POCKET CONSULTANT

OCCUPATIONAL HEALTH

KERRY GARDINER • DAVID REES • ANIL ADISESH
DAVID ZALK • MALCOLM HARRINGTON

SIXTH EDITION

WILEY Blackwell

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FOREWORD

When a text such as *Pocket Consultant: Occupational Health* has survived over six iterations, the authorship has most likely changed. This is certainly the case here: the first version was authored by Malcolm Harington and Frank Gill – with just Malcolm Harrington remaining in this the sixth edition. What has enabled this book to be (hopefully) so comprehensive and coherent yet retain its 'pocket consultant' format is that every edition has been written by colleagues in the same academic department. However, it is with deep sadness we report that, since the fifth edition (2006) was published, both Frank Gill and Tar Ching Aw have passed away – it is to them that this book is dedicated.

With deliberate intent, it was decided to utilise the profound knowledge and experience of some of our friends and colleagues from further afield geographically to make the text less parochially British and reflect a more global perspective. In addition, there have been significant developments in various aspects of occupational health, and the structure and content of the book have been chosen to reflect this, particularly the new chapters on clinical evaluations, control banding, tertiary prevention and the legal and ethical aspects of occupational health. The chapter on special issues has also been expanded greatly.

We hope that you enjoy and learn from this text as much as we have had fun writing it – and, ultimately, that it resides as a fitting testament to Frank and Ching.

Malcolm Harrington and Kerry Gardiner
2021

CHAPTER 1

Introduction

1.1 What is occupational health?

Occupational health is a multifaceted and multidisciplinary activity concerned with the prevention of ill health in working populations. This involves a consideration of the two-way relationship between work and health, wherein it is as much about the effects of the working environment on the health of workers as it is about the influence of the workers' state of health on their ability to perform the tasks for which they were engaged. The main aim of occupational health is to **prevent**, rather than **cure**, ill health from wherever it arises in the working environment.

Health ↔ Work

A joint International Labour Organization/World Health Organization (ILO/WHO) Committee defined the subject back in 1950 as: 'the promotion and

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maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations'.

The relationship between the worker and the world of work is, necessarily, complex (Figure 1.1). The worker brings to the place of work a pre-existent health status influenced by many factors – only some of which are under the worker's direct control; hence, any disease/illness/outcome that manifests in the individual has to be viewed in this context. The health outcome could be caused by work, modulated by work or completely unrelated to it. Such a view of occupational health is, however, predominantly a medical model; albeit now the situation was and has been realised to be very much more complex.

1.2 Who is involved in occupational health?

Historically, occupational health has been viewed as a clinical subject, implying that the dominant roles in prevention should be played by the physician and the nurse. The ILO/WHO definition from 70 years ago is explicit that a broader and fully integrated perspective is essential.

Thus, the list of professionals involved is extensive and includes:

- occupational/industrial hygienists
- physicians
- nurses
- sociologists
- toxicologists
- psychologists
- health physicists
- microbiologists
- epidemiologists
- ergonomists
- engineers (including ventilation)
- safety practitioners and safety engineers
- work organisation specialists
- acousticians
- lawyers.

Yet, the ultimate responsibility for maintaining the health of the workforce rests with the employer and, to a lesser extent, with the employee. This is the way most health and safety law is formulated. On the basis of this model, one can begin to view those involved as an even broader group. The 'stakeholders' would thus include a number of groups who, although they may not be professionally responsible for ensuring the wellbeing of the workers, do have a crucial interest in the outcome (Figure 1.2).

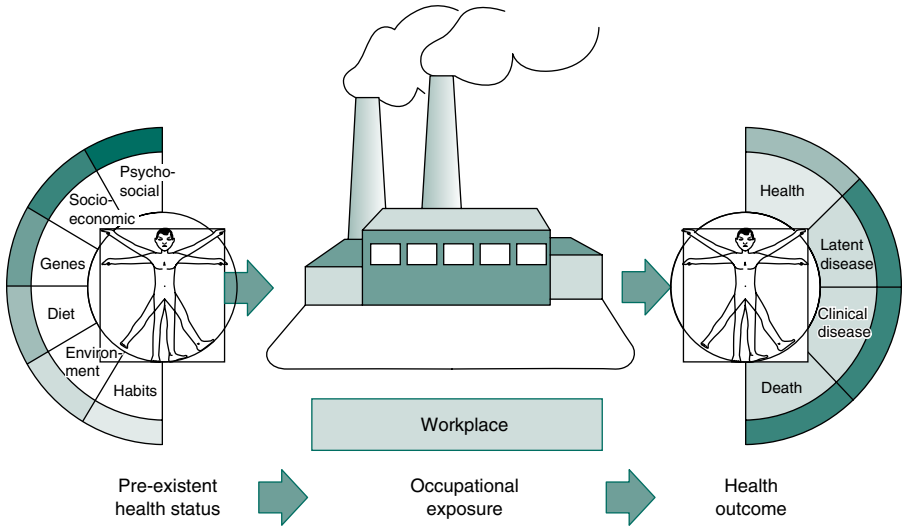

FIGURE 1.1 The problems facing the occupational health practitioner attempting to establish a link between work and health. The new employee brings a legacy of genetic, social, dietary and environmental factors affecting health to the new workplace, which may influence their response to workplace hazards.

