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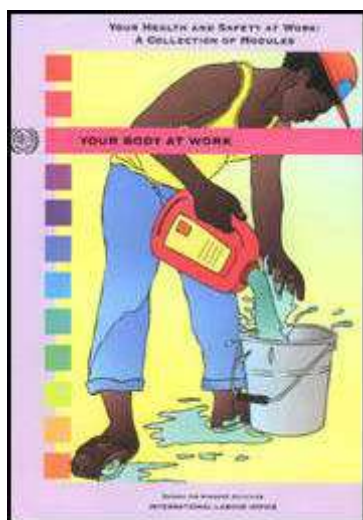
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Your Health and Safety at Work: A Collection of Modules - Your Body at Work (ILO, 1996, 40 p.)



*(introduction...)*



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## Your Health and Safety at Work: A Collection of Modules - Your Body at Work (ILO, 1996, 40 p.)



**Bureau for Workers' Activities**

**International Labour Office  
Geneva**

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A provisional edition was published in 1993

First edition 1996

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Roskam, E.

*Your body at work*

Geneva, International Labour Office, 1996

Included in: *Your health and safety at work: A collection of modules*

/Workers' education teaching aid/, /trainer's manual/, /occupational health/, /occupational safety/, /safety training/, learning element/. 13.04.2

ISBN 92-2-109438-3

ISBN 92-2-108014-5 (set)

*ILO Cataloguing in Publication Data*

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Designer/Enzo Fortarezza *Printed in Italy/ILO Turin Centre*

## **Preface**

Imperfect as is the world in which we live, some accidents are doubtless inevitable, but so many others need not occur. In the workplace, in particular, no occupational injuries must occur. If this vision belongs to an ideal world, as some would say, a more realistic aim would at least be to reduce drastically the number of occupational accidents. Such, at least, is the sole intention of the Bureau for Workers' Activities in proposing this collection of modules, specially produced for the use of trade unions in their educational activities organized around the area of occupational safety and health.

During the years of gestation which preceded the establishment of the ILO in 1919, the first two international conventions were adopted by the International Association for Labour Legislation in Berne in 1905: one prohibiting the use of white phosphorus in the production of matches, and another regulating night work by women. Since its creation in 1919, the ILO has adopted some 32 Conventions and 35 Recommendations concerning exclusively workers' health and safety, all laying down minimum standards. Immense effort and resolute purpose on the part of the ILO's constituents to protect workers' health and safety have borne fruit in the form of these standards, but the chasms still yawn wide between, in the first instance, their adoption and ratification, and, in the second, their ratification and implementation. It is to be hoped that this collection of 12 modules on health and safety will find its place in an overall international thrust to arrest the high incidence of occupational accidents and diseases. Targets must be set, health and safety practices systematically monitored, and labour inspection must be rendered more effective. If this collection comes close to satisfying these aims, then these modules would have abundantly served their purpose.

Pedagogically, all twelve modules are of equal importance. There is no established sequence to follow: a course could be organized using either a single module, several, or all. This approach

obeys the basic principle of modular teaching: that the materials could be adapted to the time available and the circumstances.

I particularly wish to thank the author of the collection, our colleague Ellen Roskam, as well as Alan Le Serve, formerly attached to the Bureau for Workers' Activities, under whose technical guidance the modules were produced. I also extend thanks to all the international trade union organizations and national centres that reviewed the provisional edition and field-tested it. I am pleased to announce that the French and Spanish editions are forthcoming. It is my wish that this modest effort will help to alleviate the human anguish and suffering caused by thoughtless accidents and sloppy workplace habits. Above all, these modules should help to draw the attention of all those responsible to the extent of the problem of occupational hazards and provide practical guidelines which they could apply.

*Giuseppe Querenghi*  
*Director*  
*ILO Bureau for Workers' Activities*

## Goal of the Module

This Module provides trainees with background information on how exposure to workplace hazards can affect a worker's body and therefore his or her health. Topics discussed are: how hazardous agents can enter the body; local, systemic, acute and chronic effects; and the role of the health and safety representative in creating a safe and healthy workplace.

## Objectives



At the end of this Module, trainees will be able to:

- (1) describe three ways in which hazardous agents can enter the body;
- (2) give examples of local, systemic, acute and chronic effects;
- (3) explain several methods of preventing hazardous agents from entering the body.

## I. Introduction

### How does the body fight hazards?

The human body has natural defence systems which help to protect you against many hazards (dangers). These defence systems also help the body to heal (repair) itself when it gets injured or sick. However, there are hazards - arising from bacteria, viruses, chemicals, dusts, vapours, noise, extreme temperatures, work processes, etc. - to which you may be exposed (which are around you) at work or in the general environment, that can break down (weaken) the body's defence systems.


### What kinds of hazards exist in the workplace?

Some common hazards that may be in your workplace include:

- **chemical hazards**, arising from liquids, solids, dusts, fumes, vapours, gases;
- **physical hazards**, such as noise, vibration, unguarded machinery, unsatisfactory lighting, radiation, extreme temperatures (hot or cold);
- **biological hazards**, from bacteria, viruses, infestations, infectious waste;
- **psychological hazards**, resulting from stress and strain;
- **non-application of ergonomic principles**, resulting in poorly designed machinery and tools or poorly designed work practices.

Since your body's defence systems cannot always win the fight against these hazards, it is

important for you to learn what hazards exist in your workplace and what controls are necessary to prevent exposures. Hazard awareness will help you when you work with your union and employer to eliminate hazards.

