Safe use of pesticides

Pesticides are toxic to both pests and humans. Pesticide particles may be inhaled with the air while they are being sprayed.
Special precautions must be taken during transport, storage and handling. Spray equipment should be regularly cleaned and maintained to prevent leaks. People who work with pesticides should receive proper training in their safe use.

Precautions

The label

Pesticides should be packed and labelled according to WHO specifications (1). The label should be in English and in the local language, and should indicate the contents, safety instructions and possible measures in the event of swallowing or contamination. Always keep pesticides in their original con- tainers (Figs. 10.1 and 10.2). Take safety measures and wear protective clothing as recommended.

Storage and transport

Store pesticides in a place that can be locked and is not accessible to unauthorized people or children (Fig. 10.3); they should never be kept in a place where they might be mistaken for food or drink. Keep them dry but away from fires and out of direct sunlight. Do not carry them in a vehicle that is also used to transport food.

Disposal

Left-over insecticide suspension can be disposed of safely by pouring it into a specially dug hole in the ground or a pit latrine (Fig. 10.4). It should not be disposed of where it may enter water used for drinking or washing, fish Pondsor Rivers. In a hilly area the hole should be on the lower side of such areas. Pour run-off water from hand washings and spray washings into the hole, and bury containers, boxes and bottles used for pesticides in it (Fig. 10.5). Close the hole as soon as possible. Cardboard, paper and cleaned plastic containers can be burned (Fig. 10.6), where this is per- mitted, far away from houses and sources of drinking-water. For reuse of cleaned

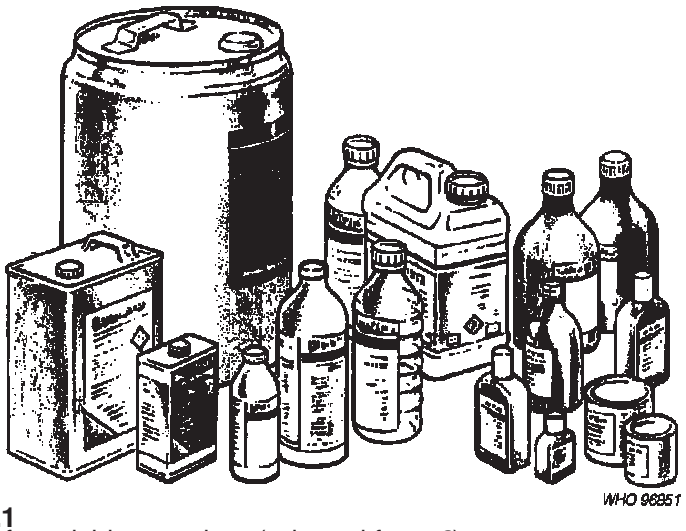

Fig. 10.1
Types of pesticide container (adapted from *2*).

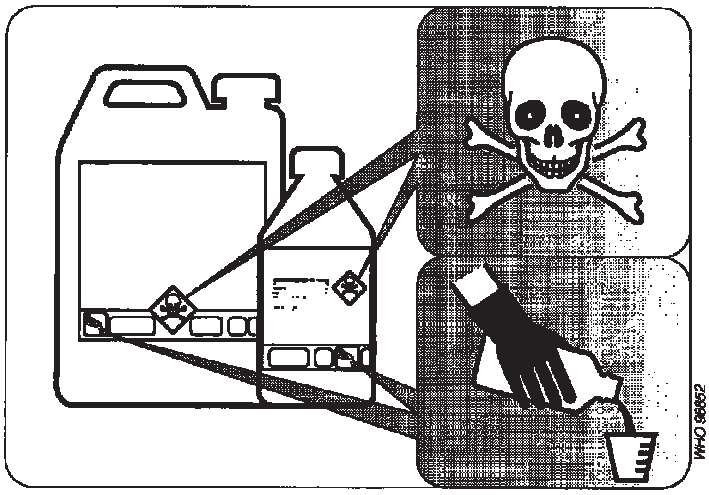

Fig. 10.2
Look for warning symbols, pictograms and colour coding on labels (adapted from *2*).

Containers, see box (p. 388). Pyrethroid suspensions can be poured on to dry ground where they are quickly absorbed and degraded and do not cause environmental problems.

Surplus solution can be used to kill insect pests such as ants and cockroaches. Pour or sponge it on to infested places (under kitchen sinks, in corners of a house).

