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**JOINT ILO/WHO COMMITTEE
ON OCCUPATIONAL HEALTH**

Fifth Report

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WORLD HEALTH ORGANIZATION

GENEVA

1967

JOINT ILO/WHO COMMITTEE ON OCCUPATIONAL HEALTH

Geneva, 29 August - 6 September 1966

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JOINT ILO/WHO COMMITTEE ON OCCUPATIONAL HEALTH

Fifth Report

A Joint ILO/WHO Committee on Occupational Health met in Geneva from 29 August to 6 September 1966 to discuss the organization of the occupational health services in developing countries.

Mr Flores, Chief of the Conditions of Work and Life Department of the ILO opened the meeting on behalf of the Directors-General of the two organizations. After briefly referring to the previous meetings of the Joint Committee and to the role of ILO and WHO in the field of occupational health, he drew attention to the importance of good working conditions in connexion with the economic and social development of countries. He stressed that due consideration should be given to occupational health in national programmes of industrialization. Mr Flores drew attention to the role of the UN Development Fund and gave examples of institutes and projects that have been developed with its assistance.

The Committee elected Dr R. Asturias Valenzuela Chairman and Dr M. Yamaguchi Vice-Chairman. Dr J. J. Gillon and Dr M. Rouhani were appointed Rapporteurs.

INTRODUCTION

During the general discussion, the Committee reviewed the occupational health situation in different regions of the world. It was apparent that, from the occupational health aspect, almost all countries could be considered to be in a developing stage, since resources available for occupational health were rarely used fully, and needs in this field were rarely covered effectively. It was, however, decided to concentrate on the situation existing in developing countries, in the generally understood sense of the term. It was early apparent that the problem could be approached in different ways according to the availability of resources and trained or interested personnel. On the other hand, it appeared that, while reviewing possible resources in this field, it was useful to study the types of difficulty that prevented their proper use and the means by which these difficulties might be overcome.

The participants stressed the need to give due consideration to the numerous social and cultural problems that frequently accompany rapid urbanization and industrialization ; this is necessary in order to co-ordinate the activities of the various authorities concerned and those of the occupational health services covering primary, secondary and tertiary industries. The importance of occupational accidents, whether caused by machinery or by hand tools, must not be forgotten ; moreover, in certain circumstances, members of the worker's family might be liable to such accidents, as well.

Developing countries have, however, certain advantages in that they have the opportunity of applying from the outset—after appropriate adaptation to local conditions—principles that in industrialized countries of long standing developed only slowly and were hampered by existing customs and institutions.

1. REVIEW OF EXISTING RESOURCES FOR THE PROTECTION OF WORKERS' HEALTH IN THE DEVELOPING COUNTRIES

A general review of the existing resources for protection of workers' health in various developing countries was made. The examination of these resources showed a vast difference in size and scope between various developing countries and between different industries in the same country. Many factors were responsible for this state of affairs, mainly historical, geographical, educational, economic and financial, coupled with the particular traditions of each country.

The majority of the participants stressed the inadequacy of the resources in general. Moreover, such meagre resources as are available are in most instances badly used because of lack of planning and co-ordination.

Despite the differences mentioned above, it was noted that as regards the existing occupational health facilities a fairly common pattern could be distinguished in most of the developing countries. The existing facilities were then reviewed with special reference to large industries, medium and small industries, artisan workshops, agricultural communities, and government employees. The legal provisions, labour inspectorates and occupational safety and health departments and institutes in various countries were also discussed.

Large industries

Some large companies, national or international, operating in developing countries have developed comprehensive medical services, including curative and preventive services, with special emphasis on the occupational health requirements of the workers. These enterprises have in some instances their own industrial hygiene laboratories enabling them to provide accurate

environmental supervision without depending on an outside agency. The curative and preventive services of these enterprises often cover the families of the workers as well. But in most of the developing countries the medical services available to workers are by and large provided by government or state institutions and are often insufficient.

Medium and small industries

Some industries have a full-time physician who, in addition to giving curative and preventive care to workers, fulfils certain duties of the industrial physician, e.g., pre-placement and periodic examinations as well as plant inspection, environmental hygiene, and health education.