	<b>Points to remember</b>
<ol style="list-style-type: none"><li>1. Occupational exposure to hazards can break down your body's defence systems.</li><li>2. Occupational hazards need to be controlled for a workplace to be safe and healthful.</li><li>3. Some common workplace hazards are:<ul style="list-style-type: none"><li>• chemical hazards</li><li>• physical hazards</li><li>• biological hazards</li><li>• psychological hazards</li><li>• non-application of ergonomic principles</li></ul></li><li>4. It is important to learn about occupational hazards, including how exposure to such dangers can affect your health and how to protect yourself from exposure to such dangers in the workplace.</li></ol>	

## II. Routes of entry

### How do hazardous agents get into the body?

If you look at a diagram of the human body you can see that it is exposed to the outside world through a variety of surfaces. These include the skin, lungs, nose, mouth and the digestive, urinary, and genital tracts. Hazardous agents (e.g. chemicals and micro-organisms such as bacteria and viruses) can get into the body through any of these surfaces. The most common **routes of entry** are:

- (a) through the lungs (**inhalation**)
- (b) through the skin (**absorption**)
- (c) through the mouth (**ingestion**).

### A. Inhalation



**More hazardous agents get into your body by inhalation (by being breathed in) than by any other route.**

### **Your respiratory system filters the air you breathe**

Your body's respiratory system has very effective mechanisms for filtering out normal pollutants from the air you breathe. Filtering systems in the nose and mouth (for example, the hairs in the nose, the mucus in the mouth and lungs) prevent large foreign particles (like coarse dust) from travelling down into your lungs where they can have damaging effects. The hairs in your nose trap large dust particles. You can see how effective this natural filter is by blowing your nose after working in a dusty or smoke-filled environment.

### **Can particles get past these filtering mechanisms?**

Generally, large dust particles (including fibres) can be filtered out of the respiratory system. But small dust particles are difficult to eliminate and can reach the deepest parts of the lungs where they can cause serious local respiratory problems. (See section III of this Module for an explanation of local effects.)

When the lungs are exposed to high concentrations of dust, toxic vapours, cigarette smoke, etc. (high amounts of the pollutant in the air), the filtering mechanisms can become overloaded and damaged. Once they are damaged, various bacteria, viruses, etc. are more likely to grow in the lungs, causing infections such as pneumonia. That is why workers in dusty occupations (bauxite and coalminers, sugar factory and asbestos workers, flour mill workers, furniture makers, etc.) are known to be more susceptible (open) to tuberculosis, bronchitis and other respiratory diseases than workers in non-dusty occupations.

### **Can other forms of chemicals be inhaled as well?**

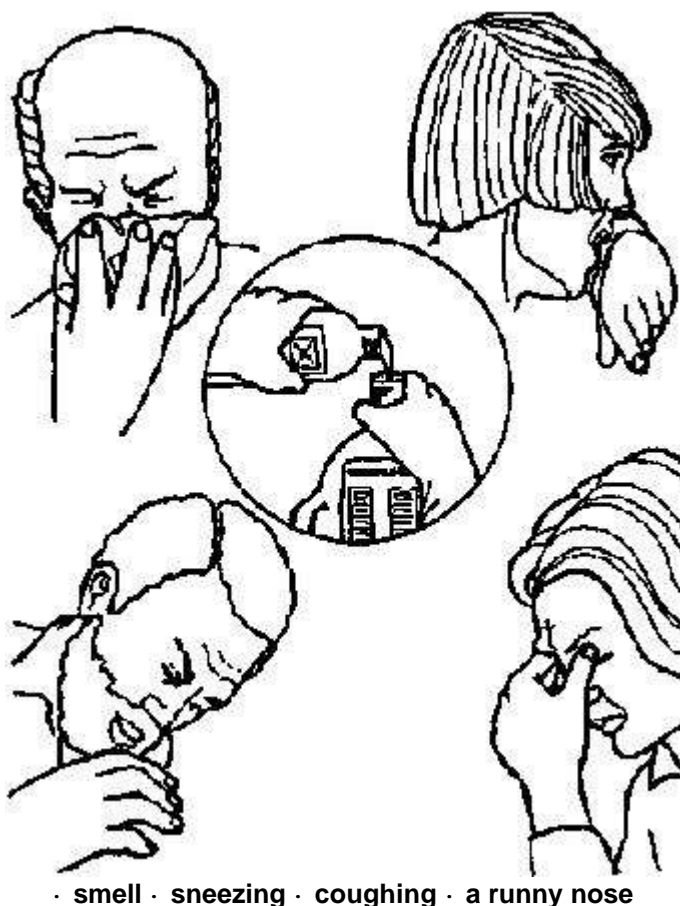
Other forms of chemicals can also enter the body through the respiratory system. Chemicals come in a range of forms: vapours, solids, liquids, dusts, gases (see the Module, *Chemicals in the workplace* for an explanation of each of these chemical forms) and you can inhale almost all of these. Some chemicals will have damaging local effects on the lungs, while others will be absorbed into the bloodstream and have potentially damaging effects on various **target organs**.

Target organs are those parts of the body that particular chemicals always affect. For example, lead affects the central nervous system (brain and spinal cord) but is stored in the bones where it

accumulates (increases) with further exposures. Therefore, the target organs for lead are both the central nervous system and the bones. Other target organs for different chemicals are the heart, lungs, kidneys and liver.

### How do you know whether you are being exposed to respiratory hazards at work?

Your body has several built-in mechanisms which can act as warning signals when hazards are present:



· smell · sneezing · coughing · a runny nose

These physical responses, or signals, will sometimes tell you there is a potential hazard present. In some cases these also will help you to remove a hazardous agent from your respiratory system. However, sometimes these signals will not warn you about hazards. For example, some chemicals have no odour so you cannot smell them. There are other chemicals that you can only smell when the concentration is well above so-called "safe levels" and already harming your health, and there are certain chemicals that you cannot smell after being around them for a while - your nose gets "accustomed" or used to them. Therefore, smell is not always a reliable warning signal.