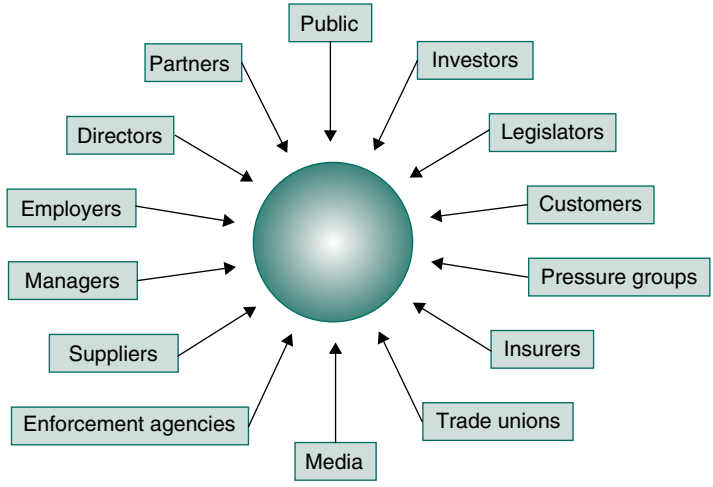

FIGURE 1.2 The occupational health stakeholders.

1.3 The world of work

The changing patterns of employment in the 'world of work' will have important and significant implications for the future make-up and expertise of occupational health, as well as for the competence needed to deliver the goods. Across the world,

the days of full-time long-term employment in one industry for a worker with one set of skills are rapidly disappearing. The main features for the future seem to be:

- fragmented industry (with materials sourced globally)
- hybrid working - work and home
- smaller workforces
- more mobile employees
- waning influence of 'organised labour'
- multiskilled workers
- greater use of subcontracted tasks
- less job stability
- less job security
- more part-time work
- more flexible hours of work (zero hours contracts)
- more mechanised (and therefore possibly more dehumanised) workplaces.

1.4 The world of people at work

Today, certainly in high-income and some middle-income countries, occupational physicians see more illness but less disease. Although musculoskeletal disorders and stress-related complaints dominate the scene, they too are interrelated, and both are subject to 'somatising tendencies' (presenting as physical symptoms related to different target organ systems). Thus, the new 'age of existentialism' is dominated by such conditions as:

- stress-related disorders
- non-specific effect modifiers
- post-traumatic stress disorder
- chronic fatigue syndrome
- chronic somatising disorders
- multiple chemical sensitivity
- diffuse pain syndromes
- a combination of psychological, neurological and immunological issues.

1.5 The roles of the occupational health professional

In high-income and some upper middle-income countries, many of the 'classic' occupational diseases have been controlled or, at least, the means for controlling them are known. In fact, for many, the industries themselves have been closed and hence the incident cases have stopped – proof, if ever it were needed, of the relationship between exposure and disease. In such settings, the delivery of an effective occupational health service to employed people will become more complex and more difficult in the future; although, with greater

emphasis on control, there should be less to do in dealing with the injured or sick. These, by definition, represent the 'failings' of an effective preventive programme.

Moreover, the influences of the stakeholder and the complexities of the employment scene have shifted the traditional emphasis away from the structure of 'see the health effect, diagnose the illness, find the cause' to the more proactive stance of 'control the exposure and monitor the effects'. In this model, the roles of the occupational/industrial hygienist become central and should sit as the primary or at least equal lead to the clinical aspects rather than being secondary to them. One further aspect of occupational health services is worth mentioning: in the market economies, there has been a shift towards demonstrating to employers the economic value to them of such a service (Figure 1.3).

To exemplify how the European perspective of the more clinical aspects of occupational health have changed, a brochure produced by the UK's Faculty of Occupational Medicine listed the ways in which occupational physicians can