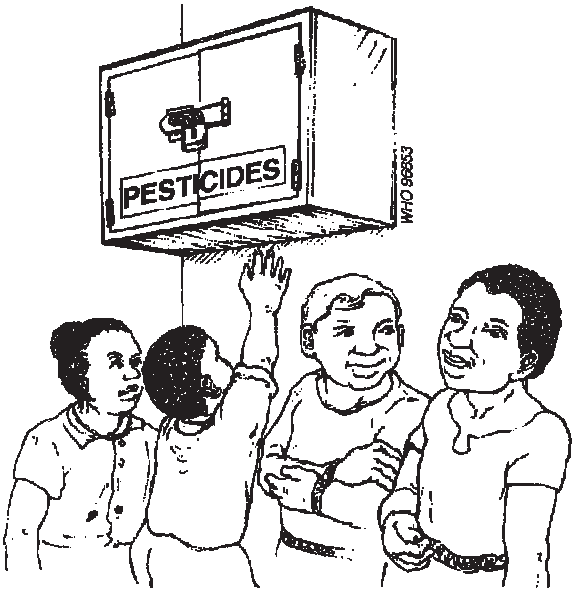

Fig. 10.3
Keep pesticides out of reach of children (adapted from *3*).

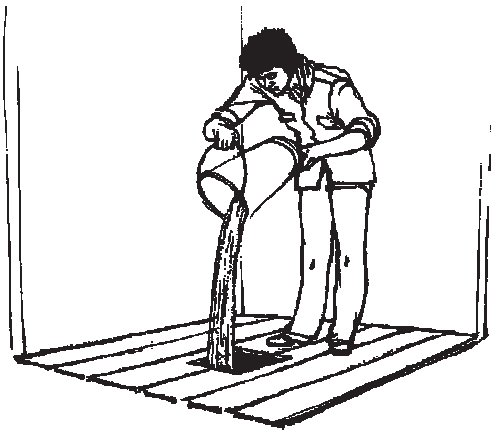

Fig. 10.4
Surplus insecticide solution can be dis- posed of safely by pouring it into a pit latrine or a specially dug hole in the ground.

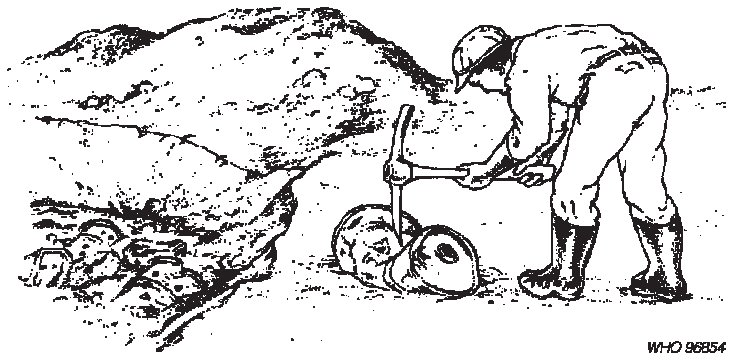

Fig. 10.5
Packages to be buried must be made unusable and reduced in bulk as much as possible (adapted from *4*).

Fig. 10.6
Clean paper and cardboard and cleaned plastic containers (not PVC) may be burnt (adapted from *4*).

mosquitos from biting from below. Where bedbugs are a problem, mattresses can be treated.

Cleaning used pesticide containers

The reuse of pesticide containers is risky and not recommended. However, some pesticide containers may be considered too valuable to be thrown away after use. Whether containers are suitable for cleaning and reuse depends on the material they are made of and what they contained. The label should provide instructions on possibilities for reuse and cleaning procedures.

Containers that have held pesticide formulations classified as highly hazardous or extremely hazardous must not be reused. Under certain conditions, containers of pesticide formulations classified as slightly hazardous or unlikely to present acute hazard in normal use can be reused for purposes other than the storage of food, drink or animal feed. Containers made of materials such as polyethylene that preferentially absorb pesticide should not be reused if they have held pesticides in which the active ingredient is classified as moderately, highly or extremely hazard- ous, regardless of the

Fig. 10.7
Use suitable equipment for measuring out and mixing insecticides (adapted from *2*).