In some instances, a physician, assisted by a nurse, divides his time among several medium-sized industries. Joint occupational health services for groups of factories have been established in several countries. These services are organized either within one industry or on a geographical basis; the participating enterprises share the services of medical personnel and contribute to the cost of the programme. In some places, an industrial physician directs the service; in others, the programme is centred on an out-patient clinic at a local hospital. In the majority of cases, however, the medical services available to workers are insufficient, even when provided by governmental agencies or by social insurance organizations.

Artisan workshops

Individual undertakings in this category usually employ only a very small number of workers; however, collectively, they represent the great majority of industrial workers in almost all developing countries. It was the general consensus of the Committee that this category totally lacked any kind of organized service and was dependent entirely on the facilities provided by the State or social insurance organizations, when and where available.

Rural communities

Although a process of industrialization is at work in almost every developing country, the rural population still represents the majority of the total population. On the other hand, because of the introduction of mechanization and the extensive use of synthetic fertilizers and pesticides, the health hazards to agricultural communities have increased several-fold. In most of the countries, the social insurance scheme does not cover the agricultural workers, and this large population has to rely on inadequate local medical facilities, if available at all.

Government and other services

In most of the developing countries, the government is the main employer, not only of civil servants but also of other workers. In many countries, however, this group of employees is not covered by occupational health legislation and the advantages to be derived therefrom. The beginnings of a general medical service are sometimes provided in certain countries through insurance schemes, but in some instances the provisions do not cover the dependants.

Legislation

Although in the majority of developing countries international Conventions have been ratified and governments have enacted legislation dealing with such matters as working hours and rest periods ; protection of young workers and women ; minimum standards of safety and health ; and compensation in case of industrial injuries, the degree of enforcement varies. Legislation concerning compulsory occupational health services in places of employment has been enacted only in some countries. It was noted that even in these countries there is little evidence of its effectiveness.

Official agencies established and operated by the Ministry of Labour, Ministry of Health or other ministries, exist in most of the developing countries. The shortage of medical and other professional personnel, whether employed by the ministries or not, causes difficulties in enforcing legislation and regulations and in giving advice on occupational health problems.

Professional and auxiliary staff

A severe shortage of professional and technical personnel in all aspects of economic and social activity is common to all developing countries ; the occupational health services are no exception.

In many countries, great use is made of paramedical and auxiliary staff. Unfortunately, in most instances, personnel in these categories lack proper training. The inadequacy of training of factory inspectors in matters of occupational health was also stressed.

Some of the large industries where a comprehensive occupational health programme has been established have resources to provide specialized training in this field for physicians and nurses.

Occupational health institutes

In some countries, occupational health institutes or laboratories have been established with the help of international organizations. Government occupational health personnel have access to these institutes to obtain

assistance in getting analyses, field surveys and investigations carried out. Industries and individual undertakings can also obtain service from these institutes, whose activities include in-plant evaluations, training of occupational health personnel, and research. Some of these institutes constitute a special department of the university, others are attached to the labour inspection services or other state agencies.

Financing the programme

Internal resources

In some countries, the financing of existing medical services is undertaken by the government. In other countries, some large industries have established and are supporting the cost of comprehensive programmes, including curative, preventive and occupational health services available to workers and their eligible dependants.

In many other instances, these services are provided by non-governmental organizations, such as social or private insurance organizations.

External resources

Assistance from international organizations is of two kinds : (1) indirect assistance, either in the form of basic international standards, the object of which is to provide the necessary foundation to improve conditions of life and work, or in the form of manuals, guides and other technical publications concerning various aspects of health and safety and the organization of occupational health services ; (2) direct assistance by sending experts to help the national authorities to formulate plans and start the implementation of occupational health programmes adapted to local conditions, by furnishing equipment for establishing laboratories and centres, by giving practical advice in the field of industrial hygiene, and by providing fellowships, training courses and seminars for technical personnel.