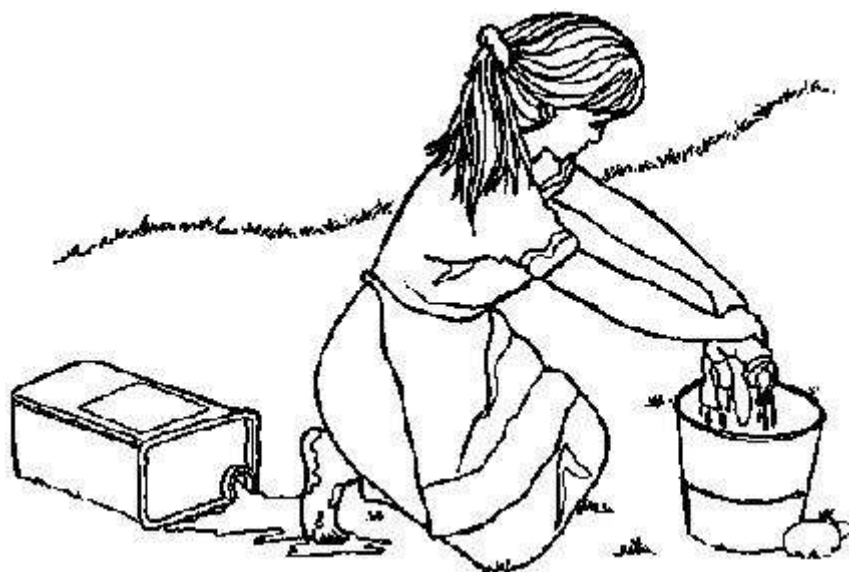
New workers and visitors are another potential signal to workplace hazards. They are "newly exposed" and can tell you if they have health problems **only** when they come into the workplace.



### Points to remember about inhalation

1. More hazardous agents get into your body by inhalation than by any other route of entry.
2. Although your body filters many of the normal pollutants from the air you breathe, it cannot eliminate every type of contaminant.
3. Small particles are difficult for the body to eliminate and can get deep into the lungs where they can cause respiratory problems.
4. Workers in dusty occupations are more susceptible to respiratory diseases than workers in non-dusty occupations.
5. Chemicals, in their various forms, can be inhaled and damage various target organs as well as the lungs.
6. It is important to notice warning signals, such as smelling chemical odours. It is also important to notice if you **stop** smelling a chemical odour that you used to smell - you may be "accustomed" or used to the smell and not know that you are being exposed to the chemical.

### B. Absorption



**Your skin is also a major route of entry for hazardous agents in the workplace. Diseases can develop when chemicals and other materials used at work come into contact with your skin.**

#### Does skin protect you against occupational hazards?

Skin is an important protective cover for the body, but it cannot always protect you against workplace hazards. This is because chemicals can be **absorbed** (taken in) directly into the body through healthy skin. Once they are in the body, chemicals can be absorbed into the bloodstream and transported to target organs where they can have damaging effects.

#### What kinds of workplace hazards can cause occupational skin diseases and injuries?

There are many materials or conditions found in the workplace that can cause occupational skin diseases and injuries.

1. Mechanical work that involves **friction, pressure and other forms of force** (for workers using pneumatic riveters, chippers, drills and hammers) can cause calluses, blisters, nerve damage, cuts, etc.

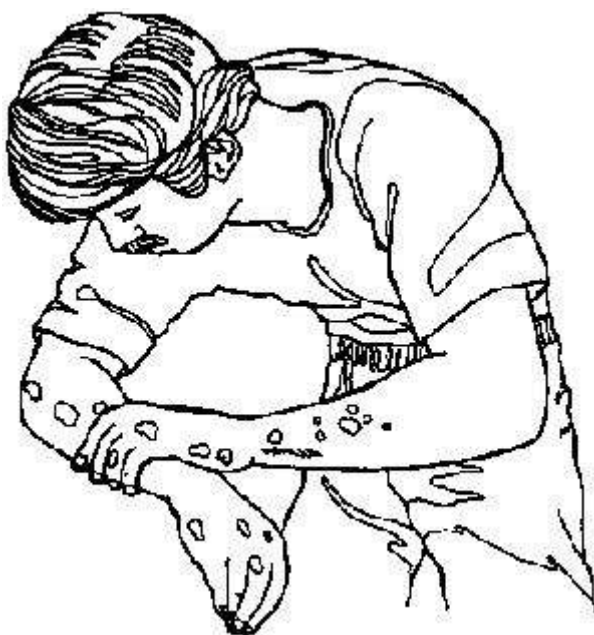
2. Chemicals are a major source of occupational skin diseases. Hundreds of new chemicals are introduced into workplaces each year and some of them can cause skin irritations and allergic skin reactions. Some chemicals, such as strong acids and alkalis, will cause skin injuries almost immediately. Others, like diluted acids and alkalis, various solvents and soluble cutting fluids, will cause an effect only after you have been exposed to the chemical for several days.

Some chemicals can damage your skin, making it red, blistered, itchy or flaky. This condition is called **dermatitis**.

Some of the many chemicals that cause dermatitis are:

- strong acids (such as sulphuric acid);
- strong alkalis (such as caustic soda);
- all forms of mineral oil, including diesel, lubricating and fuel oils, solvents, thinners and degreasers such as paraffin, trichloroethylene, turpentine and petroleum products;
- tars, pitch and other coal tar products including phenols and cresols.

Dermatitis can affect workers who are exposed to the substance. The symptoms usually appear only when the chemical touches the skin and disappear when the worker stops having contact with the chemical.