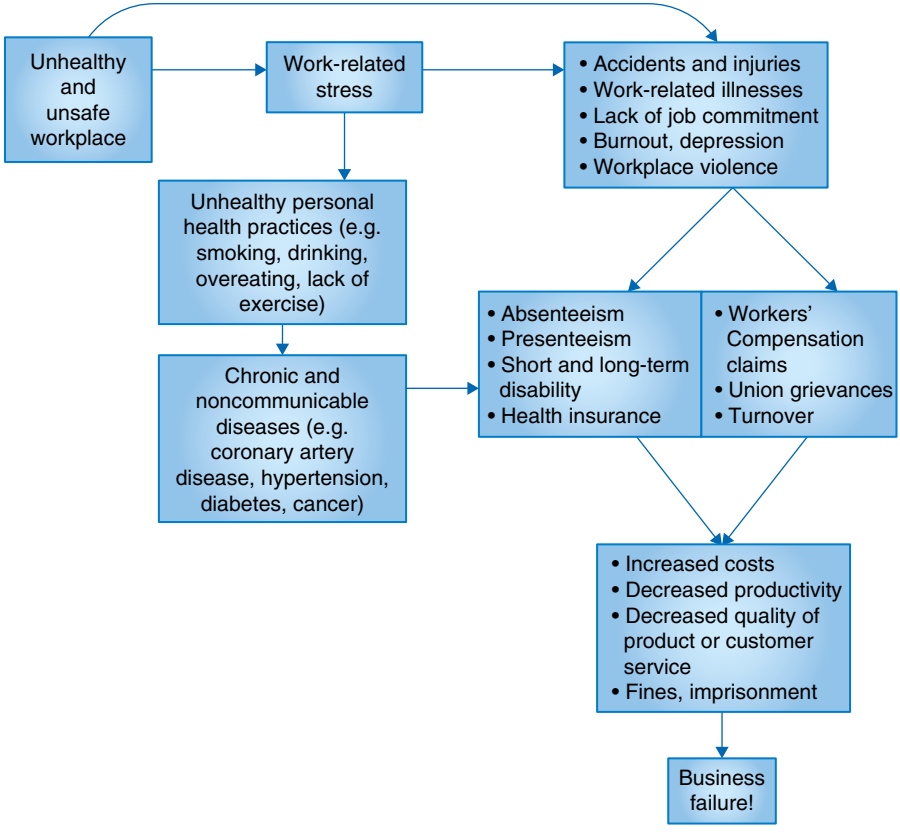

FIGURE 1.3 The business case in a nutshell. Source: Joan Burton, *WHO Healthy Workplace Framework and Model: Background and Supporting Literature and Practices.* https://www.who.int/occupational_health/healthy_workplace_framework.pdf.

help employers to 'meet their obligations' under European health and safety legislation. These included:

- helping with company compliance with the law
- advising on health and safety policy
- assisting in the control of sickness absence
- reviewing the fitness of employees following sickness absence
- managing rehabilitation
- advising on fitness to work
- managing access to first aid services
- organising health promotion initiatives
- designing and managing substance abuse programmes at work
- advising on the management and alleviation of stress
- advising employees about overseas travel on company business
- assessing employees' eligibility for long-term disability benefits or retirement on health grounds
- advising on work accommodation of employees with chronic illnesses; this is a prominent role, especially in countries with ageing workforces.

The order of these functions is probably not random, and many might dispute the contents of this list and certainly the order. Nevertheless, it demonstrates the move towards delivering an economically attractive package to the employer. Whether this is what the employee **needs** is another matter. Indeed, one can dispute whether this medical model has any real validity for the twenty-first century.

In low-income and some middle-income countries, an occupational health service often starts with the provision of medical care for the workforce (akin to a general practice at the worksite, and often with provision for the workers' dependants) (see Chapter 2).

Many of these functions are often performed by an occupational health nurse, who frequently works in isolation from any form of direct medical advice. Both physicians and nurses, however, have to be aware of their clinical limitations (either by training or by the fact that the employee is another physician's patient), and both also must see the workplace in the context of what actually goes on at the place of work and how the patient interacts with it (see Section 1.6).

Such a knowledge of the activities and processes at the place of work is a central feature of the work of the occupational/industrial hygienist, the ergonomist, the acoustician, the expert in work organisation, etc. These professionals are in short supply globally and few businesses employ their own. Their role and expertise are in predicting, recognising and understanding the sources of exposure and all of the inherent complexities of the work process, such as the nature of the materials used and produced, the intermediaries and waste products and how they are disposed of, and the methods of production. In addition, the hygienist is also an expert in measuring the concentrations and emissions of workplace contaminants/agents (and particularly the context) to assist in decision-making – particularly 'control'. It is often said that the only real

responsibility of an occupational/industrial hygienist is to effect change in the workplace – to fail to do so renders any efforts in measurement and so on as moribund.

The investigation of a putative link between a hazard and health effect requires a study of the populations exposed (a task for the epidemiologist), as well as a knowledge of the toxicological effects (a task for the toxicologist) with the necessary accompaniment of a risk assessment (a task for the occupational health and safety professional with experience in risk assessment/management).

Often, safety is not only considered separately from health but also corporately located in a separate part of the organisation. This is inappropriate and counterproductive to the development and execution of an integrated health and safety strategy to protect health in the workplace.

Who does what then comes down to the resources available to the company, as well as the hazards and risks inherent in the process. As industry becomes more fragmented, the large, company-financed, multidisciplinary teams will disappear as well. The role of independent consultant advisers will then come to the fore, but the integrated activity of several professional groups working together to achieve long-term goals could be lost. In this context, the corporate control of the company may need to take the coordinating role.

Every professional providing occupational health advice and service must ensure that they have had the relevant training; the syllabus and standards are usually set/monitored by the professional bodies of their specialty that are responsible for overseeing competence. Training and education schemes are available for the main groups listed in Section 1.2. Furthermore, many of these bodies now insist upon programmes of continuing professional development for the career lifetime after successful completion of the examinations for competence.

Whatever the workplace activity and whoever is responsible for managing health and safety, the means of protecting the workforce from workplace hazards can be summarised as:

- hazard identification
- risk assessment
- management intervention
- control procedures
- review and audit effectiveness.

