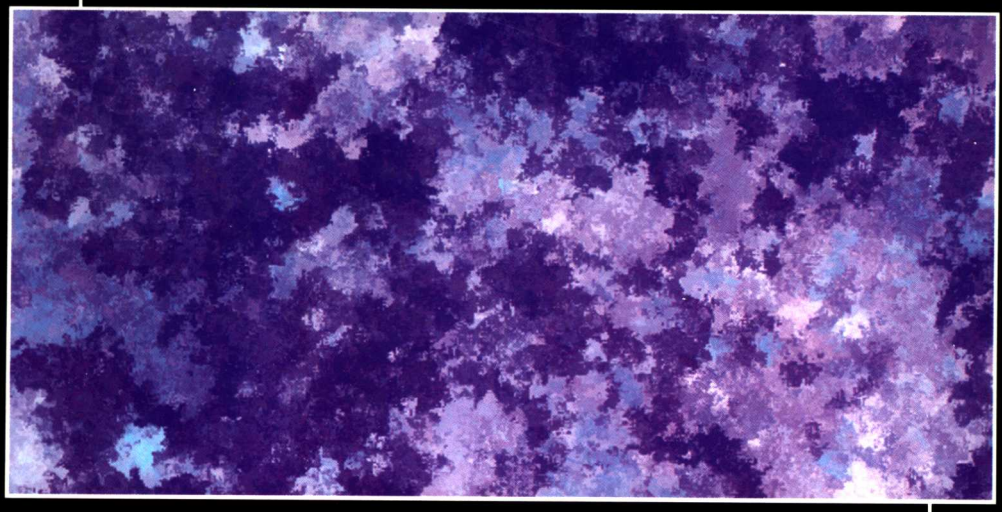
INTERNATIONAL PROGRAMME
ON CHEMICAL SAFETY



MANAGEMENT OF POISONING

A handbook for health care workers

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the International Labour Organisation

Preface

This handbook has two main aims: to give people living in rural places, far from medical help, information on what to do when someone is poisoned; and to suggest ways of preventing poisoning in the community.

It is written for people with little or no medical training who are likely to be the first to come into contact with someone who has been poisoned, such as community health workers (CHWs), first-aiders, or professionals in other sectors working in rural communities. Some information has also been included for health workers with a knowledge of clinical medicine and diagnostic procedures, working in rural health stations and health centres where there may be some medical equipment and medicines available.

The handbook is meant to be used as a practical reference book in an emergency. It can also be used by people who teach community health workers and others practical skills, such as mouth-to-mouth respiration and heart massage, that can only be learnt by practising under trained supervision. It may also be useful as a teaching aid for student doctors, nurses, and paramedical personnel.

The book will be most useful if it is translated into local languages and adapted to local conditions, which may vary in terms of: the tasks authorized for CHWs, such as giving injections; the functions assigned to CHWs; the functions assigned to local health centres and doctors at rural hospitals; the availability of medicines; and the particular problems prevalent in the area.

Only a small amount of information is given about chronic poisoning, which is often caused by using chemicals at work. Readers who wish to know more about chronic poisoning should find a book that deals with the health of people at work (occupational health).

The intended readership

Community health workers. CHWs can generally read, write, and do simple arithmetic, and have basic training in:

— first aid,
— taking body temperature,

— counting the pulse,
— dispensing medicines.

CHWs may also be trained to give intramuscular and subcutaneous injections.

First-aiders. First-aiders are trained to rescue people from danger, and to give immediate help to the victims of accidents until a trained health care worker can take charge. People who are likely to be the first on the scene of an accident, such as workers in factories or offices, firefighters, or policemen, are often trained in first aid.

Professionals with no medical training. Many highly educated professional workers, such as teachers, agricultural advisors, pharmacists, scientists and technologists, know about the use and effects of chemicals. In communities where there are no doctors, they may be the only people who know about chemicals and poisons. They may be first on the scene of an accident or they may be called upon to help someone who is thought to have been poisoned. They need to know the first aid for poisoning due to pesticides, medicines, household products, and other substances. They should also be able to advise people on how to prevent poisoning.

In some countries professional people with no medical training may attend courses run by poisons centres to learn basic first aid skills.

Nurses, medical students and paramedical staff. The book may be useful as a handbook and training manual.

