

FIRST-AID TREATMENT OF PESTICIDE POISONING

A. APPLICATORS, PESTICIDE REGISTRATION PERSONNEL:

- Subject A: May need to know the early symptoms of poisoning by pesticides to which they are exposed, and the local effects of pyrethroids.
- Subject B: Should know the general principles of treatment of a case of possible pesticide poisoning.
- Subject C: Should know how to treat splashes of pesticide on the skin and in the eye.

B. SUPERVISORS, SANTARIANS, AGRICULTURAL EXTENSION WORKERS, AND OTHER PERSONNEL TRAINED TO CARRY OUT FIRST AID.

- Subject A: Should know the symptoms and signs of poisoning by all the chemical groups to which local applicators may be exposed.
- Subject B: Should know the management and treatment of cases exposed to all the chemical groups studied in Subject A.
- Subject C: Should know how to treat splashes of pesticide on the skin and in the eye.

NOTES TO TRAINERS:

1. The modules contain only very brief notes on the resuscitation of patients who are unconscious, pulseless, and not breathing. This subject is important, but is best taught by practical demonstrations. Alternatively, new modules can be prepared with expert assistance, illustrated with a series of photographs showing the techniques.
2. Trainers may wish to prepare and distribute a list of local medical facilities or doctors to whom poisoning cases could be sent.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs
Number: 1 General

Main points:

Pesticides can affect the body in two ways: they can cause a local reaction where they touch exposed parts of the skin and the eye, or they can be absorbed into the body and cause a systemic reaction. Local reactions vary from direct irritation following a single contact to allergic reactions, usually after multiple contacts with the same compound. Pesticide poisoning is the appearance of systemic reactions.

**PESTICIDE POISONING CAN MIMIC THE SIGNS AND SYMPTOMS
OF OTHER COMMON DISEASES.**

IT IS IMPORTANT TO FIND OUT EXACTLY WHAT HAPPENED.

**PESTICIDE POISONING IS LIKELY ONLY WHEN THE PERSON
IS KNOWN TO HAVE HAD RECENT EXPOSURE TO A PESTICIDE.**

**THE PERSON MAY BE WEARING SOAKED CLOTHING OR BE KNOWN
TO HAVE SWALLOWED PESTICIDE, EITHER ACCIDENTALLY OR DELIBERATELY.**

ALL CASES SHOULD BE SEEN BY A DOCTOR AS SOON AS POSSIBLE.

**IT WILL BE IMPORTANT FOR THE DOCTOR TO KNOW
TO WHICH PESTICIDE THE PERSON HAS BEEN EXPOSED.**

**IF THE CONTAINER IS AVAILABLE, SEND IT WITH THE POISONED PERSON
FOR THE DOCTOR TO SEE.**

**OTHERWISE, COPY THE TRADE AND APPROVED NAMES OF THE PESTICIDE
FROM THE LABEL.**

**THE LABEL MAY INCLUDE IMPORTANT NOTES ON THE TREATMENT OF
POISONING, WHICH SHOULD BE FOLLOWED.**

Subsidiary point:

Always check first whether the poisoned person is breathing and has a pulse. If necessary, start resuscitation immediately, and do not waste time getting the information above. However, someone else should be asked to find the name of the pesticide, as it is important that antidotes should be used for some types of pesticide poisoning.

Suggested visual aid: Text, if needed.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs
Number: 2 Organophosphorous poisoning.

Main points:

Poisoning by organophosphorous insecticides is the commonest form of pesticide poisoning, and needs immediate treatment.

ONSET: ½ - 24 HOURS AFTER EXPOSURE

**AT FIRST: PERSON FEELS SICK,
COMPLAINS OF HEADACHE,
GENERAL WEAKNESS OR TIREDNESS.**

**THEN: PERSON BEGINS TO SWEAT AND SALIVATE (WATER AT
THE MOUTH), MAY VOMIT AND HAVE DIARRHOEA,
COMPLAINS OF STOMACH CRAMPS,
PUPILS BECOME VERY SMALL,
PERSON MAY MENTION BLURRED VISION,
MUSCLES TWITCH, AND HANDS SHAKE,
BREATHING BECOMES BUBBLY,
PERSON MAY HAVE A FIT AND BECOME UNCONSCIOUS.**

Subsidiary point:

All cases should be seen by a doctor as soon as possible.

Other information:

For first aid treatment, see modules VI B 1 and 2.