This type of assistance is also given under the United Nations Development Programme (Special Fund) which, through the agencies of ILO and WHO, has helped certain countries to establish occupational health institutes or labour institutes.

Bilateral agreements on technical co-operation and assistance are already in operation in certain developing countries. Their methods and objectives are similar to those outlined above.

2. BASIC NEEDS AND SPECIAL PROBLEMS OF THE DEVELOPING COUNTRIES IN THE FIELD OF OCCUPATIONAL HEALTH

The special problems existing in developing countries are due to economic, geographical, climatic, and ethnic factors, coupled with technical difficulties.

The geographical location of a country may be important ; in tropical and sub-tropical regions the working conditions are especially arduous and add to the difficulty of wearing personal protective equipment. Because of climatic considerations there may be certain additional dangers connected with work ; for example, in certain regions, the occupational health services must take into account the risk of snake bites and malaria.

A large proportion of the population have hitherto worked near their own homes using primitive methods. Suddenly they have been obliged to adopt the rhythm of modern industry and to submit to discipline under artificial environmental conditions. These people were formerly distributed geographically according to an ancestral way of life. The opening of mines and public works, the creation of new industries, and the development of towns provide attractions that cause temporary or permanent migration and facilitate the spread of some contagious and endemic diseases. Furthermore, transport difficulties prevent the organization of centralized services capable of providing first-aid for all the enterprises. Living conditions do not usually allow workers to get the necessary rest at the end of the day's work.

Feeding is not always adequate to compensate for the increased expenditure of energy and to ensure a balanced diet ; these deficiencies cause a reduction in physical resistance and increase morbidity. In certain regions, there are inadequate supplies of potable drinking water.

Most of the workers are employed in small or very small enterprises, which lack a solid economic foundation. This is equally true in the towns and in the rural areas.

The large enterprises are situated near the sources of raw materials or near transport facilities. They may be relatively isolated ; this fact combined with their size makes it advantageous for the management to provide a health programme. Such large enterprises are often equipped with new machines, but safety problems arise from the fact that it is difficult to make the workers conscious of the dangers, for the machines belong to a world quite different from that with which they are familiar ; some workers move from primitive agricultural work to handling automatic machines. It should also be noted that installations and methods of work derived

from a foreign country create maintenance, ergonomic and safety problems when used in different circumstances.

The importance given to industrialization tends to obscure the fact that agriculture is still the means of subsistence for the majority of people in these countries. Until now, however, those engaged in agriculture have not usually undergone any cultural evolution and even the most elementary instruction may be difficult for these workers to understand. The use of machetes and other cutting tools is an important danger, not only because of the risk of injury but also because of the potential infection of the wound. In many developing countries, women perform heavy work even when they are pregnant, and very young children work also.

When the specific problems outlined above are considered in conjunction with the lack of resources described in section 1, it is clear that the first need of the developing countries is to find ways of financing the development of occupational health services and that, in the meantime, they should concentrate on training personnel as effectively as existing resources permit.

3. CHARACTERISTICS AND FUNCTIONS OF OCCUPATIONAL HEALTH SERVICES IN DEVELOPING COUNTRIES

In the developing countries, the functions of occupational health services in the places of employment must be based on ILO Recommendation No. 112 (*Occupational Health Services Recommendation 1959*), taking into account the resources and the needs as well as special problems relating to developing countries.

However, bearing in mind the general health problems of these populations, the occupational health services must take their share in applying the general principles of preventive medicine, if necessary adapting them to local conditions; they must not limit themselves to the prevention and treatment of occupational diseases and injuries, but should make efforts to adapt the work to the man and the man to the job, striving to establish and maintain the highest possible degree of physical and mental well-being of the workers.

It was emphasized that industrialization and the resultant economic development might frequently result in an increase in the income per capita, an improvement in nutrition, and the raising of the cultural level; these are powerful factors in enhancing the standard of health of the population. Initially, however, industrial workers may have to contend with an unfavourable health situation, which they share with the general population, as well as fatigue and occupational hazards. These last two factors are, however, very important as the workers have neither the experience nor the appropriate knowledge to combat them.