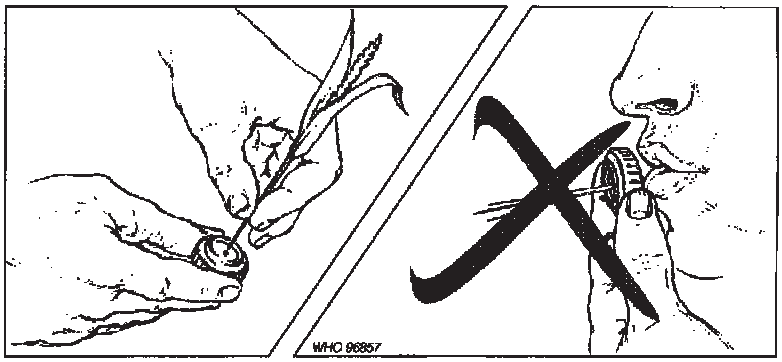

Fig. 10.8
Clean blocked nozzles with a soft probe (adapted from *2*).

General hygiene

Do not eat, drink or smoke while using insecticides. Keep food in tightly closed boxes. Use suitable equipment for measuring out, mixing and transferring insecticides (Fig.10.7).Do not stirliquids or scoop pesticide with bare hands. Use the pressure-release valve of the pump or a soft probe to clear blockages in the nozzle (Fig. 10.8; see also Chapter 9, p. 379). Wash the hands and face with soap and water each time the pump has been refilled. Eat and drink only after washing the hands and face (Fig.10.9).Take a shower or bath at the end of the day.

Protective clothing

Spraying indoors

Spray workers should wear overalls or shirts with long sleeves and trousers, a broad-brimmed hat, a turban or other head gear and sturdy shoes or boots. Sandals are unsuitable. The mouth and nose should be covered with a simple device such as a disposable paper mask, a surgical-type disposable or washable mask, or any clean piece of cotton. The cotton should be changed if it becomes wet. The clothing should be of cotton for ease of washing and drying. It should cover the body without leaving any openings. In hot and humid climates the wearing of additional protective clothing may be uncomfortable, and pesticides should

Mixing

People who mix and pack insecticides in bags must take special precautions (see Chapter 9, p. 373). In addition to the protective clothing described above, it is recommended that gloves, an apron and eye protection such as a face shield or goggles be worn (Figs. 10.10 and 10.11). Face shields provide protection for the whole face and are cooler to wear. The mouth and nose should be covered, as

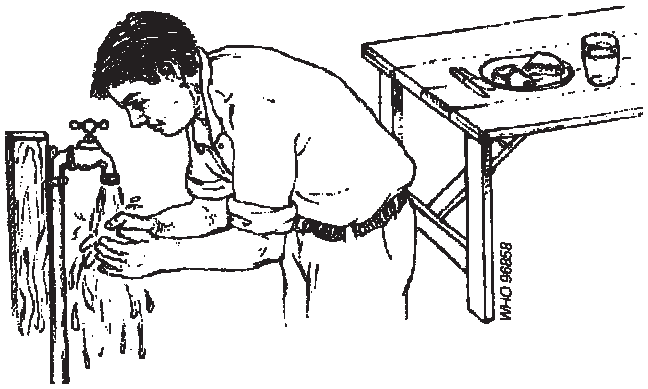

Fig. 10.9
Wash the hands and face before eating or drinking (adapted from *2*).

Fig. 10.10

Wear gloves when handling concentrates.

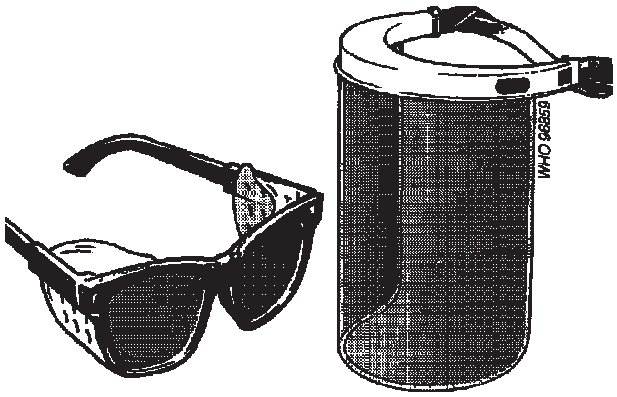

Fig. 10.11
Protective equipment for the eyes and face (adapted from *2*).

Recommended for indoor spraying. Care should be taken not to touch any part of the body with gloves while handling pesticides.

Impregnation of fabrics

Long rubber gloves should be worn when treating mosquito nets, clothes, screen- ing or tetse traps with insecticides.

Under certain circumstances extra protection may be required, e.g. from vapour, dust or spray of hazardous products. Such additional protective items should be indicated on the product label and may include aprons, boots, face masks, overalls and hats.

