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Occupational health services for all

A global survey on OHS in selected countries of ICOH members

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Preface

More than three billion working people in the world have daily occupational health needs that can only be met by providing occupational health services (OHS) to workers and workplaces. The development of occupational health services has been a priority on ICOH's agenda for decades. The development work includes all key aspects of occupational health, research, training, information, and the development of good practices. ICOH has traditionally played an important role in occupational health research, in the development of human resources and their competence and skills, and in the dissemination of information on occupational health challenges and problems.

It is also important to improve occupational health service systems and infrastructures, and provide occupational health services for all, as emphasized by ILO Convention No. 161 on Occupational Health Services, the WHO Global Strategy on Occupational Health for All, and most recently, the UN Sustainable Development Goals (SDGs). For this, the ICOH has supported the development of comprehensive and basic occupational health services.

ICOH has strategically responded to the call of the International Organizations. To propose and undertake proper strategic and practical actions for the development of occupational health services, we need an up-to-date situation analysis on the state of workers' health and occupational health services in the world. ICOH has decided to contribute to both of these needs by:

a) collaborating in the production of estimates of the global burden of occupational diseases and injuries, and
b) surveying the current global situation of occupational health services, including their normative basis, human resources, content, activities, and development needs.

The ICOH Board appointed a Working Group (WG No 1) for the 2015–2018 tenure, with several tasks, including:

1) Advising the Officers and the Board on activities for the Global Strategy on Occupational Health for All, with a special reference to the global ban of asbestos.
2) Examining research and policy on the Global Strategy on Occupational Health for All and proposing ICOH actions.
3) Reviewing and proposing international support measures concerning the development and promotion of Basic Occupational Health Services (BOHS).

The Working Group has reported a high number of activities, including a survey of the occupational health situation in the countries of ICOH members and a survey of competences and training curricula of occupational health experts.

The present survey investigated the current global situation of occupational health services in the countries of ICOH members by using a framework of eight key domains describing the key features of the occupational health systems and setting 21 specific questions for the key informants, the 58 ICOH National Secretaries, on the occupational health services in their countries. The study basis comprises one third of the countries of the world, employing 70% of the global workforce. The Report provides an analysis and a summary of their replies, and enables estimates of the global situation and drawing of conclusions for further development of the global occupational health service system.

ICOH continues, in collaboration with the International Organizations, National Governments, institutions and professional bodies, to develop occupational health services, keeping in mind the ultimate objective: well-working and competent occupational health services for every working individual and workplace in the world. The UN SDG target time, the year 2030, is appropriate for this objective.

ICOH is grateful to the ICOH National Secretaries for their active participation and highly informative replies, and the researchers Jorma Rantanen, Suvi Lehtinen, Antonio Valenti and Sergio Iavicoli for an excellent survey carried out.

Dr. Jukka Takala
President of ICOH

Abbreviations

AAI	Active Ageing Index
BOHS	basic occupational health services
DWA	Decent Work Agenda
EU	European Union
EU-OSHA	European Agency on Safety and Health at Work
FAO	Food and Agriculture Organization
GDP	gross domestic product
GP	General Practitioner
GPA	WHO Global Plan of Action on Workers' Health
GSC	global supply chain
HDI	Human Development Index
ICOH	International Commission on Occupational Health
ILO	International Labour Organization
ISSA	International Social Security Association
MDGs	Millennium Development Goals
MOH	ministry of health
MOL	ministry of labour
MSDs	musculoskeletal disorders
NDWP	national decent work programme
NGO	non-governmental organization
OECD	Organisation for Economic Co- operation and Development
OHN	occupational health nurse
OHP	occupational health physician
OHS	occupational health services
PEROSH	Partnership for European Research in Occupational Safety and Health
PHC	primary health care
SDGs	Sustainable Development Goals
SMEs	small and medium-sized enterprises
UHC	universal health coverage
UN	United Nations
UNDP	United Nations Development Programme
VZF	Vision Zero Fund
WHO	World Health Organization
WIND	Work Improvement in Neighborhood Development
WISE	Work Improvement in Small Enterprises
WRDs	work-related diseases

Executive summary

The International Commission on Occupational Health (ICOH) has promoted occupational health for decades, in line and in collaboration with the United Nations (UN); the International Labour Organization (ILO); and the World Health Organization (WHO); as well as with numerous Non-Governmental Organizations and Professional Associations. Recently the UN has, as a part of sustainable development goals, SDGs, amplified its efforts for the development of basic and comprehensive occupational health services. In line with the UN SDGs, WHO has launched an objective for Universal Health Coverage (UHC), and ICOH is interested in promoting occupational health services for all, including basic occupational health services, BOHS, as support for the ILO and WHO strategies.