Doctors. Some information has been included specifically for doctors working in rural health stations and health centres where there may be some medical equipment and medicines available. This information has been separated from the main text. It does not include details of medical treatment that can be given only in a hospital.

Acknowledgements

This handbook has been prepared on the recommendation of a group of experts convened by the International Programme on Chemical Safety (IPCS)[1] in February 1987. A draft text was prepared by Dr J.A. Henry and Ms H.M. Wiseman, and commented on by a number of experts, in particular Dr E. Fogel de Korc (Montevideo, Uruguay), Dr G.R. Gardiner, Dr J. Jackson and Mr W. Tardoir (Brussels, Belgium), and colleagues from UNEP's International Register of Potentially Toxic Chemicals (IRPTC) and the Occupational Safety and Health Branch of ILO. An editorial group, convened by the IPCS to review the text, consisted of Dr J.-C. Berger (Luxembourg), Dr N. Besbelli (Ankara, Turkey), Professor M. Ellenhorn (Los Angeles, USA), Professor B. Fahim (Cairo, Egypt), Dr Sming Kaojarern (Bangkok, Thailand), Professor A. Furtado Rahde (Porto Alegre, Brazil), Dr N.N. Sabapathy (Fernhurst, England), Professor A.N.P. van Heijst (Utrecht, Netherlands), and Dr A. David (ILO). The text was tested at an IPCS Workshop, held in Harare, Zimbabwe, from 28 January to 1 February 1991, and subsequently in two training workshops in Zimbabwe. Parts of the text were also reviewed at an IPCS Workshop held in Dakar, Senegal, 24–27 January 1995. For the IPCS, Dr J. Pronczuk de Garbino provided the editorial inputs and Dr J.A. Haines coordinated the work.

The first aid manual of the Joint Voluntary Aid Societies in the United Kingdom, and publications of the Global Crop Protection Federation, were particularly useful as source materials for the first draft. The United Kingdom Department of Health, through its financial support to the IPCS, provided the resources for the drafting of the text and for the editorial group to meet. The illustrations were prepared by Picthall & Gunzi, London.

[1] The IPCS is a cooperative venture of the World Health Organization (WHO), the International Labour Organisation (ILO) and the United Nations Environment Programme (UNEP). WHO is the executing agency for the programme, which aims to provide the internationally evaluated scientific data basis for countries to develop their own chemical safety measures, and to strengthen national capabilities to prevent and treat harmful effects of chemicals and to manage chemical emergencies.

Introduction

How to use this book

This book is in two parts. Part 1 gives general information on poisons and poisonings, how poisonings happen and how you can prevent them. It also gives guidance on how to deal with poisoning emergencies. Part 2 gives specific information on the effects of poisoning with various pesticides, medicines, household chemical products, and poisonous plants and animals, and guidance on what to do when you think someone has been poisoned. A word list and an index are also provided.

To be ready for emergencies

1. Keep a first aid kit, like the one recommended in Chapter 10, in the house, in the community, or at work.
2. Study this book before it is needed, especially Part 1, Chapters 4–9, which tell you what to do when someone is poisoned.
3. Practise some of the first aid, so that you know what to do in an emergency.

To look up a chemical, plant or animal

Use Part 2 when you see someone who is poisoned. Look in the index at the end of the book to find the medicine, chemical, plant or animal you think may have caused the poisoning.

Information for doctors

In Chapter 5, "First aid", and Chapter 9, "How to look after a poisoned patient outside hospital", and in Part 2, parts of the text are separated off by horizontal lines. This information is meant for doctors.

If you do not understand the meaning of some of the words in this book

Look for the word in the word list on p. 295 (medical words used in the boxes of information for doctors are not explained in the word list).

Poisons centres and poison control programmes

In many countries there are poisons centres which give advice about the treatment and prevention of poisoning. They have information about medicines, pesticides, poisonous plants, venomous animals, and household products, and chemicals used at work. The doctor in the poisons centre can tell you what to do when someone has swallowed or breathed in a chemical, spilt it on the skin, or splashed it in the eyes.

Most poisons centres can be contacted at any time of day or night by telephone or, in some countries, by radio. They may have supplies of special antidotes (for example snake or spider antivenoms). Some poisons centres have hospital wards where they can treat poisoned patients.