**Irritant injury (blistering caused by contact with toxic chemicals).**

Another common occupational skin disease is **contact dermatitis** - a type of allergic reaction, just like asthma or hay fever. A worker may be allergic to a particular chemical and, once he or she becomes sensitized to that chemical, every time he or she comes into contact with it, dermatitis will result. Contact dermatitis does not necessarily only occur at the place where the chemical touches the skin - it often extends to other parts of the body. Contact dermatitis never occurs on the first exposure to a new chemical - it takes time to develop. However, once it develops, even exposure to a small amount can cause a severe skin reaction.

Some of the chemicals that cause contact dermatitis are:

- formaldehyde;




- nickel compounds;
- epoxy resins and catalysts used in the plastics industry;
- germicidal agents used in soap and other cleaners, especially hexachlorophene, bithionol and halogenated salicylanilides;
- chromates.

3. Skin injuries are also a common result of **physical hazards** such as:

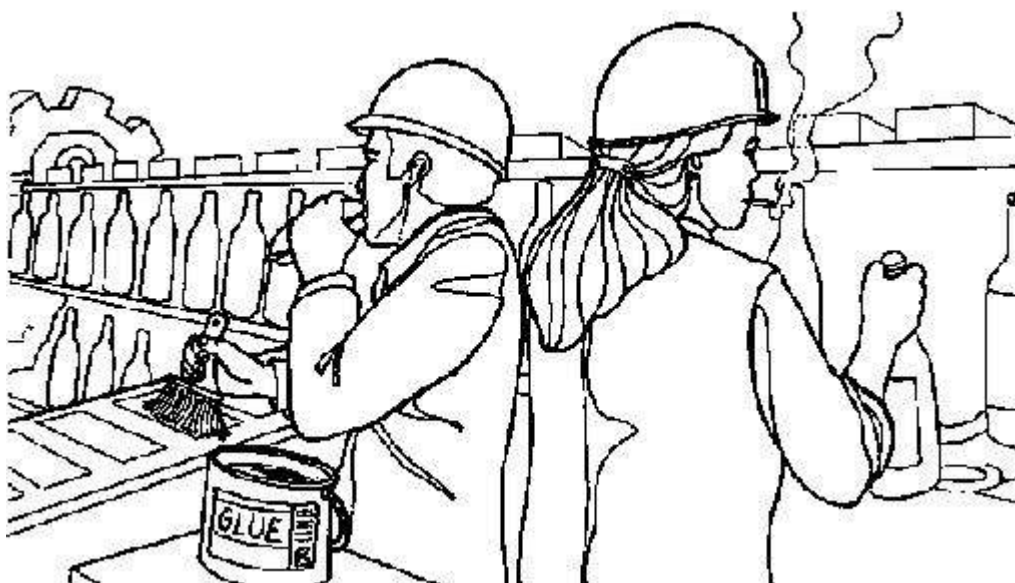
- **heat**, for example burns often experienced by electric furnace operators, lead burners, welders, pipeline workers, road repair workers, roofers and tar plant workers who work with liquid tar;
- **cold**, for example frostbite, often experienced by workers working outside;
- **electricity**, for example burns from contact with short circuits or bare wires;
- **sunlight, ultraviolet light, laser light, X-rays**, etc.;
- **high temperatures and high humidity levels**, for example in a tropical work environment.

4. Biological hazards, such as **bacteria, fungi, viruses or parasites**, can cause skin infections. Workers who are likely to be exposed to biological hazards are:

- animal handlers and breeders
- food processors
- fishermen
- farmers
- animal hide handlers
- bakers
- bartenders
- kitchen personnel
- medical and dental personnel
- agriculture and livestock workers
- grain handlers
- long-shoremen
- silo workers
- dairy workers

	<b>Points to remember</b>
<p>1. Your skin is a major route of entry for hazardous substances in the workplace.</p> <p>2. Chemicals can be absorbed through healthy skin into the bloodstream and transported to target organs where they can have damaging results.</p> <p>3. Exposure to chemicals, physical hazards and biological hazards in the workplace can result in occupational diseases and allergic reactions.</p>	

### C. Ingestion



Hazardous agents can also get into the body by ingestion.

### How do you ingest hazardous agents?

Ingestion happens when a hazardous agent is swallowed. Some ingested agents pass into the digestive system where they can be destroyed or neutralized by the acid in the stomach. However, some can be absorbed very quickly into the bloodstream through the walls of the stomach and small intestines. Once in the bloodstream, they can travel to different target organs (such as the kidneys and liver) where they can have damaging effects.

Workers can swallow hazardous agents by accident if they do not wash their hands before eating, drinking or smoking at work, or if they keep their food, drink and cigarettes in a contaminated (dirty) area. Eliminating hazardous chemical and biological agents is the best way to prevent ingestion. Other important methods of prevention are personal hygiene (cleanliness), and ensuring that workers have access to washing facilities, food storage and eating areas that are away from their work areas. It is also important that workers are educated about the importance of personal hygiene, and storing and eating food away from work areas.

### Can the body remove ingested hazardous agents?

Vomiting and diarrhoea are ways in which the body tries to remove certain toxic substances from the digestive system. However, these response mechanisms cannot remove **all** ingested hazardous agents from the body. Vomiting and diarrhoea can be signals of ingestion of chemical and biological agents and must be investigated.