1.6 Occupational health in modernity

Such an ideal of the total 'ownership' of health and safety by all – managers and managed alike – may be some time distant, if it is achieved at all. Nevertheless, occupational health professionals need to be looking for the newer emphases that will emerge in the next few decades as these will influence the content and style of their work. Apart from the shifts in workforce size, skills and structure

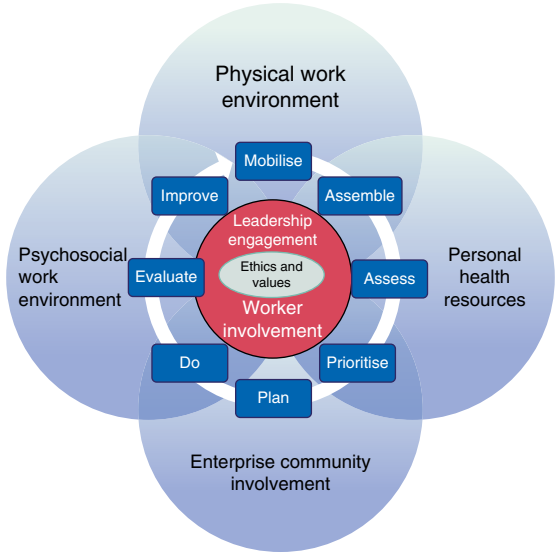

FIGURE 1.4 The World Health Organization's Healthy Workplace Model: Avenues of Influence, Process and Core Principles. *Source:* Joan Burton, *WHO Healthy Workplace Framework and Model: Background and Supporting Literature and Practices*. https://www.who.int/occupational_health/healthy_workplace_framework.pdf.

mentioned in Section 1.3, several other influences have emerged, which necessitate yet more shifts in the job content of the occupational health practitioner. These are some to think about:

- public safety/consumer protection
- public risk perceptions (and effective public risk communication)
- environmental impact of workplace process
- leisure industry risks
- hybrid working
- a drive towards the concept of 'healthy workplaces' (Figure 1.4) and 'wellbeing at work'
- being an employer of choice because of effective health-promoting programmes.

1.7 Summary

The health of the employee at a place of work is the concern of many professional groups. There is a need to identify hazards, be they physical (agents + motion), chemical, biological or psychosocial, and even those unrelated to work hazards in sufficiently resourced settings. Once identified, the risks to the workforce must be assessed and measures to control these risks must be implemented. Measuring the effectiveness of this process involves the

monitoring of the workplace environment, the health status of the employees and risks to health from lifestyle factors. Auditing the effectiveness of these measures and improving the control are never-ending processes.

The absolute requirement remains the health of the worker. This is what both the workers and employers desire – a healthy high-performing workforce at work. It follows that the culture of good health and safety policy and practice must pass from the professionals – and the management – to the workforce. When everyone at the workplace believes that such policies and practice are part of their responsibility, occupational health can be considered to have achieved its main goal.

CHAPTER 2

Occupational Health Services – An International Perspective

2.1 Delivery of occupational health services

Only about 15–25% of the global workforce is covered by occupational health services. Even in developed countries provision is incomplete. Delivery is particularly low in the informal economy, agriculture and micro- and small-sized enterprises and for migrant and short-term contract workers. These work arrangements and sectors predominate in low-income and some middle-income countries but they occur in all nations. The widespread informalisation of work arrangements has probably reduced occupational health service coverage. General health services have a substantial role in the delivery of occupational health services: workers presenting to these facilities include those underserved by their enterprises or with an unrecognised

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work-related condition; the unemployed; and patients with diseases of long latency (cancers for instance) who have long left employment in the causative work. Many non-occupational conditions impact on work ability and require accommodation at work; the treating doctors and workplace practitioners need to work together to manage the situation optimally. The generally low level of occupational health service coverage and the interfaces between general and more specialised worker-orientated services mean that a national system should ensure that the services are complementary and that there is a goal to make at least basic occupational health services (BOHSs) universally available.

Different models exist for the provision of occupational health in various countries, with the differences lying in the mix of occupational health professionals that make up the occupational health team, the range of services that they provide, the legislative requirements and framework and the perceived needs by workers and their employers. Some of the legislative and preventive activities are performed by government departments, whereas the provision of occupational health services for groups of workers is often organised by employers. The training of occupational health professionals is usually offered by academic centres or training institutes.

An important difference between countries lies in the method used to pay for occupational health services. For those countries where there is an insurance--based workers' compensation system in place, or national legislation that requires employers to ensure that workers have access to an occupational health service, the services are often not provided by an in-house service directly connected with the company, but instead by a commercial provider from a site distant from the workplace. The range of services that can be provided in these systems is often clearly defined but restricted to what the insurance system allows or national legislation requires the employer to provide. In these types of systems the occupational health services often enjoy a degree of independence from the employer, but they may have more limited influence over workplace conditions than in other systems. In those countries where the occupational health services are paid for directly by the employer – either via an in-house service based on the company premises or purchased from an external supplier – there is the potential for services to be provided that are restricted only to what the employer wishes to purchase or provide to its staff. However, an in-house service working closely with the employer may be in the best position to identify workplace risks and influence the employer to improve working conditions in a more proactive manner.