Maintenance

Clothing should be kept in a good state of repair and should be inspected regularly for tears or worn areas through which skin contamination might occur. Protective clothing and equipment should be washed daily with soap, separately from other clothing. Gloves need special attention and should be replaced when there is any sign of wear and tear. After use, gloves should be rinsed with water before they are taken off. At the end of each working day they should be washed inside and outside.

Safe techniques

Spraying

The discharge from the sprayer should be directed away from the body. Leaking equipment should be repaired and the skin should be washed after any accidental contamination. Persons and domestic animals must not remain indoors during spraying. Rooms must not be sprayed if someone, e.g. a sick person, cannot be moved out. Cooking utensils, food and drinking-water containers should be put outdoors before spraying. Alternatively, they can be placed in the centre of a room and covered with a plastic sheet (Fig. 10.12). Hammocks, paintings and pictures must not be sprayed. If furniture has to be sprayed on the lower side

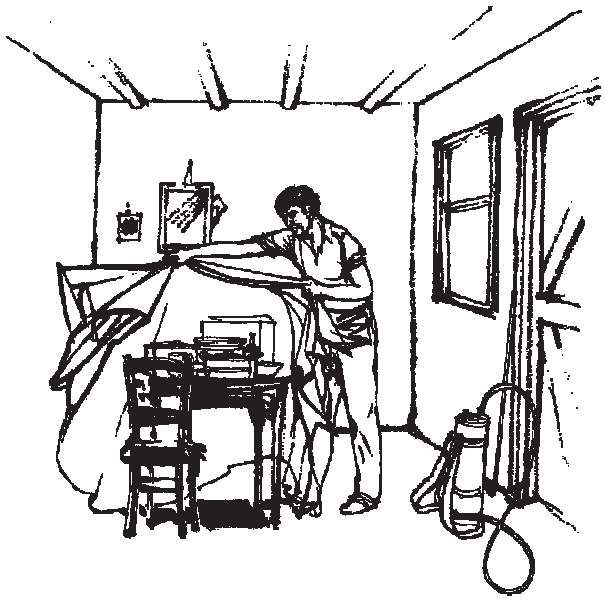

Fig. 10.12
Furniture and food should be covered with a plastic sheet or placed outdoors before a house is sprayed.

Unsprayed. Floors should be swept clean or washed after spraying. Inhabitants should avoid contact with the walls. Clothes and equipment should be washed daily.

Organ phosphorus and carbamate compounds should not be applied for more than 5–6 hours a day and the hands should be washed after every pump charge. Blood cholinesterase activity of spray personnel should be checked weekly if fenitrothionor old stocks of Malathion are used (see box).

Monitoring exposure to organ phosphorus compounds

Commercial field kits are available for monitoring blood cholinesterase activity. Low levels suggest overexposure to an organo phosphorus insecti- cide. Such assays should be performed weekly for all persons handling theseproducts.Personswithundulylowcholinesteraseactivityshoulds top working with insecticides until it has returned to normal.

Impregnation of fabrics

Gloves should be worn when handling the insecticide concentrate and preparing the insecticide mixture. Care should be taken to avoid splashing insecticide into the eyes. A wide, shallow bowl should be used (Fig. 10.13), and the room should be well ventilated to avoid

Fig. 10.13
Wear long rubber gloves and use a wide, shal- low bowl when impregnating fabrics.

Emergency measures

Signs and symptoms of poisoning

Poisonings due to pesticides are usually acute and result from extensive skin contact or ingestion. Signs and symptoms vary with the type of pesticide and can sometimes be confused with those of other illnesses.

Indications of pesticide poisoning

General: extreme weakness and fatigue.
Skin: irritation, burning sensation, excessive sweating, staining.
Eyes: itching, burning sensation, watering, difficult or blurred vision, narrowed or widened pupils.
Digestive system: burning sensation in mouth and throat, excessive salivation, nausea, vomiting, abdominal pain, diarrhoea.
Nervous system: headaches, dizziness, confusion, restlessness, muscle twitching, staggering gait, slurred speech, fits, unconsciousness.
Respiratory system: cough, chest pain and tightness, difficulty with breathing, wheezing.

It is important to obtain additional information:

- Has the patient been working with a pesticide? Did contamination occur?
- Precisely which product was used? How much was ingested?
- How long ago?

An effort should be made to obtain evidence from pesticide containers or spray equipment; the labels on containers should be read and retained.