### Points to remember about ingestion

1. Hazardous agents can enter the body by being ingested (swallowed).
2. Some ingested hazardous agents are neutralized in the stomach, while others are absorbed into the bloodstream and transported to target organs.
3. Eliminating hazardous agents is the best method of preventing their ingestion. Other important methods of prevention are personal hygiene and ensuring workers have access to washing facilities, food storage and eating areas that are away from their work areas.
4. Vomiting and diarrhoea are ways the body tries to remove certain toxic substances from the digestive system.
5. Toxic materials may enter the body by more than one route, so be familiar with all routes of entry to prevent exposures.

### III. Effects of toxic substances

Although some of the medical terms may be unfamiliar to you, it is important to understand the body's reaction to toxic materials. Knowing what to look for may alert you to the signs and symptoms associated with a particular occupational disease. Toxic substances can cause **four** types of effects on the body: local, systemic, acute and chronic.

#### A. Local effects

Some substances have only a localized effect on one part of the body - where the hazardous agent comes into contact with or enters the body. For example, the local effect can be on the skin, such as an acid burn, or in the digestive tract when a hazardous agent is ingested. Some substances like ammonia, chlorine, welding fumes and exhaust fumes can cause local irritation to the lungs when they are inhaled.

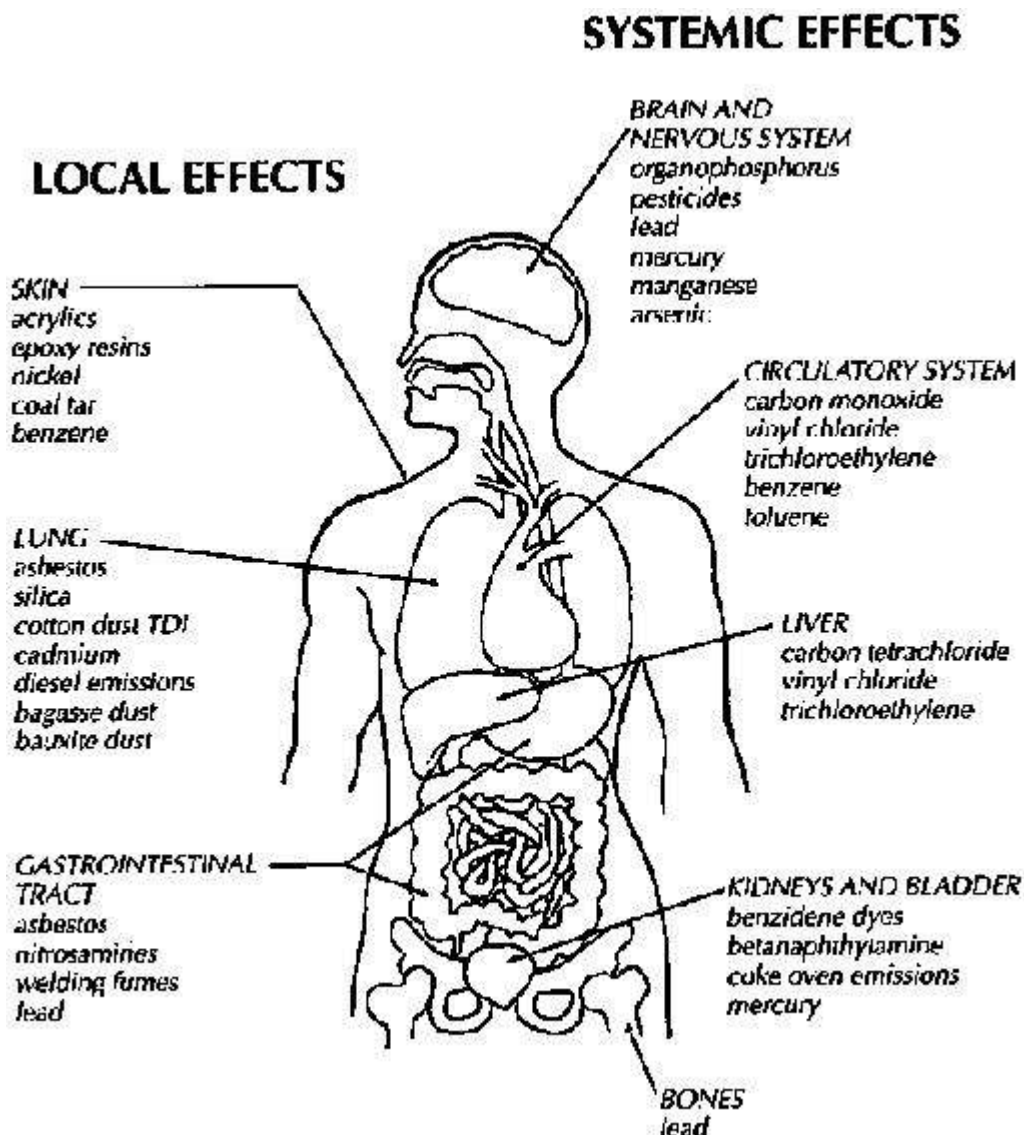
#### B. Systemic effects

Systemic effects are problems caused inside the body once a hazardous agent has entered. Systemic effects can occur **in the blood** when the substance is absorbed into the bloodstream, and **in the organs** that either store the toxic material (such as the bones and the brain), *neutralize* it (such as the liver), or *remove* it from the body (such as the kidney and bladder).

A typical systemic effect in the blood is **anaemia** (a shortage of red blood cells) which can be caused by a number of chemicals, including: lead, beryllium, cadmium, mercury compounds and benzene. Benzene can damage the cells that form blood, leading to **leukaemia**.

The liver can be damaged by toxic substances because it tries to break down many of them once they have entered the body. Some chemicals known to damage the liver are: benzene, DDT, dioxane, phenol and trichloroethylene. Vinyl chloride monomer, used in the plastics industry, is known to cause a rare form of liver cancer.

The kidneys and bladder also can be affected by many toxic substances because they are major routes of exit out of the body.



