling anaesthetic eye drops and **RADIO FOR MEDICAL ADVICE**. • Give 10 mg morphine sulphate and 10 mg metoclopramide intramuscularly, if advised medically.
Further advice on **pain relief**: **see table 13.**	
Loss of vision	• This is a **MEDICAL EMERGENCY**. • Irrigate the eye as described above and seek **URGENT** medical advice.

Further advice on **the treatment of eye injury**: **see appendix 7.**

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Table 8
SKIN EXPOSURE TO CHEMICALS

Skin exposure to chemicals may cause local damage of either chemical burn or frost-bite. Chemical burns resemble thermal burns, with redness, irritation, swelling, pain, blistering and ulceration.

The chemical may be absorbed through the skin, causing general symptoms of poisoning; these symptoms may be delayed for several hours.

Limited exposure to leaking refrigerator gases, compressed gases or solid carbon dioxide (dry ice) may cause local frost-bite that, in principle, will cause the same damage as chemical or thermal burns and is treated accordingly. No special treatment instructions are needed – refer to chemical burns.

In extended burns, fluid loss may be serious.

DECONTAMINATION in all cases of skin exposure, regardless of chemical or symptoms

- Chemical protective gloves and clothing should be used while washing the casualty's skin. After decontamination, it is not necessary to use protective clothing.
- Carefully remove and double-bag contaminated clothing and personal belongings. Cut off the clothes, if necessary.
- If the chemical has affected eyes **and** skin, **the eyes should have PRIOR attention**.
- **IMMEDIATE** washing with copious amounts of water for at least 10 minutes while removing contaminated clothing, rings, wristwatches, etc. **Don't delay**.
- Do not use neutralizing substances.
- Remove the casualty to the ship's hospital.
- Continue washing the skin for additional 10 minutes with soap or shampoo and water.

Exposure to PHOSPHORUS (WHITE OR YELLOW) which ignites in air

- Keep the injured part of the body under water or covered with wet dressings.
- Using chemical protective gloves, remove the phosphorus with a clean spoon or forceps.

Exposure to HYDROFLUORIC ACID

- Using latex gloves, massage exposed area with calcium gluconate gel for at least 15 minutes or until pain is relieved. Leave the gel on the skin. The gel should be re-applied 4 to 6 times daily for 3 to 4 days if a chemical burn is present.

Further advice: **see table 16.**

Signs and symptoms	Treatment
Burning pain with redness and/or swelling of contaminated skin, irritating rash	• After washing with water, wash exposed areas thoroughly (including skin folds, nail beds and hair) with soap or shampoo and water. Clean away from the burn in every direction. DO NOT use cotton wool for cleaning as it is likely to leave bits in the burn. • Dab gently any remaining dirt using a swab soaked in warm water. BE GENTLE as this may cause pain.
Chemical burns	• Cover burns with a sterile dressing (e.g. perforated silicone dressing or vaseline gauze), overlapping the burn or scald by 5 to 10 cm (2 to 4 inches). Then apply a covering of absorbent material (e.g. a layer of sterile cotton wool) and a suitable bandage.

Further advice on **chemical burns**: **see appendix 8.**

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Signs and symptoms	Treatment
Blisters	• Leave blisters intact. • If blisters have burst, clip off the dead skin by using a sterilized pair of scissors. Flood area with clean, lukewarm (previously boiled) water from a clean receptacle to remove debris. • Cover blisters with a sterile dressing (e.g. perforated silicone dressing or vaseline gauze), overlapping the burn or scald by 5 to 10 cm (2 to 4 inches). Then apply a covering of absorbent material (e.g. a layer of sterile cotton wool) and a suitable bandage.
Pain	• Give two tablets of paracetamol every six hours until the pain is relieved. • If there is very severe pain, give 10 mg morphine sulphate and 10 mg metoclopramide intramuscularly, if advised medically. • **SEEK MEDICAL ADVICE** • If breakthrough pain persists after 15 minutes or more, give a second injection of 10 mg morphine sulphate intramuscularly.

Further advice on **pain relief**: **see table 13.**

Blisters and ulcers	• Dressings should be left undisturbed for 3 to 4 days unless the dressing becomes smelly or very dirty, or the temperature is raised. Redress such areas as described above. • Provide adequate relief for continuing pain (see above).
Blisters, ulcers covering an area exceeding 9% of body surface (corresponding to 9 times the size of the palm of the hand)	• In addition to normal food and fluid intake give: The **first 24 hours**: For every 10% of the body surface area with burns, give 3 L of salted water (1½ teaspoonfuls of table salt in 1 L) intermittently to help replace fluid loss. **24 to 48 hours**: For every 10% of the body surface area with burns, give 1½ L of fluids (preferably oral rehydration salt solution – ORS) intermittently. • **RADIO FOR MEDICAL ADVICE.** **After 48 hours** the fluid intake should in principle be normal. • Check for urine output that should be approximately 30 to 50 mL per hour (approximately 1 L per 24 hours).