In many countries, other organizations work with poisons centres in a national poisons control programme to improve the treatment and prevention of poisoning. These organizations include:

— hospitals and other places where poisoned patients are treated;
— organizations that collect information on poisoning;
— organizations that make or use substances which might cause poisoning;
— government authorities that control the use of chemicals within the country;
— universities and colleges where doctors and other people are taught about poisoning.

There is space in the back of this book where you can write the addresses of organizations in your country that might help you deal with cases of poisoning or give advice on how to prevent poisoning.

Contents

PART 1

General information on poisons and poisoning

CHAPTER 1

Poisons and poisoning

Objectives

After studying this chapter you should:

1. Know what a poison is.
2. Understand what is meant by local poisoning and systemic poisoning. Understand all the ways poison can get into the body, and be able to recognize circumstances where poisoning might happen.
3. Understand what is meant by acute poisoning and chronic poisoning, and be able to explain to people that continued exposure to small amounts of poison for several days, weeks or months can be harmful, even if they do not immediately feel unwell.
4. Be able to explain to people that taking too much medicine may be dangerous.
5. Be able to explain to people why it is important to take care when handling dangerous chemicals and why it is important to wash chemicals off the skin as soon as possible.
6. Be able to explain how petroleum distillates, such as kerosene, cause harm if they are swallowed.
7. Understand why people who have swallowed poison may be helped if they are made to vomit or given activated charcoal.
8. Recognize that people are more likely to be harmed by poison if they are very old, very young or in poor health.
9. Know why a person who has been exposed to poison may appear to be unaffected by it, and why it is often a good plan to watch a person for 12–24 hours after they have been exposed to poison, even if they seem well.

What is a poison?

A poison is any substance that causes harm if it gets into the body. Harm can be mild (for example, headache or nausea) or severe (for example, fits or very high fever), and severely poisoned people may die.

Almost any chemical can be a poison if there is enough in the body. Some chemicals are poisonous in very small amounts (for example, a spoonful by mouth or a tiny amount injected by a snakebite); others are only poisonous if a large amount is taken (several cupfuls, for example).

The amount of a chemical substance that gets into the body at one time is called the dose. A dose that causes poisoning is a poisonous dose or toxic dose. The smallest amount that causes harm is the threshold dose. If the amount of a chemical substance that gets into the body is less than the threshold dose, the chemical will not cause poisoning and may even have good effects. For example, medicines have good effects if people take the right doses, but some can be poisonous if people take too much.

Exposure to a poison

When people are in contact with a poison they are said to be exposed to it. The effect of exposure depends partly on how long the contact lasts and how much poison gets into the body, and partly on how much poison the body can get rid of during this time.

Exposure may happen only once or many times.

Acute exposure is a single contact that lasts for seconds, minutes or hours, or several exposures over about a day or less.

Chronic exposure is contact that lasts for many days, months or years. It may be continuous or broken by periods when there is no contact. Exposure that happens only at work, for example, is not continuous.

Chronic exposure to small amounts of poison may not cause any signs or symptoms of poisoning at first. It may be many days or months before there is enough chemical inside the body to cause poisoning. For example, a person may use pesticide every day. Each day the person is exposed to only a small amount of pesticide, but the amount of pesticide in the body gradually builds up, until eventually, after many days, it adds up to a poisonous dose. Only then does the person begin to feel unwell.

How poison gets into the body

The way poison gets into the body is called the *route of exposure* or the *route of absorption*. The amount of poison that gets into the blood during a given time depends on the route.

Through the mouth by swallowing (ingestion)

Most poisoning happens this way. Small children often swallow poison accidentally, and adults who want to poison themselves may swallow poison. If