The importance of functions as defined in ILO Recommendation No. 112, and described in previous reports of the Joint ILO/WHO Committee on Occupational Health,¹ was stressed by the participants.

Pre-employment and periodic medical examinations

The role of pre-employment medical examinations in developing countries was considered to be of prime importance for the workers, for the industry, for health and social security departments and for community health. In these countries, this is one of the most important screening procedures.

In the case of disease, it is important to inform and direct the patient so that he can receive the necessary care. If he has a minor reduction in physical capacity, one should be tolerant, remembering that the improvement in his standard of living as a result of receiving wages will have a favourable effect on his health. However, it should be borne in mind that the worker must be capable of performing the tasks allotted to him and that certain aspects of his work may make special physiological and psychological demands on him. Pre-employment medical examination should be oriented towards workers' abilities rather than their disabilities. It is not possible to obtain maximum benefits from these examinations without good practical experience of the medical problems of adaptation to work. It is essential that the examining physician should have the fullest degree of professional and moral independence.

In certain countries in the process of industrialization, the pre-employment medical examination may represent initially the only activity in the field of occupational health that can be carried out. The Committee was of the opinion that it would be valuable to make such pre-employment medical examinations compulsory. This will not be possible, however, unless the number of available doctors is sufficient in relation to the size of the working population. Moreover, these medical and biological investigations necessitate the expenditure of money, and their feasibility depends on the financial sources available. Nevertheless, every effort should be made to introduce such examinations as rapidly as possible.

With respect to the periodicity of routine medical examinations, it is obvious that there must be some flexibility, unless legal requirements have to be satisfied.

Preventive and curative medicine

The Committee agreed that it was not possible to draw a sharp division between curative and preventive medicine and that doctors might use different approaches according to whether their main preoccupation was

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1953, 66 ; 1957, 135 ; 1963, 246.

with the cause, the environment or the disease. Occupational medicine depends essentially on preventive procedures ; however, curative medicine may also have preventive aspects.

Except in certain circumstances, occupational health services should not undertake curative activities as a major responsibility. Where no other facilities are available the industrial physician will have to undertake curative work. Emergency care and first-aid are certainly among his duties. In certain countries he will also be concerned with industrial accidents and occupational diseases, but only if better treatment is not available elsewhere. Similarly, minor ailments of the worker could also be treated at work, if this permits the worker to remain at his job. The treatment of other medical and surgical conditions does not necessarily come within the scope of the occupational health services, but it is possible that the facilities provided by the enterprises, at least in certain countries, are better able to treat patients than the general curative services of the country.

Medicosocial problems

The participants stressed the importance of occupational health services in the control of drug dependence and other social diseases, both with regard to individual cases and in supervising and guiding groups by appropriate means. Several participants emphasized the importance of migration, isolation and the improper use of leisure time on the development of these social diseases.

In this context, occupational health services should give attention to the workers' nutrition and advise on the provision of a well-balanced diet.

4. THE ORGANIZATION OF OCCUPATIONAL HEALTH SERVICES WITH SPECIAL REFERENCE TO THE ROLE OF PARAMEDICAL AND AUXILIARY PERSONNEL

In considering the organization of occupational health services in developing countries, it is not possible to propose one universal plan applicable to all. Resources and needs differ from one country to another and the situation may evolve more rapidly in some than in others. Moreover, a service like occupational health can develop only within the framework of economic and social circumstances, including basic labour and social legislation, social insurance and cultural background.

Whilst it is for each country to choose its own method, it is nevertheless possible to give some general guidance in regard to practical action. Some of the suggestions below are directed towards short-term objectives ; others involve setting in operation measures of more long-term significance. It is

desirable at the start to establish appropriate relations with the existing planning organization with a view to the long-term effectiveness of the project.

Occupational health operates in two directions complementary to each other ; one aimed at the worker, the other at the conditions of work. It appears necessary to aim first at improving the health of workers, taking into account their most important needs and the limited resources. This priority has the advantage of making it possible to establish more rapid and more direct contact with workers. Although the Committee considered the primary objective to be the achievement of a general improvement in the health and adaptation of the worker, they stressed that modern methods of layout and processing were of great importance in improving working conditions.