Further advice on **fluid replacement**: **see appendix 13.**

FOLLOW-UP

- A patient who has had significant exposure or any symptoms related to exposure should be kept warm in bed and closely observed for 48 hours and **RADIO MEDICAL ADVICE OBTAINED**.
- Emergency transport for on-shore hospital evaluation will usually be required.

Table 9
INHALATION OF CHEMICALS

Inhalation of chemicals may cause suffocation (asphyxia) due to:

- Obstruction to breathing in the throat or the air passage through spasm of the air tubes or by swelling of the linings of the voice box due to irritant fumes;
- Fluid in the lung air spaces caused by irritant fumes;
- Poisoning of the blood which prevents the carriage or use of oxygen in the body caused by, for example, carbon monoxide and cyanide;
- Poisoning of the mechanism of breathing in the chest (e.g. by organophosphate pesticides) or the brain (e.g. by chlorinated hydrocarbons);
- Gases which do not support life because they replace oxygen in the atmosphere (e.g. carbon dioxide, nitrogen).

Vapours of volatile liquids often have a pleasant or disagreeable odour. They may cause lightheadedness, dizziness, headache or nausea.

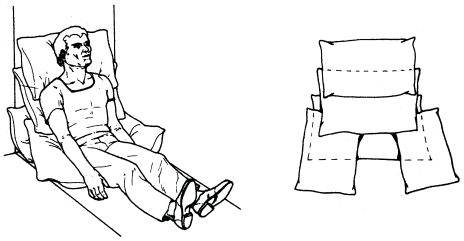
A few gases have delayed corrosive effects on the lungs.

For advice on **CPR** in **cases of suffocation**: **see table 2.**

For advice on **chemical hazards of fire**: **see appendix 9.**

For advice on **chemical hazards of welding**: **see appendix 9.**

WARNING: Any casualty who has been gassed and has impaired consciousness must NOT be treated with morphine.

Signs and symptoms	Treatment
Soreness of throat, hoarseness or cough	• Remove the casualty from the polluted atmosphere, have him rinse his mouth and give one glass of water to drink.
Dry cough, mild breathlessness and wheezing	• The casualty should be put to bed and placed in the high sitting-up position. 
Severe breathlessness and wheezing	• If breathlessness or wheezing are present, give oxygen at a flow rate of 8 L per minute until symptoms resolve. • Additionally, administer by spacer device: 200 µg salbutamol **or** 500 µg terbutaline **and** 250 µg beclomethasone **or** 400 µg budesonide every 15 minutes for the first hour. • At the same time: **RADIO FOR MEDICAL ADVICE**. • If breathlessness and wheezing persist after the first hour, continue with oxygen and repeat administration of salbutamol/terbutaline and beclomethasone/budesonide every 2 hours for the next 10 hours, and then 4 times a day until symptoms resolve.

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Signs and symptoms	Treatment
Severe breathlessness and frothy sputum, blue discoloration of the skin, anxiety and sweating (pulmonary oedema)	• Casualties must be handled extremely carefully. All strain must be avoided. • **RADIO FOR MEDICAL ADVICE.** • Arrange for evacuation. The casualty will need to be transferred to a shore hospital as soon as possible.

Further advice on **breathing difficulty: see appendix 9.**

	• Give oxygen, salbutamol/terbutaline and beclomethasone/budesonide as above. • Use a sucker, if available, to get rid of the frothy secretions. • If the casualty is very breathless, give 50 mg furosemide (frusemide) by intramuscular injection to increase the urine output. • If symptoms persist, continue with oxygen and repeat administration of salbutamol/terbutaline and beclomethasone/budesonide every 2 hours for the next 10 hours, and then 4 times a day until symptoms resolve.
Fever, breathlessness, productive cough, increased pulse rate (over 110 per minute)	• **RADIO FOR MEDICAL ADVICE.** • The casualty should be put to bed and placed in the high sitting-up position.

Further advice on **diagnosis of breathing problems: see appendix 9.**

	• Give 500 mg amoxicillin every 8 hours. **Note:** Some are allergic to penicillins, including amoxicillin. In such cases, give 500 mg erythromycin 4 times daily. • If the patient is breathless, wheezing or blue, oxygen should be given continuously together with 200 μg salbutamol or 500 μg terbutaline 4 times daily by spacer device, until the symptoms and signs improve.

FOLLOW-UP

A patient who has had significant exposure or any symptoms related to exposure should be kept warm in bed and closely observed for 48 hours and **RADIO MEDICAL ADVICE OBTAINED**.

Table 10
INGESTION OF CHEMICALS

Ingestion of hazardous materials at sea is rare but can occur through attempted suicide, contaminated food or water, or through poor personal hygiene.