If pesticide poisoning is suspected, first aid must be given immediately and medicaladviceandhelpmustbesoughtattheearliestopportunity.Ifpos

First-aid treatment

If breathing has stopped: Give artificial respiration. If no insecticide has been swallowed, mouth-to-mouth resuscitation may be given. Pull the patient's chin up and til the head back with one hand to keep the airway clear. Place the other hand on the patient's fore head, with the thumb and index finger toward the nose. Pinch together the patient's no strils with the thumb and index finger to prevent air from escaping. Take a deep breath, then form a tight seal with your mouth over and around the patient's mouth (Fig. 10.14). Blow four quick, full breaths in first without allowing the lungs to deflatefully. Watch the patient's chest while inflating the lungs. If adequate respiration is taking place, the chest should rise and fall. Remove your mouth and allow the patient to breathe out (Fig. 10.15). Take another deep breath, form a tight seal around the patient's mouth, and blow into the mouth again. Repeat this procedure 10–12 times a minute (once every five seconds).

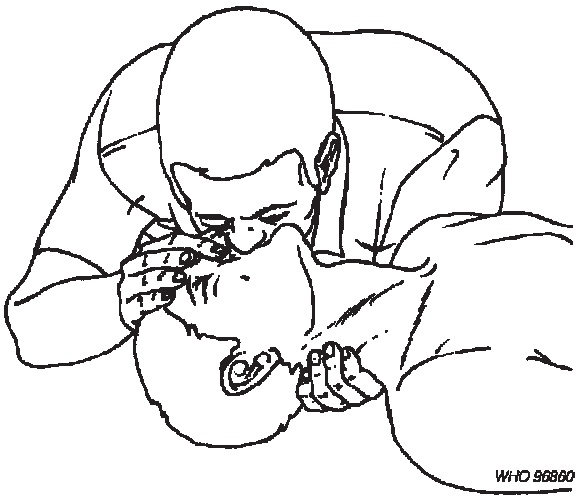

Fig. 10.14
Mouth-to-mouth resuscitation. Take a deep breath, then form a tight seal with your mouth over and around the patient's mouth (© WHO).

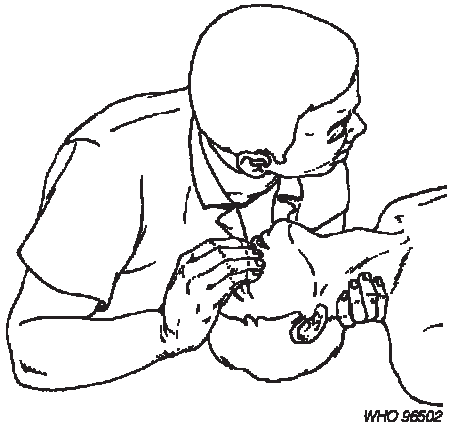

Fig. 10.15
Mouth-to-mouth resuscitation. Remove your mouth and allow the patient to breathe out (© WHO).

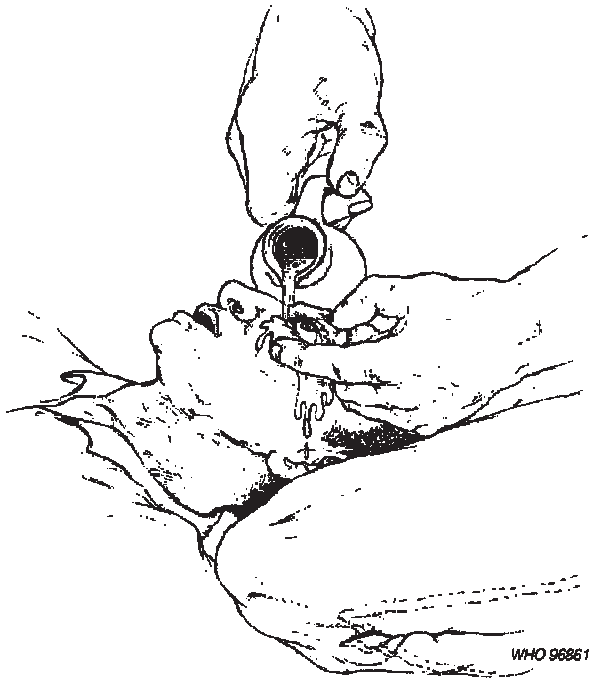

Fig. 10.16
Wash pesticide splashes from the eyes with clean water for at least five minutes (adapted from 3).

Artificial respiration should be continued for as long as possible if there is still a pulse. If insecticide has been swallowed, another form of artificial ventilation should be used.