Suggested visual aid: Text, using words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs
Number: 3 Carbamate poisoning

Main points:

Carbamate insecticides have the same action as the organophosphorous compounds, but they are much faster in onset, and recovery is much faster. If a man is applying these compounds and does not take the proper precautions, he may feel so ill after a while that he has to stop work. Soon after exposure ends, he will start to feel better, unless he is still absorbing pesticide from contaminated skin or clothing.

ONSET: SOMETIMES AT WORK - 3 HOURS.

**AT FIRST: PERSON FEELS SICK AND MAY VOMIT,
COMPLAINS OF HEADACHE AND DIZZINESS,
TIREDNESS AND TIGHTNESS IN CHEST**

**THEN: PERSON MAY BEGIN TO SWEAT AND SALIVATE,
MAY MENTION BLURRED VISION,
MUSCLES MAY TWITCH.
RARELY, A PERSON MAY HAVE A FIT AND BECOME
UNCONSCIOUS.**

Subsidiary point:

If the first aider is sure that exposure has ceased, all contaminated clothing has been removed and the skin washed, and there is no recovery after one hour, the case must be seen by a doctor as soon as possible.

Other information:

For treatment, see module VI B 3.

Suggested visual aid: Text, using the words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs
Number: 4 Organochlorine poisoning.

Main points:

Poisoning by organochlorine pesticides is uncommon, and most of the more hazardous compounds have been withdrawn from the market for some years. Organochlorine poisoning is unlikely to occur from any exposure to DDT. Signs and symptoms of poisoning are due to excitation of the nervous system.

AT FIRST: PERSON COMPLAINS OF HEADACHE AND DIZZINESS, THE PERSON MAY APPEAR VERY WORRIED AND MAY BECOME EXCITED.

**THEN: PERSON MAY VOMIT,
SHOW WEAKNESS IN ARMS AND LEGS,
HANDS MAY SHAKE,
PERSON MAY BECOME DISORIENTED IN TIME AND SPACE.
FITS MAY FOLLOW.**

Other information:

For treatment, see module VI B 4.

Suggested visual aid: Text, using the words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs
Number: 5 Pyrethroid insecticides

Main points:

Although pyrethroids have been used for many years, there have been few reports of systemic poisoning by these compounds. This is because, although they are absorbed as other pesticides, they are very quickly broken down to harmless products in the body after absorption. However, they do have a

LOCAL REACTION.

**WITHIN HOURS OF FIRST EXPOSURE,
PYRETHROID COMPOUNDS MAY CAUSE TINGLING ON EXPOSED SKIN,
ESPECIALLY AROUND THE MOUTH AND NOSE.**

THE TINGLING IS PERSISTENT AND UNCOMFORTABLE, BUT NOT PAINFUL.

**THERE IS NO MARK OF REDNESS OR IRRITATION ON THE SKIN
WHERE THE TINGLING OCCURS.**

**APART FROM WASHING THE AFFECTED SKIN WITH SOAP AND COLD WATER,
THERE IS NO TREATMENT THAT WILL MAKE ANY DIFFERENCE.**

**THE TINGLING WILL DISAPPEAR OF ITS OWN ACCORD
WITHIN 24 HOURS AFTER THOROUGH WASHING.**

Other information:

There is no separate treatment module for pyrethroid compounds.

Suggested visual aid: Text, using words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs; treatment
Number: 6 Poisoning by rodenticides

Main points:

- 1. ANTICOAGULANT RODENTICIDES: ONSET: USUALLY SLOW.**
THERE ARE SIGNS THAT THE BLOOD WILL NOT CLOT SUCH AS EASY BRUISING AND PROLONGED BLEEDING FROM MINOR INJURIES, OR PAINFUL SWELLING OF A LARGE JOINT AFTER NO APPARENT INJURY.

TREATMENT: IF THE PERSON HAS BEEN POISONED BY MOUTH, INDUCE VOMITING. THE PERSON NEEDS TO BE SEEN BY A DOCTOR AS A BLOOD TEST IS NECESSARY FOR DIAGNOSIS. THE DOCTOR CAN ALSO GIVE A SPECIFIC ANTIDOTE, VITAMIN K.
- 2. CALCIFEROL DERIVATIVES: ONSET: USUALLY SLOW.**
LOSS OF APPETITE, FEELING SICK WITH PAIN IN THE ABDOMEN, HEADACHES IN THE BACK OF THE HEAD AND SENSITIVITY OF THE SCALP; LATER, MENTAL CONFUSION AND LOSS OF MEMORY