Ingestion of a toxic material can cause retching, vomiting (sometimes the vomit is blood-stained), abdominal pain, colic and later diarrhoea. Particularly severe symptoms are caused by corrosives, strong acids, alkalis or disinfectants which burn the lips and mouth and cause intense pain, and rarely perforation of the gut.

Ingested poisons can also produce general toxic effects (e.g. impaired consciousness, convulsions, or heart, liver and acute kidney failure) with or without irritation of the gastrointestinal tract, and such effects can be delayed.

In all cases of ingestion, if the casualty is completely alert and able to swallow, treat as follows:

- Have the casualty rinse mouth with water. Give one glass of water to drink.
- Observe in a place of safety for at least 8 hours.
- If a significant amount of material has been ingested and the casualty complains of pain in the mouth or the stomach, give two tablets of paracetamol every 6 hours until the pain is relieved. **RADIO FOR MEDICAL ADVICE.**

Further advice on **ingestion of chemicals**: **see appendix 10.**

- **Vomiting should not be induced!**
- Do **not** give salt water to induce vomiting, as it may be dangerous to do so.
- Inducing vomiting by stimulating the back of the throat is usually ineffective and may cause aspiration of the chemical into the lungs, and therefore should not be attempted.
- Dilution with large amounts of water or other liquid is **not** recommended as it may increase the absorption of the chemical.
- Syrup of Ipecac is not recommended, as it may cause aspiration of the chemical into the lungs and there is no evidence of clinical benefit from its use.
- Activated charcoal is usually not recommended at sea because if unconsciousness occurs it may be inhaled into the lungs. Its use in a given case should always be discussed with the radio medical advice.

Refer to IMGS or equivalent national medical guide.

Signs and symptoms	Treatment
Frequent vomiting	• Frequent and prolonged vomiting is a bad sign. Give 10 mg metoclopramide intramuscularly; repeat 2 hours later if vomiting persists. • Do **not** give solid food.
Bleeding (bright red blood, dark brown “coffee ground” vomit or black, tarry, foul-smelling faeces)	• If severe bleeding occurs, there may be circulatory collapse: **see table 11.** • **RADIO FOR MEDICAL ADVICE.**

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Signs and symptoms	Treatment
Perforation of the gut (severe pain all over the abdomen, board-like rigidity of the abdominal wall, shock) **Note:** No bowel sounds are heard on listening to the abdomen with a stethoscope. Further advice on **pain relief**: **see table 13.**	• **RADIO FOR MEDICAL ADVICE.** • Arrange for evacuation. The casualty will need to be transferred to a shore hospital as soon as possible. • Give 10 mg morphine sulphate and 10 mg metoclopramide intramuscularly, if advised medically. • If advised medically, give cefuroxime 750 mg intramuscularly every 8 hours and a metronidazole 1 g suppository every 8 hours. • Institute a rectal infusion with rehydration salts while awaiting the transfer of the casualty to shore hospital. • The intravenous administration of fluids may be required.

Further advice on **rectal infusion and other fluid replacement**: **see appendix 13.**

FOLLOW-UP

- If the casualty is free of symptoms 8 hours after ingestion, no further action is usually required.
- Remember that vomit may be inhaled into the lungs, causing difficulty in breathing;
  if this occurs, treat as for inhalation: **see table 9.**
- A patient who has had significant exposure or any symptoms related to exposure should be kept warm in bed and closely observed for 48 hours and **RADIO MEDICAL ADVICE OBTAINED**.
- If ingestion was intentional, continuous observation and medical advice is required. Put casualty ashore as soon as possible for hospital evaluation.

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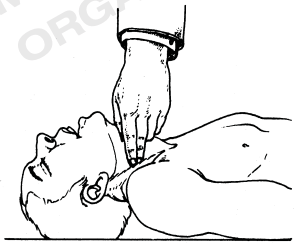
Table 11
SHOCK

Chemical burns and chemical-induced bleeding from the gut may cause circulatory collapse and shock with diversion of the blood from the limbs to maintain an adequate blood (and oxygen) supply to the brain and heart. Severe pain from chemical burns may also contribute to shock.

There are also a number of chemicals which are toxic to the heart directly and result in reduced pump action of the heart.

Severe shock may threaten the life of the casualty.