ICOH activities cover research, training, information and the introduction of good occupational health service practices. Part of these activities has been the monitoring and follow-up of the development of the global occupational health service situation, the principal infrastructure for workers' health in the world of work.

The objective of this study was to survey the status of occupational health services in a sample of countries from all continents, comprising one third of the countries of the world.

A structured questionnaire was designed for 21 questions divided into eight domains for the main characteristics of the occupational health service system. The domains covered the most important structural, functional, resource, substantive, and financial aspects of occupational health services. Within the framework of the domains, the questions cover issues related to national policies, regulation, strategies and programmes, institutions and professional associations, service infrastructures and coverage, content and activities of services, human resources, training and education, financing, future development needs, and the changes that have taken place in occupational health service systems in the past five years.

The questionnaire was sent to 58 ICOH National Secretaries who were recruited as key informants for the survey. The response rate was high, 84.5%, and the proportion of NA replies among the 21 questions was low. The countries of 49 employ 70% of the total labour force of the world.

Among the respondents the ratification rate of ILO Convention No. 161 on Occupational Health Services was 29%, almost twice the global average. Sixty-seven per cent of the respondents' countries had drawn up an occupational health service policy and developed them with the help of national institutions, occupational safety and health (OSH) authorities, institutes of occupational health or respective bodies, universities, and professional associations, and in collaboration with social partners. In one third of the respondents' countries the governance of occupational health services was the responsibility of the Ministry of Labour (MOL) alone, in another third the joint responsibility of the Ministry of Labour and the Ministry of Health (MOH), and in one fifth the responsibility of the Ministry of Health alone. Fifty-five per cent of the countries had an Institute of Occupational Health or Occupational Safety and Health or a respective organ. Associations of occupational health physicians (88%), occupational hygienists (61%), safety engineers (67%) and occupational health nurses (22%) were the most common professional occupational health and safety associations in the respondents' countries.

The legal provisions for the organization of occupational health services were most often stipulated by the occupational safety and health law; in a few countries by health legislation or voluntarily.

The coverage of occupational health services varied widely between the respondents' countries (0.5–100% of the workforce). The average OHS coverage of workers among the respondents' countries was 24.8%; the estimated coverage of total global workforce was 18.8%.

Most of the countries have organized service provision through multiple models. A total of 92% of the respondent countries utilized the big industry model, and sixty-five per cent also group services. A total of 76% of the respondents' countries provided OHS from primary health care units, and 50% hospital polyclinics services. Private services were used by 84% of the respondents' countries. The majority, 55% of respondents reported use of the BOHS approach; 24% reported its use as a separate service, and 35% used it as a service integrated with PHC, meaning that some countries organized BOHS by using both settings

The majority (86%) of the respondents' countries provided occupational health services corresponding to the ILO Convention No. 161 stipulated standard content of services or more comprehensive occupational health services. The total number of available human resources in the occupational health services was 416 000, giving an average density of one expert per 5663 workers. The most common expert groups were physicians in occupational health (34%), safety engineers (36%), who were only partly available for occupational health services), occupational health nurses (18%), and occupational hygienists (9%). Three or more specialties were available in 92% of the respondents' countries. Specialties in occupational health or occupational medicine were available in 90% of the respondents' countries: occupational hygiene in 57% and occupational health nursing in 43%, ergonomics in 47%, and psychology in 27%.

The financing of occupational health services was organized according to a 'mixed model' in 65% of the respondents' countries, and by the 'employer alone' in 31%.

The most common future development needs of occupational health services were their content, infrastructure and functions. The recorded changes in occupational health service systems in the past five years were the improvement of legislation; the development of national policies, profiles and programmes; and improved organization of occupational health services.

Conclusions: In spite of occupational health service policies, strategies and programmes, the infrastructures and institutional and human resources for the implementation remain insufficient *(implementation gap)*. The estimated coverage of services was low; only a quarter of the workers in the survey group and less than one fifth of the global workforce *(coverage gap).* Qualitatively, the content and multidisciplinary nature of occupational health services corresponds to international guidance, but the coverage, comprehensiveness and content of services remain largely incomplete due to a lack of infrastructure and shortage of multiprofessional human resources *(capacity gap)*. In view of achieving the UN SDGs for workers' health, all countries, particularly those with low occupational health service coverage, should give a higher policy priority to occupational health services and ratify ILO Convention No. 161; strengthen their governance, regulation and implementation; expand their coverage to provide occupational health services for all working people, including small enterprises, the self-employed and informal sector workers; strengthen human resources; generate sufficient, well-working financial models; and continuously develop the service system to meet workers' health needs and the rapidly changing needs of workplaces. This requires efforts to close the implementation gap, coverage gap and capacity gap in occupational health services.