It was generally agreed that for practical purposes an essential first step is for each country to make an inventory of available resources. This might indicate a complete absence of resources or nothing more than a few sporadic attempts to deal with the problem of occupational health. The potentialities vary from country to country and the initial approach must therefore be flexible.

Countries that apparently have no resources

In countries where there is an apparent lack of resources, the development of occupational health services may be stimulated by establishing official committees or specialized institutes, or the initiative may come from industry itself.

Official committees and institutes

As a first step, a small group of people might meet to review the existing organizations and individuals likely to give support. Initially, only one office would be needed. Some initial inquiries could be made, a programme drawn up and official recognition obtained. The committee thus established could subsequently retain an advisory role in relation to the projects it had encouraged, facilitate the purchase of equipment, initiate the establishment of an institute, and contribute to the development of legislation.

In other countries it might be more effective to attempt to interest influential and socially-conscious people in the establishment of a specialized institute, with the official participation of the administration or of the university. This institute could be run either by a single country or by a group of countries. Initially, at least, its activities should be of an applied character, directed to the solution of practical problems. It could train specialists, carry out laboratory investigations, advise those services in direct contact with industry, give them instructions and participate in the development of legal standards.

The first method of approach is perhaps less rapidly effective for large-scale development but it has the merit of requiring a smaller outlay.

Contribution of industry

In developing countries, industrialization most often begins with the introduction of large industries, equipped with considerable resources, well aware of workers' capacities and accepting occupational health as part of the modern industrial picture. In many countries, the resources of the industries may well be greater than those of the State. Examples can be found in the mining, oil, iron and steel, chemical, textile and other industries.

It is often possible to suggest to such companies the setting up of medical services which, in the course of time, could make one of the most effective contributions to progress, not only in occupational health, but in the health of the country in general. At a later stage, these services can be made available to smaller industries. If the latter become sufficiently interested in these services, they may then organize a suitable service among themselves.

It is often possible from the outset to envisage State intervention to oblige large industries to establish effective occupational health services where such services are not already provided by other organizations.

Countries where resources are available

Where obvious local possibilities exist, or even where only sporadic efforts have been made, a small informal group such as already described, or even an individual with some social standing in an administrative or academic capacity, might be effectively used in developing these possibilities or efforts in a variety of ways—for example by arousing the interest of employers, workers, and official bodies ; by using general practitioners on a part-time basis ; by using hospital laboratories ; or by providing information and documentation.

Such activity will become fully effective only when it receives official support ; this is an important initial step in the development of these services.

It is possible to base occupational health action on a hospital, a university department or a hygiene service. Such voluntary effort has the merit of being less costly and may be assisted by public or private funds. Moreover, the member industries can contribute according to services rendered.

Role of the government

An important initial action expected of any government is the enactment of legislation and the application of the provisions of ILO Recommendation No. 112. The provisions adopted in every case should be

flexible and progressive. The obligations and standards imposed should take into account the available resources and provide for future developments. They must also define the administrative structure and determine the respective responsibilities of the various ministries and organizations concerned, leaving room for private initiative and taking into account the working costs involved. It is essential to have an inspection service as part of the administration in addition to any voluntary action on the part of employers.

Other possibilities were suggested. Direct action by the State may be slower than action by industry itself. It is, however, possible for a government to provide for medical services to be established in a prescribed manner when an industrial state is developed.

Financing

The State may agree to allow tax reductions or other incentives to private enterprises for organizing health services and so make a substantial reduction in national costs of health. This practice cannot always be easily adopted. Sometimes, by industrial negotiation, it is possible to obtain funds for occupational health services by other means. For example, in one port, a special levy is imposed on imports. Generally speaking, occupational services are paid for by employers, but in developing countries small businesses are often not in a position to defray costs. In one country, the State aid consists of long-term loans at low interest for the provision of occupational health services.