2.2 Low- and middle-income countries

In many low- and middle-income countries (LMICs), such as in parts of Africa, South America and Asia, occupational health provision is extremely low at the enterprise or worksite level. Statutory compulsion is unlikely to extend coverage because employers (or the self-employed) do not have the resources or knowledge to provide services. International and regional agencies have, therefore, encouraged

using primary care services as vehicles to deliver basic occupational health, including preventive activities. Training on the safer use of organophosphate pesticides in small-scale farming and monitoring of exposed sprayers are examples of services that can be provided through primary care.

Where occupational health services are provided, they are typically delivered as part of the general medical care for the workforce. In-house medical services are usually only available for larger companies, especially those belonging to multinational organisations. Larger companies that employ more workers have the resources to provide medical facilities for their workforce and often have occupational health policies and standards that apply to all their member companies worldwide. For LMICs, this model often places emphasis on the treatment of illnesses, whether occupational or non-occupational in origin, with fewer resources for occupational health prevention. Some companies even have their own private clinics and hospitals to care for local workers and their families. These clinical facilities also cater for the medical needs of overseas expatriate staff and their families. One reason why companies often concentrate on treatment services is the limited availability and access to medical facilities in these countries and the improved relationships with government. Another is the importance attached to dealing with the immediate health problems as they present at that time, and the often longer term health problems that arise out of hazardous occupational exposures.

Preventive occupational health functions are often organised as a separate safety (or health and safety) department, which increasingly includes environmental aspects in its remit. The model, which relies on the availability of doctors, dentists, nurses, care assistants and other clinical staff, has been described as providing 'family medicine in industry', rather than providing occupational health cover. Treatment-orientated medical services are the rule in some countries where occupational physicians focus on the recognition and treatment of occupational disease, with less emphasis on workplace visits and assessments to identify potential hazards and to recommend corrective action.

2.3 Rapidly industrialising countries

In countries such as Thailand, Malaysia, Vietnam and Indonesia (part of the group of countries referred to as the 'tiger cub economies'), there has been rapid economic and industrial development. In these countries, increasing attention is being paid to occupational and environmental health issues. In recent decades, many parts of South East Asia (particularly Malaysia, Singapore and Indonesia) have been affected by episodes of environmental haze, which enveloped the major cities. This haze was accompanied by an increase in respiratory, eye and other health effects. Historically, the source of this haze was thought to be primarily the burning of biomass material during the clearing of tropical forest areas for shifting agriculture, forestry or land development. Other contributors include traffic exhaust fumes, industrial activity and the El Niño weather phenomenon.

Occupational health professionals in these countries are increasingly involved in advising on such matters of environmental and health concern. Governmental and quasi-governmental organisations have been formed to coordinate activity on occupational and environmental health.

The developments in occupational health in Malaysia can be used as an example of how occupational health services may be provided in an industrialising country. In Malaysia, the National Council for Occupational Safety and Health (in the Ministry of Human Resources) is responsible for determining the direction and policy on occupational safety and health for the country. Several entities give effect to the Council's determinations. The Department of Occupational Safety and Health of the Ministry of Human Resources develops and enforces occupational health and safety legislation. A goal is to develop a culture of prevention in the country. The Occupational Health Unit, Institute for Medical Research, Ministry of Health, Malaysia, is a central government source of advice and information, with satellite government occupational health clinics operating in different parts of the country to provide services to health workers. A National Institute of Occupational Safety and Health (NIOSH) provides training, consultation services and information and conducts research in the field of occupational safety and health. The Malaysian Social Security Organisation has offices throughout the country and, among other responsibilities, operates workers' compensation and rehabilitation. There are several avenues for training physicians in occupational medicine. These include local academic institutions, some of which have links with training establishments in other countries. The Academy of Occupational and Environmental Medicine Malaysia represents physicians in the field of occupational and environmental medicine and aims to improve practice in these disciplines. Historically occupational hygiene lagged behind the medical disciplines, but this has improved. The Malaysian Industrial Hygiene Association promotes the discipline and supports the development of hygienists. Private clinics with occupational health doctors and more specialised multidisciplinary occupational health clinics service some larger enterprises. The country has adopted a programme to develop BOHSs in line with the recommendations put forward by the World Health Organization (WHO) and International Labour Organization to cover underserved workplaces, with small- to medium-sized enterprises a focus. With the development of notification schemes for occupational diseases, and the agreement of uniform criteria for diagnosing such diseases, the preventive aspects of occupational health services have been emphasised.