Some hazardous substances that cause local and systemic effects

### C. Acute effects

Exposure to many occupational hazards causes the body to produce an immediate obvious response, called an acute effect. Acute effects often disappear soon after the exposure stops and are often reversible. An example of an acute effect is the nausea, headache or vomiting a worker might experience after using a solvent to clean auto parts. Acute effects can be localized to one part of the body (such as a skin reaction from a chemical), but they can also be systemic (if, for example, that chemical also gets absorbed into the bloodstream, there can be effects on target organs).

### D. Chronic effects

Some hazardous substances cause chronic effects, which usually appear a long time after the exposure occurred and persist over time. A chronic condition usually only appears after a long time because of the disease's **latency period** (the period of time between the exposure and the first sign of disease). Chronic conditions, such as many occupational cancers, may take 20 or 30 years to develop.

Some chronic conditions develop after just a short exposure, whereas other chronic conditions only develop after repeated contact with a substance or work process.

Like acute effects, chronic effects can be localized to one part of the body (such as chronic lung disease which develops over years), but they can also be systemic.


For all diseases, it is better to prevent rather than treat the illness once it has developed, but for chronic diseases such as cancer, **prevention is the only cure**. With chronic diseases it is difficult to establish the cause of the condition and even harder to get compensation. Thus it is important to document all exposures to workers and maintain good records for at least 30 years.

### Can exposure to some hazards cause both acute and chronic effects?

While exposure to some hazards only causes either an acute or a chronic response, exposure to other hazards - such as formaldehyde and noise - can cause both kinds of effects. Short-term exposure to formaldehyde may cause headaches or eye irritation (acute effects), while long-term exposure may cause recurring allergic skin reactions or cancer (chronic effects). Short-term exposure to loud noise may cause ringing in the ears, while long-term exposure may cause permanent hearing loss. Solvents can also produce both acute and chronic effects on the nervous system.

Local, systemic, acute and chronic health effects can all result from exposure to one substance. For example, if a worker drinks too much alcohol, these are the possible effects that can result:

- **Local effects** - stomach irritation and stomach upset.
- **Systemic effects** - an increase in the blood alcohol level, which can cause damage to brain cells.
- **Acute effects** - drunkenness, headache and a hangover.
- **Chronic effects** - permanent liver damage, which can have a latency period of many years.

	<b>Points to remember about local, systemic, acute and chronic effects</b>
<ol style="list-style-type: none"><li>1. Toxic substances can have different kinds of effects on the body.</li><li>2. Local effects occur at the place where the hazardous agent comes into contact with or enters the body.</li><li>3. Systemic effects occur inside the body once a hazardous agent has entered the body.</li><li>4. Acute effects are usually immediate, obvious, short-term responses to exposure to a hazard. They can be localized to one part of the body, or they can be systemic.</li><li>5. Chronic effects develop over time. You may not see any symptoms until many years after the exposure occurred because of long latency periods. Chronic conditions can result from a short exposure, or from repeated contact with a substance or work process. Chronic effects can be localized to one part of the body or systemic.</li><li>6. Prevention is the only cure for chronic conditions.</li><li>7. Exposure to some hazards can cause both acute and chronic health effects.</li></ol>	

#### IV. Role of the health and safety representative



**Health and safety representative**

Your role is to work proactively (this means taking action **before** there is a problem) to eliminate hazards from the workplace as much as possible, to make sure workers are protected, and to educate workers about occupational hazards.

**Eliminating hazards** from the work environment is always the first choice for preventing disease.

When hazards cannot be eliminated, they should be controlled. Workers should press management to introduce effective controls in the workplace such as **engineering controls** (for example, a mechanical handling device so workers do not have to come into contact with chemicals); **administrative controls** (such as reducing the number of hours workers perform certain hazardous jobs); **substituting** safer chemicals or work processes for particularly hazardous ones; and by providing **personal protective equipment**, such as gloves (however, this is the least desirable method of control). (For more information, see the Module *Controlling hazards*.)

Steps to help you reach the goal of eliminating respiratory hazards from the workplace:

1. Work with your union and the employer to make sure the air in the workplace is monitored regularly for hazards. Air monitoring is an effective way of finding out the precise levels of contaminants in the air. (Unfortunately, the equipment and personnel needed to do air monitoring can be difficult to get.)
2. Learn the results of the air monitoring and compare the results with national or international standards for the materials being used in your workplace.
3. Work with your union and the employer to have regular medical checks performed on all workers who may be exposed to chemicals or other hazardous work processes. Request the results of these tests.
4. Unions should organize bans to prohibit or severely restrict the use of particularly hazardous substances such as asbestos. Some unions have already organized such bans and others should do the same. (Many of the International Trade Secretariats have information on hazardous substances.)
5. Work with your union and the employer to introduce controls that will prevent workers from being exposed to respiratory hazards.
6. Check the labels on chemical containers and request to see hazard data sheets (sometimes known as material safety data sheets, MSDS) on all hazardous materials used in the workplace to learn what is in them and what are the recommended protections. If you cannot obtain hazard data sheets through your employer, you or your union can always request them directly from the chemical manufacturer.
7. Look for dust or mist that you can see on work surfaces or on your skin, hair and

clothing. If you can see mist or dust settled on things, then it is likely that you inhaled some of the chemical while it was in the air.

8. Make sure that ventilation systems are checked regularly to ensure they are operating effectively.

9. Develop and distribute a survey asking your co-workers about their health and safety concerns. Collecting information, for example, on immediate symptoms such as a burning sensation of the skin, nose or throat, dizziness, headaches, coughs, bronchitis, colds or flu that will not go away or that keep coming back, can help to identify problem areas in the workplace. Once you have the information, work with your union and the employer to treat workers with health problems and to clean up the most hazardous areas right away.