If shock is prolonged, acute kidney failure may result: see table 12 and **appendix 12.**

Signs and symptoms	Treatment
Pale, cold skin, often moist; later the skin may develop a bluish, ashen colour; rapid and shallow or irregular and deep breathing; rapid, weak but false pulse; anxiety and sweating	• The casualty should be placed in a horizontal position. His legs should be elevated approximately 30 cm unless there is injury to the head, pelvis, spine, or chest, or difficulty in breathing. • Loosen clothing around the neck. • Check for a pulse. The best pulse to feel in an emergency is the carotid. Feel for five seconds before deciding it is absent. If it cannot be felt or is feeble, there is insufficient circulation and **CPR may be necessary: see table 2.**
	
	• Measure and record pulse and blood pressure every 15 minutes. • Give oxygen at a flow rate of 8 L per minute until symptoms resolve. • Keep the casualty warm.
Shock due to chemical burns	• Within the first 24 hours, give for every 10% of the body surface area with burns 3 L of salted water (1½ teaspoonfuls of table salt in 1 L) intermittently as often as the casualty tolerates (e.g. one glass every 10 minutes). • Liquids should not be given by mouth if the patient is drowsy, convulsing, or about to have surgery.
Shock due to chemical-induced bleeding from the gut	• The intravenous or rectal administration of fluids may be required. • **RADIO FOR MEDICAL ADVICE.**

Further advice on **fluid replacement: table 8 and appendix 13.**

Further advice on **pain relief: see table 13.**

Breathing has stopped, no pulse	• Institute **CPR: see table 2.**

FOLLOW-UP

Signs and symptoms	Treatment
A reduction in the amount of urine passed	This may be due to the onset of acute kidney failure. • Measure and keep a record of the urine passed. Adjust the fluid intake until transfer to hospital is possible: **see table 12.**
No urine is passed	• **RADIO FOR MEDICAL ADVICE IN ALL CASES**. • Seek **URGENT RADIO MEDICAL ADVICE**. Arrange for evacuation. The casualty will need to be transferred to a shore hospital as soon as possible.

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Table 12
ACUTE KIDNEY FAILURE

Most chemicals are excreted by the kidneys, which may be damaged in the process. In severe poisoning, acute kidney failure may develop after 24 hours, and if it does not improve, the casualty may die after 7 to 14 days.

- Acute kidney failure must not be confused with retention of urine in the bladder.
- Acute kidney failure may arise for reasons other than chemical poisoning.

Further advice on **acute kidney failure: see appendix 12.**

Signs and symptoms	Treatment
A steady reduction in the amount of urine passed	This may be a warning of the onset of acute kidney failure. • Record casualty's fluid intake and urine output carefully on a chart as shown in **appendix 12**. • Volume of urine passed, if any, should be measured and recorded every 2 hours. • If less than 125 mL of urine is passed in 6 hours, check whether bladder is over-full. • If not full, then acute kidney failure is present.
No urine is passed	• This may be due either to an over-full bladder or acute kidney failure. • **RADIO FOR MEDICAL ADVICE.** • If medical advice is not available, insert a urinary catheter into the bladder: **refer to IMGS or equivalent national medical guide.** • If bladder is over-full (retention), leave the catheter in place and **SEEK RADIO MEDICAL ADVICE**. • If there is less than 125 mL of urine in the bladder and the casualty has not passed urine for more than 6 hours, **SEEK URGENT RADIO MEDICAL ADVICE**.

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Table 13
PAIN RELIEF

The use of analgesics (pain-killing drugs) is a very important step in the treatment of poisoning associated with severe tissue damage. Pain relief calms the casualty and stabilizes his condition. Paracetamol is a mild analgesic and morphine is used to treat severe pains. As morphine often causes vomiting, it should be combined with an anti-emetic such as metoclopramide.

Mild to moderate pain

- Give two tablets of paracetamol every 6 hours until the pain is relieved.

Severe pain

Casualty is breathing normally:

- **RADIO FOR MEDICAL ADVICE.**
- If advice is not available:
  1 Give morphine sulphate 10 mg and metoclopramide 10 mg intramuscularly.
  2 If breakthrough pain persists after 15 minutes or more, give a second injection of 10 mg of morphine sulphate intramuscularly.
  3 After 4 hours, if pain persists or recurs, give 10 to 20 mg morphine sulphate with a further dose of 10 mg metoclopramide intramuscularly.
  4 Where pain persists, the third and subsequent doses of 10 to 20 mg morphine sulphate must not be given more frequently than every 4 hours with metoclopramide 10 mg but the total dose of metoclopramide must not exceed 30 mg each 24 hours.
- Follow medical advice if available.

Casualty is breathing poorly:

- Administer oxygen at a flow rate of 6 to 8 L per minute.
- **RADIO FOR MEDICAL ADVICE**. Evacuation to shore hospital is likely to be needed.
- If medical advice is not available and the pain is excruciating, give morphine sulphate 10 mg and metoclopramide 10 mg intramuscularly.
- If breakthrough pain persists after 15 minutes or more, give a second injection of 10 mg of morphine sulphate intramuscularly. **OBSERVE CAREFULLY FOR FURTHER DETERIORATION**.
- **RADIO FOR MEDICAL ADVICE** if not received previously.