2.4 High-income countries

High-income countries usually have some legal requirement for the provision of occupational health services. The situation in Europe varies from country to country, although the directives issued by the European Commission attempt to harmonise occupational exposure standards and the requirements for occupational health provisions across the European Union (EU). The approach specifies

minimum standards for compliance but allows individual flexibility and higher standards to be promulgated if desired by EU member states. In 1994, the EU established the European Agency for Safety & Health at Work (EU-OSHA), which coordinates partnership activities, communications and research. The European Risk Observatory is one of the forward-looking functions provided by EU-OSHA. The European Foundation for the Improvement of Living and Working Conditions (Eurofound) looks more towards helping to develop social, employment and work-related policies. It also conducts the well-known European Quality of Life Survey, European Working Conditions Survey and European Company Survey.

In Austria, there is a legal requirement to appoint company occupational physicians for companies with more than 50 employees to undertake health surveillance, whereas for employers with fewer staff workplace inspections that include an occupational physician should be undertaken. The staffing of occupational medical centres specifies medical management by a physician with occupational medicine training who provides at least 20 hours a week of occupational healthcare. Health surveillance is mandated for a wide range of specified substances, exposures and work activities. The Netherlands has legislation that requires active management of sickness absence in the first six weeks with the input of occupational health professionals. Other requirements are the review of a company's occupational health and safety risk assessments and the provision of health surveillance for workers identified to be at occupational risk.

In the UK, occupational health nurses and safety practitioners are among the biggest professional groups in the provision of occupational health. Specialist occupational physicians are accessible to perhaps 13% of workers while the coverage for occupational health services is around 38% of employees; for those in the public sector, in theory, coverage approaches 100%. There is however no legal requirement for the provision of occupational health services. The enforcement of health and safety legislation is the responsibility of a government agency – the Health and Safety Executive (HSE) – which is part of the Department for Work & Pensions. It employs hygienists, engineers, nurses, various scientists and a few physicians. The HSE maintains a Science and Research Centre, which provides scientific and technical advice to support government and private sector companies as well as training. The regulatory regime requires employers to appoint 'competent persons' to assist them in their health and safety duties. Doctors have to be appointed by the HSE for companies with workers exposed to some specified workplace hazards such as lead, asbestos, ionising radiation, compressed air and certain chemicals listed in the Control of Substances Hazardous to Health Regulations 2002 (as amended in 2004). Where provided, occupational health services may be an in-house facility or employers may rely on external contracted providers of occupational healthcare. Independent providers of occupational health services are organised on a regional or national level. All hospitals in the UK's National Health Service (NHS) have some form of occupational health cover, which is typically managed by human resources departments and may be in-house or contracted, or some mixture such as the physician services being a contracted element. NHS occupational health services often provide services on a commercial basis for

local employers both to increase the availability of provision and to generate income for the NHS. The activities focus on preplacement fitness, collaboration with infection prevention and control for healthcare, absence management, which is a major function, and health surveillance. A particular emphasis on wellbeing has developed with an NHS Health and Wellbeing Framework that identifies 'organisational enablers' and 'health interventions'. Invariably the former are more difficult to address than the latter.

In France and Germany, the model used places emphasis on the requirement for the workforce to have periodic access to an occupational health service. The rationale is to allow a review of the health status of the workers, with the aim of early detection of ill health. If there is any indication that illness may be related to workplace factors, investigations and preventive action can follow. The French Labour Code requires employers to utilise either an intercompany occupational health service funded by participating companies or, for companies with more than 500 employees, they may establish their own integrated occupational health service (an in-house provision). The role of the occupational physician is specified in the French Labour Code, including that the occupational physician is responsible for directing a multidisciplinary team. German law provides an Act on Occupational Physicians, Safety Engineers and Other Occupational Safety Specialists, which requires employers to appoint occupational physicians and occupational safety specialists to support them in occupational safety and health as well as accident prevention. The Act lays out the duties of these professionals and requires paid continuing professional development. For smaller enterprises of less than 50 employees (varies by industry) they may not require an occupational physician. The concept of 'workplace health management' has evolved in recent years and parallels in many respects the US NIOSH's 'Total Worker Health' approach (see Section 18.8).

The Scandinavian countries, for example Finland and Sweden, have systems for occupational health cover that are much admired. In Finland, the Occupational Health Care Act obliges the employer to arrange preventive occupational healthcare services for its employees when there are one or more employees. Occupational health services can be obtained from a municipal service provider or a private medical centre. The Finnish Institute of Occupational Health (FIOH) is a national resource based in Helsinki, with satellite departments in other cities providing services for private and public organisations. FIOH is also a research and training provider with advisory functions for government, similar to the UK's HSE Science and Research Centre.

In the USA, there is variation between states in the provision of occupational health services. In New York State, private occupational and environmental medicine services predominate, including mobile clinics, multispecialty clinics and other services, invariably paid for by employers. The New York State Occupational Health Clinic Network has been developed as centres for the diagnosis of occupational disease, some with industrial hygienists attached. The hygienists are in a position to investigate the workplace with the cooperation of the employer and the unions. There is a wider network of clinics across the USA – the Association of Occupational and Environmental Clinics – but the

funding and resource models vary and meeting criteria for membership is required. The diagnosis of a case of occupational disease is treated as a sentinel health event, which indicates a need to assess co-workers exposed to similar workplace factors. The main government agency for enforcing occupational health and safety legislation in the USA is the Occupational Safety and Health Administration (OSHA) – part of the Department of Labor. Another such agency is the Mine Safety and Health Administration, which oversees mining operations. Responsibility for research and health hazard evaluations lies with NIOSH in the USA. This is one of the centres within the Centers for Disease Control and Prevention (CDC) – a service as part of the Public Health Service belonging to the Department of Health and Human Services. Occupational exposure standards in the USA are produced by several organisations, including NIOSH and OSHA. However, the best known standards are the threshold limit values and biological exposure indices produced by the American Conference of Governmental Industrial Hygienists (ACGIH) – a non-governmental independent professional organisation (despite its name). The standards are reviewed annually and revised as necessary. They are used by many countries outside the USA.