10. Pay attention to new workers and visitors. They are “newly exposed” to the workplace and can tell you if they have health problems only when they come into the workplace. This also can help you to identify problem areas.

Here are some steps to help you reach the goal of preventing the absorption and ingestion of hazardous substances:

1. The first choice of protection is to **eliminate the hazard** completely.
2. Workers should press management to **introduce controls** into the workplace to prevent workers from being exposed to chemical, physical and biological hazards.
3. Personal hygiene (cleanliness) is an important factor in preventing both skin diseases and the ingestion of hazardous chemical and biological agents. Therefore, make sure workers do not eat, drink or smoke at their work areas.
4. Washing facilities should be available for workers. Work with the union and the employer to provide workers with washing and changing facilities. Workers also should be educated in the importance of keeping their work clothing, skin and machines clean.
5. Proper food storage areas should be provided for workers so they do not store food in their work areas.
6. Work with your union and the employer to provide workers with a clean place to eat away from their work areas.
7. If workers are provided with personal protective equipment (such as gloves), then the equipment must be appropriate for the individual hazards in their jobs. For example, some types of gloves only provide protection against certain chemicals. Workers should also be educated in the importance of wearing their protective equipment.
8. Ask workers if they have had any vomiting or diarrhoea and if so, try to determine whether the cause was ingestion of chemical or biological agents. Work with the union and the employer to provide medical attention to those workers.

## V. Summary



It is important to understand that there are a variety of hazards in most workplaces that can affect the health and safety of you and your co-workers. Equally important is to learn what hazardous agents and work processes are used in your workplace. Hazardous agents can get into your body by various routes of entry, and can cause local, systemic, acute and chronic health effects. You and your union can take a variety of actions toward eliminating and controlling hazards and creating a safe and healthy workplace.

## Exercise: Hazards and your health



### Note to the instructor

For this exercise, you will need to have enough copies of the pictures so that each trainee or group of trainees can see them. If the class is small, you can hold up the pictures in front of the class and show to everyone at once. You will also need a flipchart (or some large sheets of paper taped to the walls) and markers or a chalkboard and chalks.

Use this exercise to get the class participants involved in identifying problems and suggesting solutions related to the topics discussed in this Module. These pictures and the discussions you stimulate will reinforce what you have taught in this Module.

### Instructions

Show each picture to the whole class and ask the questions in the text or questions of your own. When you ask questions, wait several seconds for a response from the trainees. If no one responds, then you can prompt with the responses given below.

Write the trainees' responses on the flipchart or chalkboard. Mark a line down the middle with "problems" written on one side and "solutions" on the other. Write the trainees' responses in the appropriate columns.



1. Picture with an X through it shows a worker working around open containers of liquid chemicals. His hands are in the liquid, he is not wearing gloves. There is liquid spilled on the floor nearby and he is wearing open sandals. The workplace is clearly very hot.



**Question:** What is wrong with this picture? Can the chemicals the worker is working with affect his health? How can they get into his body?

**Answer:** The worker is being exposed to hazards by working around chemicals with no protection. Also, the workplace is obviously very hot and workers can suffer from fatigue and possible adverse health effects from the heat. The worker can inhale the chemicals through the nose or mouth, they can be absorbed through his skin, and he can ingest them if he eats, drinks, or smokes with the chemicals in his hands. Chemicals can also damage the external surfaces (e.g. skin, eyes) by causing burns. Even when not absorbed, contact with them may lead to severe skin reactions.

**Question:** What is the most common route of entry?

**Answer:** Inhalation.

**Question:** If he inhales the chemicals, what effects can result?

**Answer:** There can be local effects on the lungs, but the chemicals could also be absorbed into the bloodstream and possibly have damaging effects on various target organs.

**Question:** What are some of the possible target organs?

**Answer:** Examples are the central nervous system (brain and spinal cord), heart, lungs, kidneys and liver.

**Question:** If the chemical reaches target organs and causes problems (for example anaemia), what type of effect is that called?

**Answer:** Systemic effect.

**Question:** Are there any other types of effects that could result from exposure to hazardous substances?

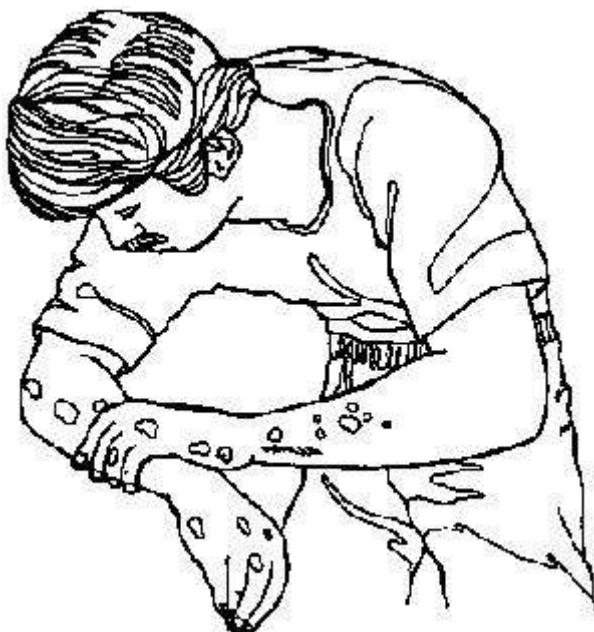
**Answer:** Acute effects and chronic effects. Local, systemic, acute and chronic health effects can all result from exposure to one substance.



2. Picture shows a worker sneezing. There is some fine dust in the workplace.

**Question:** If you often see your co-worker sneezing at work, what might you suspect? What steps might you take to follow up on your questions? What actions could you take?