TREATMENT: IF THE PERSON HAS BEEN POISONED BY MOUTH, INDUCE VOMITING. THE PERSON HAS TO BE SEEN BY A DOCTOR, WHO WILL NEED TO MAKE TESTS TO CONFIRM THE DIAGNOSIS.
- 3. ALL OTHER RODENTICIDES: EXCEPT FOR ZINC PHOSPHIDE, IF THE PERSON HAS BEEN POISONED BY MOUTH, INDUCE VOMITING.**
MEDICAL TREATMENT IS NEEDED FOR ALL CASES.
ZINC PHOSPHIDE IS CORROSIVE, AND ALL CASES MUST BE SEEN BY A DOCTOR.

Suggested visual aid: Text showing treatment.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs: treatment
Number: 7 Poisoning by paraquat and diquat

Main points:

Paraquat and diquat cause little trouble when used according to the formulators' directions. Repeated use without skin or face protection may cause malformation of the fingernails and nosebleeds. These will disappear slowly after proper precautions are taken in use. However, if these compounds are accidentally or deliberately drunk, they are very dangerous.

ONSET: IMMEDIATE WITH BURNING SENSATION IN THE MOUTH AND THROAT.

FOLLOWED BY: NAUSEA AND VOMITING, PAIN IN THE STOMACH

LATER: TIGHTNESS IN CHEST, BUBBLY BREATHING.

**TREATMENT: VOMITING SHOULD BE INDUCED.
TAKE THE PERSON TO HOSPITAL IMMEDIATELY.
THERE IS NO SPECIFIC ANTIDOTE.**

**IF THERE IS LIKELY TO BE ANY DELAY
IN GETTING THE PATIENT TO HOSPITAL,
FIND SOME UNCONTAMINATED FINE EARTH OR CLAY, MAKE A WATERY MIX
WITH IT, AND GIVE AS MUCH AS POSSIBLE TO THE PERSON TO DRINK.
ACTIVATED CARBON SHOULD ALSO BE GIVEN IF AVAILABLE.**

Subsidiary point:

Both of these compounds are highly toxic if drunk, but paraquat causes the most deaths. This is because lung damage occurs after a week or so, even if the person seems to be recovering from the first wave of symptoms. Once lung damage has occurred, it is very difficult to treat, and accounts for the high mortality among these cases some weeks after ingestion has taken place.

Suggested visual aid: Text, using words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: A Symptoms and signs; treatment
Number: 8 Pentachlorophenol and related compounds

Main points:

ONSET: RAPID

**AT FIRST: MENTAL AND PHYSICAL FATIGUE,
HEADACHE AND DISORIENTATION,
LOSS OF APPETITE,
FEELING OF SICKNESS AND VOMITING,
FEVER AND SWEATING.**

**LATER: HIGH FEVER AND PROFUSE SWEATING,
SOME COMPOUNDS CAUSE FITS
(NOT PENTACHLOROPHENOL)
DEATH IS DUE TO HEART FAILURE.**

**TREATMENT: THERE IS NO SPECIFIC ANTIDOTE
KEEP THE PERSON COOL WITH DAMP CLOTHS,
AND TAKE TO HOSPITAL AS SOON AS POSSIBLE.**

Suggested visual aid: Text, using words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: B Treatment
Number: 1 General principles

Main points:

IF THE FIRST AIDER KNOWS TO WHAT CHEMICAL TYPE THE PESTICIDE BELONGS, TREATMENT CAN BE STARTED FOR SOME TYPES OF POISONING. OTHERWISE THE GENERAL RULES FOR THE TREATMENT OF THE SYMPTOMS AND SIGNS SHOULD BE APPLIED.

CHECK FIRST FOR RESPIRATION AND PULSE.

IF EITHER IS ABSENT, START RESUSCITATION.

IF PERSON IS UNCONSCIOUS, MAKE SURE AIRWAY IS CLEAR BY PULLING THE CHIN UPWARDS AND BACKWARDS. REMOVE ANY FALSE TEETH.

LIE PERSON ON SIDE OR $\frac{3}{4}$ FRONT DOWNWARDS, WITH HEAD TURNED TO ONE SIDE. IF PERSON IS TO BE TRANSPORTED, USE THIS POSTURE IN ORDER TO PREVENT VOMIT ENTERING THE LUNGS. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PATIENT.

PREVENT FURTHER EXPOSURE TO THE PESTICIDE.