In Canada the provincial and territorial ministries of labour are responsible for ensuring compliance with the Canada Labour Code and there is no national enforcing body. There is an exception for some federal employees and a range of industries that are interprovincial or international, e.g. rail and road transportation, marine shipping and banking, where the federal government takes jurisdiction. There is no mandated provision of occupational health services, although certain aspects of provincial legislation may require some provision, such as the Ontario Designated Substances Act, which has a code for medical surveillance. This requires the periodic recording of a medical history, physical examination and clinical tests as specified, and is conducted at the employer's expense. Although not all physicians would perhaps have familiarity with the substances listed, it is accepted, and not uncommon, that employees choose to see their family physician for these purposes. An unusual model of provision is the Occupational Health Clinics for Ontario Workers, which arose from union sponsorship and now has seven clinics with funding from the provincial Ministry of Labour. Large employers and public sector organisations tend to have occupational health provision that may be in-house, private sector or a mixture of provision. A common driver for the use of occupational health is what is termed 'disability management', which is the approach to managing return to work for ill or injured employees. For occupational exposure standards these can vary between provinces and territories that follow ACGIH standards, but not necessarily the current version.

Australia has a federal structure with six states and two territories and 10 statutes relating to work health and safety with a Commonwealth Act for employees and another for maritime and offshore operations. There is no requirement to promote the use of specialist work health and safety services by 'persons conducting businesses or undertakings' (PCBU) – this term encompasses

employers and subcontractors. Guidance from Safe Work Australia requires that where a relevant exposure exists the PCBU engages a 'health monitoring doctor' who is a registered medical practitioner with experience in health monitoring. New Zealand also uses the PCBU terminology in its updated Health and Safety at Work Act (2015). There is a similar requirement for health monitoring, although it is clarified that this is carried out or supervised by an occupational health practitioner (a medical doctor, registered nurse or nurse practitioner) with knowledge, skills and experience in health monitoring.

2.5 From occupational health to healthy workplaces

Successful measures have been introduced to reduce workplace exposures and prevent occupational disease in some industries. These have mainly occurred in high-income countries and have resulted in occupational health attention being directed at more difficult targets for achieving better health; for example, the reduction of stress, retaining workers with chronic diseases in employment and activities aimed at strengthening the health status of workers. Occupational health services in these countries may also place emphasis on general health improvement measures in addition to workplace assessment and health surveillance. Health promotion activities include the provision of facilities for regular exercise at the workplace, campaigns to reduce cigarette smoking and advice on the consumption of alcohol in moderation, safe driving and healthy diet. The rationale proposed for this approach is that, once traditional occupational diseases are prevented, the focus should shift to the improvement of the general health status of the workforce. Unfortunately, in some workplaces general health activities have been emphasised at the expense of efforts towards the reduction and control of workplace hazards. In many instances these activities are not considered in relation to the hazards faced by workers, e.g. cholesterol testing of welders rather than a more beneficial smoking cessation programme for this group.

The WHO has given encouragement for this more comprehensive approach to health and work through its *Healthy Workplace Framework and Model: Background and Supporting Literature and Practice*. The Framework identifies four main avenues of influence on health: the physical work environment (the part of the workplace facility that can be detected by human or electronic senses); the psychosocial work environment (which includes the organisation of work and the workplace stressors that may cause emotional or mental stress to workers); personal health resources (efforts to improve or maintain healthy personal lifestyle practices, as well as to monitor and support their ongoing physical and mental health); and enterprise community involvement (the activities and other resources that an enterprise engages in or provides to the community in which it operates). There is an evidence-based case given for the Framework and guidance on its implementation.

2.6 Functions of occupational health services

The range of functions provided by occupational health services is given below.

Clinical occupational health activities

Preplacement assessments

Preplacement assessments vary from the use of a self-completed questionnaire to a general 'hands-on' clinical examination by a physician. The argument against the use of a questionnaire is that job applicants wanting to be employed may be somewhat economical with the truth when answering questions on the state of their health. This is especially the case when the denial of ever experiencing specific health problems is difficult to check and confirm. General clinical examinations are, however, time-consuming and have a low detection rate for relevant abnormalities. A compromise approach is to use an initial screening questionnaire focused on bona fide health requirements and the expected work activities with a staged evaluation, first by an occupational health technician or nurse and then by an occupational physician where indicated (further details of health assessments are discussed in Chapter 5). With promulgation of human rights legislation that prohibits discrimination on the grounds of protected characteristics such as sex, gender and disability, preplacement assessment and its use needs to be aligned with jurisdictional requirements.