Social security organizations can in certain countries participate in the financing of occupational health services or institutes aimed at improving occupational safety and health. However, it appears that to obtain the participation of this type of body, it is necessary to stimulate an interest in the preventive rather than the compensation aspects. In some countries, a fixed percentage of contributions is reserved for this purpose. It is also possible to enlist interest in prevention by fixing contributions according to the degree of danger involved.

There are in some countries other possible sources of finance. Reference has been made above to international organizations and to bilateral agreements, and assistance may also be available from private non-governmental foundations. Each country must make its own arrangements, but it is necessary to present precise projects indicating the objectives, the development, the procedures envisaged, and the results anticipated in a given time. This requires some training and experience.

Role of industry

All participants stressed that the large organizations could have a major influence in promoting the development of occupational health services

when there was no pre-existing service of this type. The establishment of medical services by these organizations can, by a kind of chain reaction, indirectly foster the development of services in small enterprises.

For small industries—even in highly developed countries—there is no single solution to the problem of providing occupational health services. In the developing countries, these small industries are relatively more numerous and they employ a proportionately greater part of the labour force. Conditions of work are poor and the health of the workers is a direct reflection of the low general level of health in the population. This must be taken into account when pre-employment examinations are introduced.

In these conditions, it is necessary to consider the methods of implementation of these services in small plants, but this cannot usually be done on a large scale without the intervention of a public authority. Effective action may require legislation, direct administrative participation, or varying degrees of financial assistance. This involvement not only benefits the general economy but also contributes to an improvement in general public health.

Occupational health services are needed not only for industrial undertakings but also for agricultural workers. Owing to the distances involved, poor communications and the insufficiency of medical personnel, agricultural workers are often not given early treatment. The seriousness of the situation is aggravated by the intensive use of pesticides. In such cases, it is very difficult to advocate the setting up of specific occupational health services, but one might envisage the establishment of first-aid posts and the education of personnel capable of rendering suitable first-aid treatment. These services should, if possible, be integrated in the existing basic health structure. Similar considerations also apply to isolated mining operations.

Information

The provision of information to the various bodies concerned with the health of the working population is an essential prerequisite for the establishment of occupational health services. The lack of carefully presented information may well explain the failure of several efforts in this direction. The provision of information is no substitute for positive action but is a powerful stimulus to its effectiveness. The information should be directed towards the general public, the workers and the employers, as well as towards the governmental administration.

The development of occupational health services is not only of importance to the working environment; the more it develops, the more likely it is to have a favourable influence on the health standards of the population at large. It is useful to make this fact widely known and the use of

press publicity for this purpose was suggested. At the same time, widespread publicity may help to remove negative attitudes concerning a form of medicine that might be regarded as having been imposed arbitrarily or developed only in the interest of employers.

Measures to combat customs or practices contrary to modern hygienic standards, especially in connexion with food, personal hygiene or attitudes to disease, must extend beyond the factory. In order that the services should function effectively, it is important to create in the population a better appreciation of health conditions requiring medical advice.

The national, regional or local authorities, if their co-operation is required, must also be given information by appropriate bodies concerning the positive contribution that occupational health services can bring to the community in general. A full understanding on their part is not only essential to direct participation, but it is also extremely useful in so far as their representatives can actively encourage workers and employers to be associated with the occupational health services. In order to obtain full support from the medical profession it is valuable to keep them up to date with progress in occupational medicine.

Occupational health services cannot develop extensively, receive adequate recognition, or be an effective influence without the active participation of workers. The number of workers' representatives interested in occupational health is likely to be few; questions of health and safety in industry tend to be more often considered in terms of extra pay and benefits. It is essential to stimulate understanding on the part of workers, either as the opportunity arises or by organizing meetings and courses. This information must be presented in a form easily comprehensible to the workers, especially those involved in negotiations.

It is useful if workers' representatives participate in the management of occupational health services. Such a procedure prevents unfavourable attitudes that might affect an organization established by the employer or by the State.