IMMEDIATELY REMOVE ANY CONTAMINATED CLOTHING AND WASH THE SKIN WITH SOAP AND WATER.

IF A PERSON HAS TAKEN ANY PESTICIDE BY MOUTH (EXCEPT ZINC PHOSPHIDE), AND IS CONSCIOUS, VOMITING CAN BE INDUCED, BUT READ THE LABEL FIRST.

IF VOMITING IS PERMITTED, TICKLE THE BACK OF THE THROAT WITH THE TIP OF A FINGER.

DO NOT USE A SALT SOLUTION OR ANY OTHER EMETIC. MAKE SURE THAT THE PERSON IS SEEN BY A DOCTOR AS SOON AS POSSIBLE.

IF A PERSON HAS HAD ONLY SLIGHT SYMPTOMS, AND HAS NOT BEEN SEEN BY A DOCTOR, DO NOT LEAVE THE PERSON UNTIL HE/SHE HAS APPEARED NORMAL FOR 2-3 HOURS.

SYMPTOMS AND SIGNS OF POISONING BY SOME PESTICIDES CAN REAPPEAR SUDDENLY IN THE FIRST 24 HOURS.

Suggested visual aid: Text, using part of the text above with emphasis on subjects underlined.

Section: VI First aid treatment of pesticide poisoning
Subject: B Treatment
Number: 2 Poisoning by organophosphorous compounds

Main points:

There are two antidotes for organophosphorous poisoning. One of these must be given by a doctor. The other, **ATROPINE**, should be given immediately upon diagnosis by a first aider.

START TREATMENT IMMEDIATELY IN THE FOLLOWING SEQUENCE:

1. CHECK RESPIRATION AND SEE THAT AIRWAY IS CLEAR.
2. GIVE ARTIFICIAL RESPIRATION, IF NEEDED.
3. CHECK NEED FOR DECONTAMINATION TO STOP EXPOSURE, AND REMOVE CLOTHING AND WASH AS NECESSARY.
4. GIVE ATROPINE TWO MILLIGRAMS BY A SYRINGE, OR BY AUTO-INJECTOR INTO THE THIGH OR UPPER ARM.
5. REPEAT EVERY 10 MINUTES UNTIL:
 - THE FACE FLUSHES, OR
 - THE TONGUE BECOMES DRY, OR
 - THE PUPIL OF THE EYE DILATES, OR
 - THE PULSE BEATS AT MORE THAN 140 BEATS PER MINUTE.
6. TRANSPORT TO MEDICAL ATTENTION QUICKLY, BUT ONLY AFTER THE ABOVE TREATMENT HAS BEEN STARTED.
7. DURING TRANSPORTATION, CONTINUE TREATMENT, OR CONTINUE TO OBSERVE THE PERSON AND GIVE MORE ATROPINE IF CONDITION WORSENS. DO NOT GIVE ANY MORPHINE OR BARBITURATES. IF THE PERSON HAS A FIT, GENTLE RESTRAINT SHOULD BE USED.

ENLIST OTHERS TO HELP IF NECESSARY.

Subsidiary point:

When organophosphorous insecticides are being used on a large scale, suitable supplies of atropine should be readily available in the field.

Suggested visual aid: Text, using words in capital letters above.

Section: VI First aid treatment of pesticide poisoning
Subject: B Treatment
Number: 3 Poisoning by carbamate compounds

Main points:

Carbamate poisoning must be clearly distinguished from organophosphorous poisoning (modules VI A 2 and VI B 2). The latter can have a fatal outcome if medical treatment is not prompt, while fatalities are very rare with carbamate poisoning. It is important that the first aider should know the type of compounds that have been in use on the day when the poisoning occurs.

RECOVERY IS RAPID IN CARBAMATE POISONING.

**AFTER EXPOSURE HAS BEEN TERMINATED
BY REMOVING CONTAMINATED CLOTHING AND WASHING THE SKIN,
OBSERVATION MAY BE THE ONLY TREATMENT REQUIRED.**

**IF THE PATIENT IS COLLAPSED,
A SINGLE DOSE OF ATROPINE, 2 MILLIGRAMS, SHOULD BE GIVEN
BY A SYRINGE OR BY AUTO-INJECTION INTO THE THIGH OR UPPER ARM.**

THIS DOSAGE OF ATROPINE CANNOT HARM THE PERSON.