Slow irregular breathing after morphine

- The following signs may indicate over-treatment with morphine:
  - Irregular breathing pattern;
  - Shallow and slow breathing;
  - Development of unconsciousness if the casualty was conscious at first;
  - Small pin-point pupils.
- If breathing is inadequate, give ventilation support and administer oxygen: **see table 3.**
- **RADIO FOR MEDICAL ADVICE**
- If medical advice is not available, give 0.4 mg naloxone intramuscularly. Naloxone counteracts the side effects of morphine.
- Repeat the dose within 15 minutes if the casualty's condition does not improve and medical advice is not available.

- If there is no improvement after these two injections (total dose of 0.8 mg) of naloxone, it is very unlikely the deterioration is due to an overdose of morphine.
- If there is a response, and then further deterioration occurs, give a further dose of 0.4 mg of naloxone.

Morphine is a controlled substance as it is an addiction-producing drug

- Obtain **RADIO MEDICAL ADVICE** if at all possible prior to the use of morphine. Keep an exact record of morphine use.
- Keep an exact record of morphine use.
- Keep stock locked away.
- Discontinue as soon as the pain can be relieved by paracetamol.
- If, under certain radio conditions, radio medical advice is not feasible, it is up to the master's discretion to ensure that adequate morphine is administered when pain is excruciating.

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Table 14
CHEMICAL-INDUCED BLEEDING

Some anti-coagulant pesticides ("super-warfarin") inhibit the normal blood clotting and lead to bleeding which may rarely be life-threatening, particularly if it occurs from the stomach. These effects may be delayed for 24 to 48 hours after exposure and can last for several weeks.

Signs and symptoms	Treatment
Bleeding from the nose and gums, blood in the urine, vomiting blood, vomiting "coffee grounds", black and tarry diarrhoea	• Remove the casualty to the ship's hospital. • **RADIO FOR MEDICAL ADVICE.** • Arrange for evacuation. The casualty will need to be transferred to a shore hospital as soon as possible. • Give 10 mg phytomenadione (vitamin K_1) intramuscularly, if there is any delay in evacuation. • If bleeding persists **RADIO FOR MEDICAL ADVICE** and give a further 10 mg phytomenadione intramuscularly, if advised. • Massive bleeding can only be counteracted by infusion of plasma expanders.

Further advice on **fluid replacement: see appendix 13.**

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Table 15
CHEMICAL-INDUCED JAUNDICE

Jaundice refers to the yellow discoloration of the skin and eyes. The condition can be caused by liver disease or the breakdown of red blood cells (haemolysis).

LIVER DISEASE

The liver is the chemical factory where the body attempts to destroy all poisons. The most common cause of liver injury is the excessive intake of ethyl alcohol. Infectious agents can also cause liver disease (hepatitis) and jaundice.

The liver can rarely be damaged by certain chemicals, e.g. chlorinated hydrocarbons, metal salts and phosphorus. Chemical-induced liver injury does not show itself until two to three days after poisoning.

In severe cases, rapid and progressive failure of the liver can lead to increasing drowsiness followed by loss of consciousness and death after several days.

HAEMOLYSIS

Haemolysis of red blood cells can occur when there is either mechanical destruction of the cells (e.g. in certain heart conditions) or in certain types of blood disorders. Rarely, haemolysis can also result from overexposure to certain chemicals. There is no specific therapy of haemolysis on board a marine vessel but potential complications of kidney dysfunction due to the heavy overload of haemolytic products should be mitigated by high fluid intake. Urine output should be closely monitored.

Signs and symptoms	Treatment
Yellowing of skin and eyes; pain or tenderness in the right upper abdomen; urine becomes dark brown, and the stool pale in colour	• **RADIO FOR MEDICAL ADVICE.** • The casualty should be transferred to a shore hospital as soon as possible. • The casualty should rest in bed and be kept warm. • Although the casualty may be feeling sick, he should be encouraged to take a high-carbohydrate diet in the form of liquids and bread. Liquids should contain at least two teaspoonfuls of sugar in a glass of water every 2 hours. • No drugs should be given unless there is severe vomiting, in which case give 10 mg metoclopramide intramuscularly; repeat 2 hours later if vomiting persists. • Alcoholic beverages should be completely avoided until on-shore clinical evaluation is obtained.

FOLLOW-UP

If there is a rapid onset of the symptoms and signs, associated with drowsiness or coma, then the damage is likely to be severe: **RADIO FOR MEDICAL ADVICE**. Arrange for evacuation. The casualty will need to be transferred to a shore hospital as soon as possible.

Table 16
HYDROFLUORIC ACID AND HYDROGEN FLUORIDE

These chemicals are corrosive to living tissue. They may cause deep, slowly healing, and painful burns. Systemically, damage to the heart and convulsions may occur. Several fluorides react with water forming hydrogen fluoride.

The onset of local reactions, pain and other symptoms may be delayed up to 24 hours after exposure to lower concentrations. The surface of the skin may not be destroyed for several hours, but the increasing pain and redness indicate a continuing destruction of tissues underneath the skin.