It is frequently necessary at the same time to make employers aware of the importance of occupational health problems and of the exact nature of their responsibilities towards their employees. The accent can be placed on the usefulness and economic value of these services. The co-operation of employers is more easily obtained if they are aware of modern principles of scientific management. This education of employers and workers is all the more necessary in periods of underemployment, because, in such circumstances, workers have a tendency not to disclose any disability and some employers have no hesitation in taking on other workers.

Training of personnel

The development of an occupational health programme needs competent and, if possible, specialized personnel. Most important are industrial physicians, but these cannot function to maximum advantage except as part of a team including nurses, social workers, and technical assistants with appropriate training; they may also need the help of chemists, industrial hygienists, engineers, safety officers and industrial psychologists. In the present state of resources in certain countries, such a team might be considered a distant objective, but it is important to realise that the industrial physician, even if alone at the beginning, is in a position to make substantial contributions to health and safety, which, with further industrial growth, will be developed further by specialized personnel. In particular, the Committee stressed the role of non-medical factory inspectors in the improvement of working conditions, together with the need for an adequate and suitably trained inspectorate. Appropriate training facilities for these inspectors should be available.

In the developing countries, the few industrial physicians available should not hesitate to delegate some of their duties in order to allow themselves more time to devote to tasks that cannot be done without specialized medical training. The number of doctors that need to be trained depends not only on the state of development of industry but also on the future planning.

Courses can be organized either on a regional or on a national basis. Students wishing to undertake these studies should be given training of a practical and applied character. In the absence of local training centres, recourse may be had to national or international fellowships for study elsewhere. If the beneficiaries are not assured of a post on their return they will not be able to give the services expected of them. Moreover, personnel indispensable to the operation of an occupational health service cannot in general be engaged or retained unless they are offered a salary and a status equal to those that they might expect in another branch of their profession.

In some developing countries and in certain circumstances the only medically trained person is a nurse who, in practice, can undertake in varying degrees some of the duties of the industrial medical officer whilst making specific contributions of her own.

The specialized training of both doctors and nurses can sometimes be undertaken by experts who are sent out to the country and who indicate the basic principles and advise on methods of action. Correspondence courses suitably adapted to conditions of the developing countries may be found useful, but these presuppose some initial training and practical experience.

Social workers can be a great help in furthering the work of the doctor, both within the industry and outside it. Their training does not usually require to be highly specialized in occupational health. Other auxiliary personnel (compounders, as in India, non-medical health supervisors as in Japan, etc.) can be trained nationally.

Laboratories and institutions

The practice of occupational medicine demands certain biological investigations which can usually be made in the normal type of hospital laboratory. Certain investigations may require particular apparatus, but a great deal can be done with ordinary equipment provided the physician has a close association with the laboratory and can interpret the results. As soon as the resources permit, it is valuable to begin making analyses within the industrial environment. In the present state of technology and the availability of instruments, a start is possible without the need for an elaborate laboratory. The information obtained might be more qualitative than quantitative, but useful conclusions can be drawn from the results. However, every effort should be made to organize a larger and better equipped industrial hygiene laboratory as soon as possible.

Any industry or group of industries may wish to establish its own laboratory. In addition, the factory inspectorate service may require a laboratory for its own enforcement procedures. Institutes or universities may also have laboratories to provide independent advice.

The establishment of institutes with the purpose of promoting occupational health has been discussed above. There is no doubt that where it is possible to set these up on the regional or national level they can provide most valuable services in respect of training as well as advice.

Industrial safety institutes and centres also have their importance. They have a different objective but offer a major contribution so far as a reduction of risks is concerned. These institutes could carry on research on the safety devices and protective equipment as required for local conditions, give advice, and encourage the manufacture, use and maintenance of protective equipment.

The study of environmental conditions should be given high priority; these have a particular importance in tropical and sub-tropical areas. Environmental studies enable industrial hygiene norms to be determined; initially it might be possible to define these on the basis of available knowledge derived from relatively simple methods.

Documentation

In general, the practice of occupational medicine cannot go on without the availability of up-to-date documentation such as that provided by the Occupational Safety and Health Information Centre of the ILO. In this