Subsidiary point:

In rare cases of carbamate poisoning, if symptoms recur after a single dose of atropine, more atropine may be needed. The question must then arise whether exposure has in fact ceased or some other agent or medical condition is responsible for the patient's symptoms.

Suggested visual aid : Text, using the words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: B Treatment
Number: 4 Poisoning by organochlorine compounds

Main points:

THERE IS NO SPECIFIC ANTIDOTE FOR ORGANOCHLORINE POISONING.

**TREATMENT SHOULD FIRST BE DIRECTED AT PREVENTING
FURTHER EXPOSURE, BY REMOVING CLOTHING
AND WASHING THE SKIN WITH SOAP AND WATER,
OR BY INDUCING VOMITING IF THE COMPOUND HAS BEEN TAKEN BY MOUTH.**

**BREATHING MUST BE WATCHED AND MAINTAINED IF IT FAILS
BY ARTIFICIAL RESPIRATION.**

**THE PERSON MUST BE KEPT AS QUIET AS POSSIBLE.
EXCITABILITY MUST BE CONTROLLED, AND THE PERSON MAY BE GIVEN
A NORMAL DOSE OF A BARBITURATE OR A TRANQUILLIZER, IF CONSCIOUS.
PATIENTS HAVING FITS MUST BE GENTLY RESTRAINED.**

**OBSERVATION MUST BE CONTINUED
UNTIL THE PERSON HAS BEEN TRANSPORTED TO MEDICAL CARE.**

Suggested visual aid: Text, using words in capitals above.

Section: VI First aid treatment of pesticide poisoning
Subject: C Local treatment of splashes of pesticides
Number: 1 In the eye.

Main points:

Pesticides splashed into the eye are rapidly absorbed. The eye may also be directly irritated by the pesticide or by other products in the formulation.

**THE ONLY FIRST AID TREATMENT FOR ANY CHEMICAL SPLASH IN THE EYE
IS PLENTY OF CLEAN WATER.**

**THE EYE MUST BE WASHED OUT IMMEDIATELY,
AND THE WASHING MUST BE CONTINUED FOR AT LEAST 10 MINUTES.**

**THE WATER CAN BE APPLIED FROM AN EYE-WASH BOTTLE.
IF THIS IS NOT AVAILABLE, A TEAPOT CAN BE USED.
THE WATER MAY BE COLD OR TEPID BUT NOT HOT.**

**NO OTHER CHEMICALS, USED AS ANTIDOTES OR NEUTRALIZERS, SHOULD EVER
BE ADDED TO THE WATER.**

**THE EYELIDS MAY HAVE TO BE HELD OPEN GENTLY DURING WASHING.
THE FIRST AIDER MAY NEED AN ASSISTANT TO DO THIS.**

**ALTERNATIVELY, THE PERSON SPLASHED MAY HAVE TO HOLD HIS EYE
OPEN UNDER A RUNNING TAP.**

Subsidiary points:

Organophosphorous compounds splashed into the eye can cause blurring of vision which may last several hours.

Suggested visual aid: Photograph showing an eye being washed out. A demonstration is often useful.

Section: VI First aid treatment of pesticide poisoning
Subject: C Local treatment of splashes of pesticides
Number: 2 On the skin

Main points:

Most pesticides are readily absorbed through the skin, either through soaked clothing or directly splashed on to the skin. Exposure to any pesticide should always be kept to a minimum, even though they may present only a very slight hazard.

ANY SOAKED CLOTHING SHOULD BE REMOVED AT ONCE.

SPLASHES ON THE SKIN SHOULD BE WASHED OFF WITH SOAP AND CLEAN WATER.

NO OTHER CHEMICALS, USED AS ANTIDOTES OR NEUTRALIZERS, SHOULD EVER BE ADDED TO THE WATER.

If the splash has been large, the wash water from the first wash should be disposed of in the same way as other contaminated wash waters.

IF A LARGE AREA OF SKIN HAS BEEN CONTAMINATED, THE WORKER SHOULD SHOWER.

IF THE PESTICIDE FORMULATION WAS OF MODERATE OR GREATER HAZARD, THE WORKER SHOULD NOT RISK ANY FURTHER EXPOSURE TO THE PESTICIDE FOR THAT WORKING DAY, AND SHOULD BE ADVISED TO REPORT ANY SICKNESS TO A MEDICAL CENTRE.

Subsidiary point:

The rules above apply to any splashes of industrial chemicals on the skin.

Suggested visual aid: Photograph of worker washing arm or other part likely to be splashed.