Periodic medical examinations (including health surveillance)

These may be performed because of statutory requirements or when clinically indicated for groups of workers exposed to specific hazards. In many countries, examples of statutory medical examinations include clinical examination of professional drivers and examination and blood lead determination for workers exposed to lead compounds. Periodic examinations have also been advocated in health surveillance schemes for workers exposed to respiratory sensitisers, such as isocyanates. The health surveillance of specific groups, for example executives, is often in demand from employers and the executives themselves. This is based on the following assumptions: executive staff are expensive to employ, they make critical decisions that can affect the success of the company, they are time-consuming to train and they are difficult to replace; therefore, employers often choose to place executives in a system where there is periodic confirmation that they are in good health. Despite this, executive medical examinations are of questionable economic value and some practices are ethically questionable, leading to spurious findings. They are costly to perform, with a low detection rate of significant clinical abnormalities. It has also been argued that, if there is clinical value in such periodic assessments, they should be made available to other categories of staff.

Post-sickness absence review

The rationale behind reviewing individuals with long-term sickness absence is to ensure that the cause of the illness has not affected their capacity to continue in

their present job. It also allows any necessary adjustments to the workplace to be made to accommodate the individual temporarily or permanently on his/her return to work. For food industries, occupational health services often have the responsibility to ensure that workers are non-infectious before returning to handling food products, especially after a spell of gastrointestinal illness.

Key questions that are often asked of the clinician include the following.

- Can you confirm that there is an underlying medical condition causing the absence and that the length of absence is consistent with that condition?
- Can you estimate the length of time the employee is likely to be absent with this condition?
- Can you indicate whether on return to work the employee is likely to be able to resume his or her normal duties?
- Are there likely to be any significant implications for the health and safety of the employee, or others, on his or her return to work?
- Should restricted duties, redeployment or retirement on the grounds of ill health be considered at this stage?
- Are there any legal implications for the management of this case?

The answers to these questions allow the employer to actively manage and plan ahead for the employee's return to work. It is not necessary for the manager to know confidential medical information in order to manage the employee. Occupational health professionals may also add value to these reports by identifying workplace factors that may have aggravated or incited the condition, suggesting ways of protecting this employee and others who may be similarly exposed, offering advice on rehabilitation and reintegration strategies and, where appropriate, helping the employee to address the occupational factors that may lead to protracted sickness absence. Absence from work is itself a risk factor for developing other conditions, through social exclusion, isolation and deteriorating physical condition. It is generally accepted that good work is therapeutic and that an early, safe, sustainable return to work is beneficial.

Immunisation

This is provided by occupational health departments for healthcare workers (see Section 4.2) and laboratory and research staff, when the workforce includes many employees travelling abroad as part of their job duties or when specific vaccine-preventable infections are encountered in the course of work. Travel to many locations requires that the necessary immunisations against communicable diseases are provided (see Sections 4.3 and 4.5). When this is performed by occupational health departments, it also involves general health advice for other infectious diseases, for example sexually transmitted diseases and foodborne infections.

Health education and counselling

The encouragement of workers to look after their health in terms of healthy lifestyles, proper diets, avoidance of smoking, consumption of alcohol in moderation, adequate exercise and reduction of cardiovascular risk factors has been incorporated

into the activities of many occupational health services. These efforts are aimed at using access to the workforce to reduce risk factors for diseases in general, in part driven by reduced employer health insurance costs, and to introduce measures to prevent occupational disorders. These efforts must take into consideration the context of the workplace culture and work activities to be effective.

Treatment

The functions of occupational health services may include provision of services from first aid and treatment of minor injuries to the provision of full curative medicine facilities. The extent of clinical services within occupational health services varies from non-existent to the availability of dentists, chiropodists and opticians. The provision is dependent upon the local operating circumstances and the nature of the industry.

Rehabilitation

Occupational health staff can liaise with treating clinicians and workplace managers for the facilitation of rehabilitation and return to work. Familiarity with the workplace and job alternatives and an understanding of the illness or disability stand the occupational health staff in good stead for this activity.

Workplace assessments

It follows that, without exposure, there is no effect. Therefore, the evaluation of the workplace to eliminate or reduce exposure is critical in achieving the aims of the occupational health service. These tasks are usually carried out by occupational hygienists, who structure their work in terms of recognition, evaluation and control as follows.

Recognition

This is not really a function, but includes the understanding of the toxicology of contaminants or disease aetiology, the industrial process itself (and all of its hazards) and the law.

Evaluation

This often starts at the point of a walk-through survey, where knowledge of the process/contaminant means that decisions can be made without recourse to measurements, and extends to situations in which sophisticated measurements and/or analytical techniques are necessary to quantify the contaminant with the required accuracy/precision.

Control

The most important attribute of any occupational health professional, but specifically an occupational hygienist, is to be able to improve the work environment. Occupational hygienists use their knowledge of disciplines, such as industrial