Treatment for EYE CONTACT in all cases of exposure, regardless of symptoms

- **IMMEDIATE** washing of the eye with copious amounts of water.
- Remove contact lens.
- Keep the eyelids widely apart as illustrated.
- Direct water flow from inner to outer corner of the eye. Washing must be done thoroughly for 10 minutes, timed by the clock.

- Anaesthetic eye drops should be instilled in the eye to ensure adequate irrigation of the eye.

Further advice on **eye treatment: see table 7.**

Treatment for SKIN CONTACT in all cases of exposure, regardless of symptoms

- Chemical protective gloves and clothing should be used while washing the casualty's skin. After decontamination, it is not necessary to use protective clothing.
- Cut, if necessary, the clothes by using shears.
- **IMMEDIATE** washing with copious amounts of water for at least 10 minutes while removing contaminated clothing, rings, wristwatches, etc.
- After washing with water for 10 minutes, dry skin.
- Using latex gloves, massage exposed area with calcium gluconate gel for at least 15 minutes or until pain is relieved. Leave the gel on the skin. The gel should be re-applied 4 to 6 times daily for 3 to 4 days if a chemical burn is present.

If skin exposure exceeds 1% of body surface (approximately the size of the palm of the hand) and local symptoms (redness, pain, blisters)

- Give 5 g calcium gluconate, as effervescent tablets in 250 mL (half a pint) of water, to drink immediately and repeat 2 hours later.
- If calcium gluconate is not available, give milk.
- **RADIO FOR MEDICAL ADVICE.**

Further advice on **treatment of skin burns: see table 8.**

Treatment for INHALATION in all cases of exposure, regardless of symptoms

- Remove the casualty from the polluted atmosphere, have him rinse his mouth and give one glass of water to drink.
- If breathlessness or wheezing are present, give oxygen at a flow rate of 8 L per minute until symptoms resolve.
- RADIO FOR MEDICAL ADVICE.

Further advice on **breathing problems: see table 9.**

Treatment for INGESTION in all cases of exposure, regardless of symptoms

- RADIO FOR MEDICAL ADVICE.
- Have the casualty rinse mouth with water.
- Give 5 g calcium gluconate, as effervescent tablets in 250 mL (half a pint) of water, to drink immediately and repeat 2 hours later.
- If calcium gluconate is not available, give milk.

Signs and symptoms	Treatment
Vomiting, abdominal pain, diarrhoea	• RADIO FOR MEDICAL ADVICE and see table 10.
Shock	• RADIO FOR MEDICAL ADVICE and see table 11.
Convulsions (seizures, fits)	See table 5.

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Table 17
ORGANOPHOSPHATE AND CARBAMATE INSECTICIDES

Organophosphorus and carbamate insecticides cause disturbances in the transmission of nerve impulses to target organs such as muscles and glands by inhibiting the enzyme acetylcholinesterase.

Signs and symptoms may include:

- Headache, nausea, dizziness, fatigue
- Blurred vision, pin-point pupils
- Confusion
- Vomiting, abdominal cramps and diarrhoea
- Sweating, salivation, watering of the eyes, and increased nasal and lung secretions
- Muscle twitching, weakness, tremor, convulsions
- Tightness in the chest, wheezing, slow pulse, respiratory and cardiac arrest.

Symptoms usually develop during exposure or within 12 hours after contact. The acute intoxication stage usually does not last longer than 48 hours unless exposure has been prolonged or the insecticide has been ingested. Recovery from exposure to carbamate insecticides usually occur within 24 hours.

Treatment for EYE CONTACT in all cases of exposure, regardless of symptoms

- **IMMEDIATE** washing of the eye with copious amounts of water.

Further advice on **eye treatment**: **see table 7.**

Treatment for SKIN CONTACT in all cases of exposure, regardless of symptoms

- **IMMEDIATE** washing with soap or shampoo and copious amounts of water for at least 10 minutes while removing contaminated clothing, rings, wristwatches, etc.
- The casualty should shower thoroughly.
- Chemical protective gloves should be worn by those attending the exposed individual to prevent self-contamination.

Further advice in cases of **skin burns**: **see table 8.**

- Contaminated clothing should be kept in properly labelled bags until washing.
- Remove the casualty to the ship's hospital.
- **RADIO FOR MEDICAL ADVICE** if symptoms develop.

Treatment for INHALATION in all cases of exposure, regardless of symptoms

(Toxic effects may be expected particularly after inhalation of dust and mist)

- Remove the casualty from the polluted atmosphere, have him rinse his mouth and give one glass of water to drink.
- Remove clothes and shower thoroughly.
- **RADIO FOR MEDICAL ADVICE** if symptoms develop.