**Answer:** You might suspect she has a cold or allergy or that there is an irritant at work that she is reacting to. You can ask your co-worker if she has a cold or allergy. Then ask if sneezing only occurs when she comes to work and if she has any other symptoms, e.g. skin rash, trouble breathing, etc. If the problem only occurs at work, then you could follow through together to investigate what she is working with, what control measures and precautions are indicated (look at hazard data sheets, chemical labels, ask the employer, health and safety representative, chemical manufacturer, etc. for information for the particular substances), what levels the worker is exposed to, and what are the “safe levels” of those substances.



**3. Picture of a worker whose hands show signs of dermatitis - the skin is red, blistered and he is scratching his hands.**

**Question:** You see your co-worker's hands look like this. You suspect that it is dermatitis from the chemicals he works with. You ask him about it but he says he is fine. What can you do?

**Answer:** You could suggest that together you get information about the materials he is working with and that perhaps he should wear protective gloves in the meantime. The best method of prevention would be engineering controls that would prevent him from having contact with the materials while he is doing his job. You can work with the employer and the union to make sure the worker gets protected.



**4. Picture of a worker working around animals and chemicals. Worker is in personal protective equipment.**

**Question:** This worker handles animals and pesticides in his job. What types of hazards does he face?

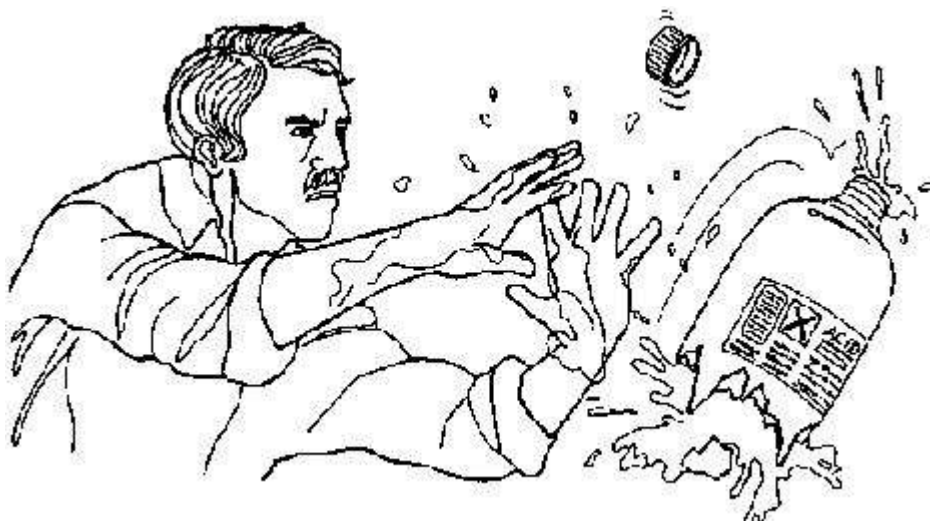
**Answer:** He can be exposed to biological hazards, such as bacteria, fungi, viruses, or parasites from the animals, as well as the chemical hazards from the pesticides. Because of these hazards, he is wearing personal protective clothing. He should be trained in the use of the protective clothing and the pesticides and in the safe handling of animals.



5. Picture of a worker at work with severe stomach pains.

**Question:** Your co-worker has severe stomach cramps and feels very nauseous. You noticed him eating lunch at his work area today and you know he works around solvents. What are the possible causes of the cramping you might think of?

**Answer:** First, he should receive medical attention. Tell the medical professional that you think he could have ingested some chemicals. When your friend is better, talk to him about the hazards of eating in the work area and the importance of washing his hands and face before eating, drinking or smoking. You may also want to investigate control methods to prevent the worker from coming into contact with chemicals while doing his job.



6. Picture of an acid burn on an arm.

**Question:** What type of effect is an acid burn?

**Answer:** A local effect.

7. (No picture)

**Question:** What is the reason that some hazardous substances only cause chronic health problems a long time after the exposure occurred?

**Answer:** Because of latency periods. This is the period of time between the exposure and the first sign of disease. For example, many occupational cancers take 20 or 30 years to develop.

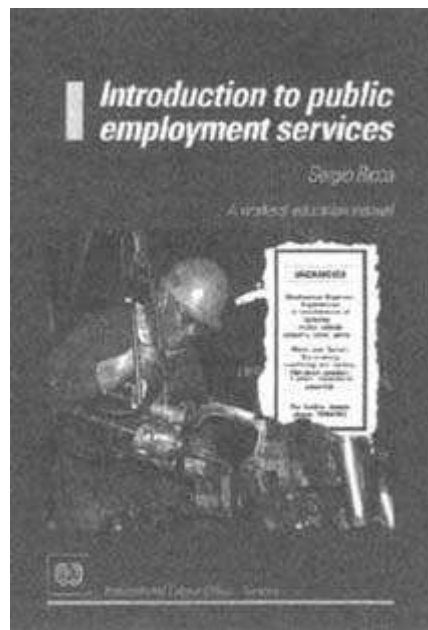
### Manuals already published



Figure



Figure



Figure



Figure



Figure

- Collective bargaining
- Workers' education and its techniques
- Workers' education in action
- International labour standards
- Structure and functions of rural workers' organisations
- Special services of rural workers' organizations
- Trade unions and the ILO
- Working conditions and environment
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#### **Back cover**

**YOUR BODY AT WORK  
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Instructor's guide to the modules

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Controlling hazards

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Chemicals in the workplace

Aids and the workplace

Ergonomics

Using health and safety committees at work

Male and female reproductive health hazards in the workplace

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