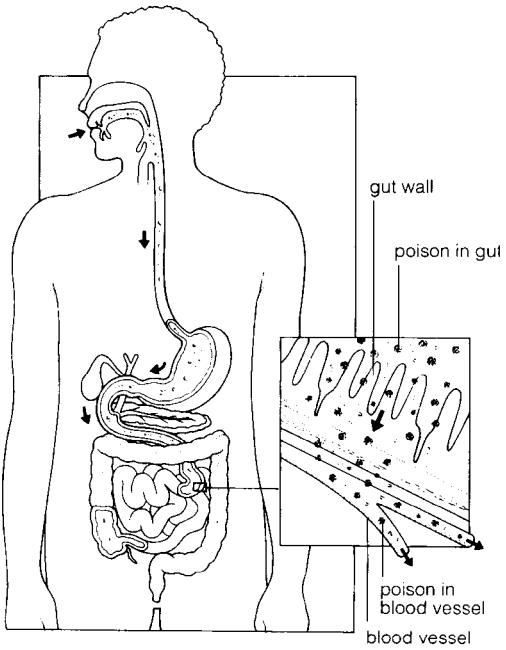

Fig. 1. Poisons that are swallowed can pass from the gut to the blood vessels.

people eat, drink or smoke after they have been handling poisons, without first washing their hands, they may accidentally swallow some of the poison. This is a common cause of pesticide poisoning.

When poisons are swallowed they go to the stomach (Fig. 1). Some poisons can pass through the gut walls and into the blood vessels. The longer a poison stays in the gut the more will get into the blood and the worse the poisoning will be.

If a person vomits soon after swallowing a poison, it may be expelled from the body before a poisonous dose gets into the blood. So, if the person does not vomit straight away, it is sometimes useful to make the person vomit. There are two other ways to stop poisons passing from the gut into the blood: (1) give activated charcoal because this binds some poisons so that they cannot pass through the gut walls; or (2) give laxatives to make the poison move through the gut and out of the body more quickly. The circumstances when it is useful to make a patient vomit or to give activated charcoal or laxatives, and the circumstances when these procedures may be dangerous, are described in Chapter 9.

Poisons that do not pass through the gut walls do not get into the blood and so cannot affect other parts of the body. They move along the gut and leave the body in the faeces. For example, mercury metal cannot pass through the gut walls; if mercury from a thermometer is swallowed, it passes out of the body in the faeces and does not cause poisoning.

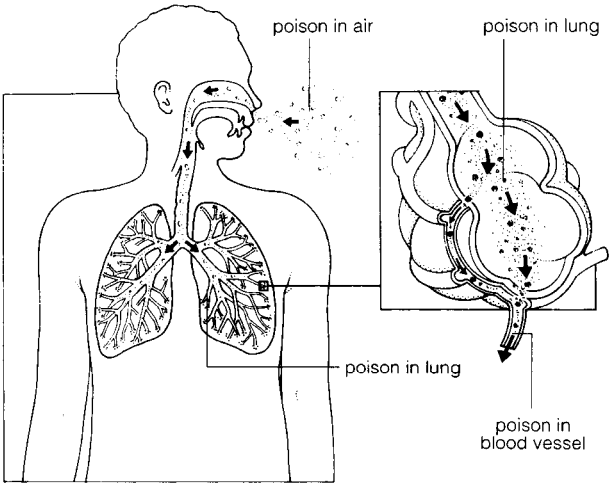

Fig. 2. Poisons that are breathed in pass very quickly from the lungs to the blood vessels.

Through the lungs by breathing into the mouth or nose (inhalation)

Poisons in the form of gas, vapour, dust, fumes, smoke or fine spray droplets may be breathed into the mouth and nose and go down the air passages into the lungs (Fig. 2). Only particles that are too small to be seen can pass into the lungs. Larger particles are trapped in the mouth, throat and nose and may be swallowed. A person may breathe in poison when working with a poisonous substance inside a building without fresh air, or when spraying pesticide without wearing adequate protection. Oil or gas heaters, cookers, and fires give off poisonous fumes which may reach dangerous concentrations if the smoke cannot get outside or if the room does not have a good supply of fresh air.

Poison that gets into the lungs passes into the blood vessels very quickly because the air passages in the lungs have thin walls and a good blood supply.

Through the skin by contact with liquids, sprays or mists

People working with chemicals such as pesticides may be poisoned if the chemical is sprayed or splashed onto the skin, or if they wear clothes soaked with chemical.

The skin is a barrier that protects the body from poisons. However, some poisons can pass through the skin (Fig. 3). They pass through warm, wet, sweaty skin more quickly than through cold, dry skin, and they pass through skin damaged by scratches or burns more quickly than through undamaged skin. A poison that damages the skin will pass through more quickly than one