Treatment for INGESTION in all cases of exposure, regardless of symptoms

- Have the casualty rinse his mouth thoroughly with water.
- **RADIO FOR MEDICAL ADVICE.**

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Signs and symptoms irrespective of routes of exposure	Treatment
Blurred vision, headache, nausea, fatigue or dizziness	• Observe in a place of safety. • **RADIO FOR MEDICAL ADVICE.** • If the casualty becomes free of symptoms, no further action is required.
Vomiting, cramp-like abdominal pains, excessive sweating and salivation, tightness in the chest or twitching of the muscles	• **RADIO FOR MEDICAL ADVICE.** • Inject 1 mg atropine intramuscularly. If the skin and mouth have not become dry within 30 minutes, give a further dose of 1 mg atropine intramuscularly. In casualties severely poisoned with an organophosphorus insecticide, very large doses (10 to 15 mg) of atropine may be required. • CAUTION: Overdosage of atropine may lead to fever, restlessness, hallucinations and disorientation, followed by depression, respiratory arrest and death. If atropine toxicity is suspected, discontinue further treatment with atropine.
Respiratory difficulty with excessive lung secretions, paralysis with complete loss of muscle function, slow pulse, or unconsciousness	• Administer controlled ventilation with oxygen at a flow rate of 8 L per minute and heart compression as warranted. • If a medically trained individual is available, atropine should be given intravenously as follows: 1 to 2 mg repeated every 15 minutes until lung secretions have dried up.
Further advice: **see table 2 and table 3.**	• Transfer to shore hospital is **URGENT.**

FOLLOW-UP

- A patient who has had significant exposure or any symptoms related to exposure should be kept warm in bed and closely observed for 48 hours and **RADIO MEDICAL ADVICE OBTAINED**.
- Since atropine has a short action, vomiting, cramp-like pains, excessive sweating and salivation or tightness of the chest may reappear after initial improvement with atropine therapy.
- If these symptoms recur, repeat injection of atropine as described above. In very severe poisoning this may be necessary for 24 to 48 hours.
- Some organophosphorus insecticides may damage the nerves in the limbs after the casualty's recovery from acute poisoning. The muscles controlled by those nerves may become weak, and paralysis with complete loss of muscle function may occur.
- **RADIO FOR MEDICAL ADVICE AND TRANSFER THE CASUALTY TO A SHORE HOSPITAL AS SOON AS POSSIBLE**.

Table 18
CYANIDES

Cyanides are fast acting, highly poisonous materials. They may be fatal if inhaled, swallowed, or absorbed through the skin and are extremely hazardous when in liquid and vapour form under pressure.

Signs and symptoms may include:

- Headache, nausea and dizziness
- Drowsiness, drop in blood pressure, rapid pulse
- Convulsions, unconsciousness
- Impaired respiration

With prompt rescue and treatment following exposure, recovery is normally quick and complete. Mouth-to-mouth resuscitation should be avoided in CPR to prevent the rescuer from being exposed.

Treatment for EYE CONTACT in all cases of exposure, regardless of symptoms

- **IMMEDIATE** washing of the eye with copious amounts of water.

Further advice on **eye treatment: see table 7.**

Treatment for SKIN CONTACT in all cases of exposure, regardless of symptoms

- **IMMEDIATE** washing with soap or shampoo and copious amounts of water for at least 10 minutes while removing contaminated clothing, rings, wristwatches, etc.
- Remove the casualty to the ship's hospital.

Treatment for INHALATION in all cases of exposure, regardless of symptoms

- Remove the casualty from the polluted atmosphere. Ensure that rescuers are equipped with respiratory protection so that they do not become poisoned also.
- After removal of the casualty from the polluted atmosphere, usually no specific treatment is necessary unless breathing is depressed or absent.

If breathing is absent, give **CPR and oxygen: see table 2 and table 3.**

Treatment for INGESTION in all cases of exposure, regardless of symptoms

- Have the casualty rinse his mouth with water.
- **RADIO FOR MEDICAL ADVICE.**

Signs and symptoms irrespective of routes of exposure	Treatment
Nausea or dizziness; slurred speech, confusion or drowsiness; difficulty in breathing and impaired consciousness	• Give oxygen at a flow rate of 8 L per minute until symptoms resolve. • Observe in a place of safety for 8 hours. • **RADIO FOR MEDICAL ADVICE.** • If the casualty becomes free of symptoms within 8 hours after exposure, no further action is required.

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Table 19
METHANOL (METHYL ALCOHOL) AND ETHYLENE GLYCOL

Methanol and ethylene glycol ("antifreeze") are particularly dangerous when swallowed. Poisoning by methanol absorption through the intact skin may also occur if methanol-soaked clothes are worn. The administration of alcohol (ethyl alcohol, ethanol) will reduce the risk of toxicity.