If there is insecticide on the skin or in the eyes: Rinse the eyes with large quantities of clean water for at least five minutes (Fig. 10.16). Remove contami-nated clothing from the patient and remove the patient from the contaminated area (Fig.10.17).

Wash the body completely for at least 10 minutes, using soap if possible. If no water is available, wipe the skin gently with cloths or paper to soak up the pesticide. Avoid harsh rubbing or scrubbing.

Vomiting

Do not induce vomiting unless the patient has swallowed pesticide that is known to be highly toxic, and medical help is not expected soon. Never induce vomiting if the patient has swallowed oil spray or products diluted in diesel or kerosene, because of the possibility of inhalation of the vomited material, which would be more dangerous than the intestinal poisoning. The product label should indicate whether the pesticide is highly toxic(skull-and-cross bonessigns). Vomiting should be induced only if the patient is conscious. If necessary, sit or stand the person up and tickle the back of the throat with a finger. Whether vomiting occurs or not, give the patient a drink comprising three tablespoonfuls of activated charcoal in half a glass of water. Repeat until medical help arrives.

Caring for the patient

Make the patient lie down and rest because poisoning with organophosphorus and carbamate compoundsis made worse by movement. Place the patient on herorhis side with the head lower than the body. If the patient is unconscious, pull the chin forward and the head back to ensure a clear airway(Fig.10.18).Cover the patient with a blanket if he or she feels cold, and cool the patient by sponging with cold water if excessive sweating occurs. If the patient vomits spontaneously, ensure that he or she does not inhale the vomit. In the event of convulsions, put padded material between the teeth to avoid injury.

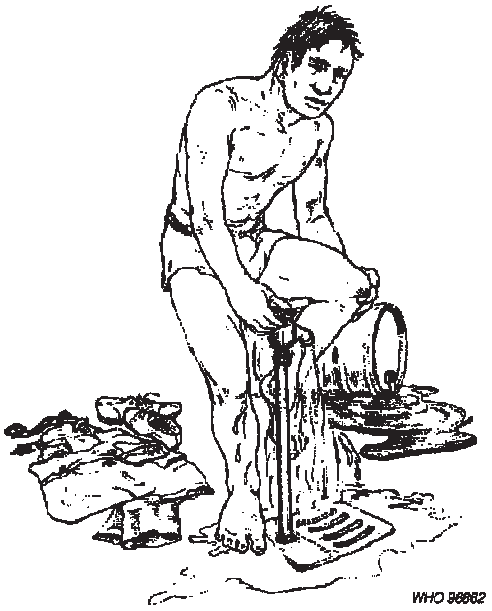

Fig. 10.17
Remove contaminated clothing immediately and wash the skin (adapted from *3*).

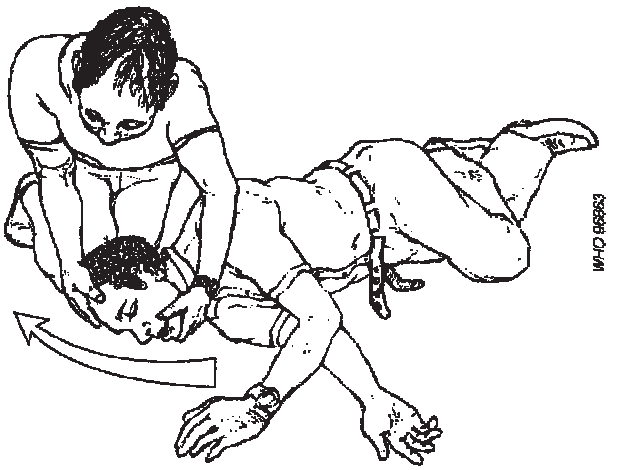

Fig. 10.18
Place an unconscious patient on her or his side and tilt the

Do not allow patients to smoke or drink alcohol. Do not give milk. Water can be given.

Further treatment

Patients requiring further medical treatment should be referred to the nearest medical facility. Detailed guidelines for the management of poisoning are being prepared by WHO (*6*). A list of poisons information centres is also available on request (*7*).

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Selected further reading

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Safe use of pesticides. Fourteenth report of the WHO Expert Committee on Vector Biology and Control. Geneva, World Health Organization, 1990 (WHO Technical Report Series, No. 813).

Source: **DIRECTORATE OF PLANT PROTECTION, QUARANTINE & STORAGE**
Link: http://ppqs.gov.in/divisions/integrated-pest-management/instruction-safe-use-pesticide