Signs and symptoms may include:

- Drunkenness, headache, nausea
- Blurred vision, avoidance of daylight (in methanol poisoning)
- Unconsciousness, impaired breathing

Onset of signs and symptoms may be delayed, particularly if alcohol (ethyl alcohol, ethanol) has been drunk at the same time.

Treatment for SKIN CONTACT in all cases of exposure, regardless of symptoms

- The casualty should remove contaminated clothing and wash with soap and water.

INGESTION

Signs and symptoms	Treatment
If a mouthful or more is swallowed, regardless of symptoms	• **RADIO FOR MEDICAL ADVICE IN ALL CASES.** • Give 25 mL of ethyl alcohol 99.5% in 250 to 300 mL water or soft drink. • This is a **MEDICAL EMERGENCY.** The casualty should be transferred to a shore hospital as soon as possible.
Drunkenness, headache, fatigue, blurred vision, photophobia (avoidance of daylight)	• Continue to give water or soft drink with ethyl alcohol as above every 3 hours until the casualty can be evacuated.
Unconsciousness with less than eight respirations of normal depth per minute or respiratory arrest	• Administer controlled ventilation with oxygen at a flow rate of 8 L per minute and heart compression as warranted.

Further advice on **CPR and oxygen administration: see table 2 and table 3.**

FOLLOW-UP

- If the casualty cannot be evacuated, and if medically advised, continue treatment with alcohol (ethyl alcohol).

Further advice on **prolonged unconsciousness: see table 4.**

- If ingestion was intentional, continuous observation and medical advice is required. Put casualty ashore as soon as possible for hospital evaluation.

Table 20
RADIOACTIVE MATERIAL

Hazards may come from either the radioactive nature of the material or its chemical nature. The radioactive nature of the material may result in external radiation or internal radiation if the substance is inhaled, ingested or absorbed through the skin.

The acute effects of radiation exposure may include:

- Vomiting
- Weakness
- Headache
- Diarrhoea

Onset and severity of signs indicate the course of illness. After a period of one to three weeks with few symptoms, loss of hair, complicating infections, diffuse bleeding and uncontrollable diarrhoea may be seen in severe cases.
LIFE IS IN DANGER.

- **Rescue personnel should wear full chemically protective clothing and breathing apparatus.**

In all cases of contamination, treat the casualty as follows:

- Remove persons from the source of radiation as far away as possible.
- Give first aid to any immediate life-threatening problems such as not breathing, heart stopped or serious bleeding.
- Institute CPR, if necessary. Use an oxygen resuscitator. **Do not use mouth-to-nose** or **mouth-to-mouth resuscitation** to prevent the rescuer from being exposed.
- Wrap stabilised or less injured casualties in blankets to contain contamination whilst you treat any seriously injured casualties.
- Remove the casualty's clothing and personal items which may be contaminated and place them in a plastic bag or sealed box. Label and hold it in a secure place that is not near any occupied space on board until the assistance of radiation experts is available to evaluate them. Treat non-life-threatening injuries at this time. Allow wounds/cuts that are not life-threatening to bleed briefly and then treat.
- Have the casualty blow his nose and gently swab the nasal passages and ears to remove any contaminated particles. Save swabs and nose blows, treat as if contaminated. Rinse the mouth thoroughly.
- If the injuries of an exposed person do not prevent it, have the casualty shower or wash thoroughly, including body hair and eyes, as soon as possible after being removed from the affected area. Hair shampoo may be used during the showering. Take care not to damage the skin when washing.
- Care should be taken to prevent the spread of contaminated washing water. Store any towels, blankets, brushes, etc., used in the decontamination.
- Apply first aid dressings to minor injuries after the decontamination washing.
- Rescue personnel wearing protective clothing and breathing apparatus should be hosed down with water for 10 minutes and should remove and store their clothing, as above, and thoroughly shower, using shampoo, after completing assistance to casualties.
- As soon as possible, take a specimen of urine from every person who has been in direct or indirect contact with the radioactive substance. Keep the urine in a closed receptacle for further analysis.
- **RADIO FOR MEDICAL ADVICE.**
- Do not give any treatment for possible ingestion, inhalation or absorption through the skin of radioactive material except on the advice of a physician.

Signs and symptoms	Treatment
Nausea, weakness, sleepiness, loss of appetite	• **RADIO FOR MEDICAL ADVICE.** • The casualty should be kept at rest under observation in a warm cabin or in the ship's hospital. • If no vomiting occurs during 2 to 3 days, the casualty should be put under medical supervision at the next port of call.

Signs and symptoms	Treatment
Vomiting within 2 to 3 days after exposure	• Give 10 mg metoclopramide intramuscularly; repeat 2 hours later if vomiting persists. An earlier onset of frequent and prolonged vomiting is a bad sign. • Be prepared to administer shock treatment. • **RADIO FOR MEDICAL ADVICE AND TRANSFER THE CASUALTY TO A SHORE HOSPITAL AS SOON AS POSSIBLE.**

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