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1 Introduction

Health is an important prerequisite for a successful private and social life and participation in work life.

In addition to occupational accidents, a silent epidemic of work-related diseases (WRDs) has been recognized. The early origins of this new concept lie in the Report of the WHO Expert Committee from 1985 (WHO Technical Report Series 714, Geneva 1985), chaired by Professor Sven Hernberg, long-time Scientific Director of the Finnish Institute of Occupational Health, FIOH, and later President of ICOH 1987–1993.

Since then, the importance and scale of occupational and work-related morbidity has been researched and found to have a global epidemic scale; the most recent estimates speak of 2.4 million fatal WRDs annually in the world. This is six times the number of fatal occupational accidents, and the morbidity from non-fatal WRDs is one or two orders of magnitude higher.

UN organizations have worked for workers' health for decades. The UN International Covenant on Economic, Social and Cultural Rights from 1976 provides safe and healthy working conditions, social protection, reasonable working hours, and equal and decent conditions of work as the right of working people. http://www.ohchr.org/EN/ProfessionalInterest/Pages/CESCR.aspx. Recently, the UN has continued this policy by launching its Sustainable Development Goals, SDGs, which contain several elements for developing basic and comprehensive occupational health services.

The Preamble of the World Health Organization Constitution defines the health of people as a basic right: *'The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition'* and also contains a special objective for health at work. WHO has emphasized the development of health services as a system, aiming at universal service provision and providing occupational health services for all workers of the world.

The International Labour Organization has promoted occupational health throughout its history. ILO Recommendation No. 112 on Occupational Health Services in 1959; Convention No. 161 on Occupational Health Services; related Recommendation No. 171 from 1985, and the List of Occupational Diseases, the most recent version being that of 2010, are international instruments created to meet this objective.

The implementation and utilization of the most valuable guidance by International Organizations has not been universal or effective. The majority of the global workforce does not enjoy the health and safety protection provided by these international instruments. Therefore, it is important to survey the global situation to provide a realistic picture of the state of the occupational health service situation, to identify the gaps and to learn from the successful implementation of international instruments and the effective development of occupational health service systems, where available.

Due to investments in occupational safety, clear progress has been made in the prevention of occupational accidents in advanced economies. However, the developing world is still waiting for such an impact. Silent WRD and occupational disease epidemics have not been well recognized in all countries. This is due to the low political priority of occupational health in all these countries and thus the lack of necessary legislation, service infrastructures and human resources for occupational health. The adverse situation is even further aggravated by poor registration of, notification of and compensation for occupational and work-related diseases, which obscures the real work life situation.

The future of work and the ability to produce resources for maintaining the economic and social fabric is critically dependent on the health and work ability of workers and thus their occupational health. This needs enhanced efforts in all countries to obtain more intensive occupational health service policies, including legislation and its enforcement; national programmes; service infrastructures with the necessary support services, including training, education, statistics and information systems; and research. Without competent and well-working occupational health service systems, no country can expect to manage the challenges of both the traditional occupational health hazards and the challenges of 'new work life' with its rapid changes in working methods, new technologies, new working practices, and employment patterns which are further amplified by the major demographic changes in the global workforce.

2 General Overview

2.1 Occupational health as a basic human right

The UN International Covenant on Economic, Social and Cultural Rights of 1976 declares safe and healthy working conditions, social protection, reasonable working hours, and equal and decent conditions of work as a right of working people (1).

The Preamble of the World Health Organization Constitution defines the health of people as a basic right: *'The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition'*. In Chapter II, Functions, Article 2, the Constitution defines the functions of WHO as being *'… (h) to promote, in co-operation with other specialized agencies where necessary, the prevention of accidents and injuries,* and *(i) to promote, in co-operation with other specialized agencies where necessary, the improvement of nutrition, housing, sanitation, recreation, economic or working conditions and other aspects of environmental hygiene…'* (2).

The ILO Declaration on Fundamental Principles and Rights at Work, adopted by the International Labour Conference in June 1998 the ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up and the recognition of the eight Fundamental Conventions in 1995 by the ILO Governing Body in line with the Declaration, have revitalized the former individual conventions' impact on workers' rights (3).

The fundamental conventions on workers' rights do not include the key occupational safety and health instruments, which are classified as 'technical conventions'; i.e. Convention on Occupational Safety and Health, No. 155 (1981), Occupational Health Services Convention, No. 161 (1985) or the more recent Convention No. 187 (2006) on Promotional Framework for Occupational Safety and Health (4–6). The reason for this may be both political and substantive; to ensure the widest possible implementation, it was necessary to limit the number of fundamental conventions to a minimum, and the selected eight fundamental conventions were seen as prerequisites for the universal implementation of basic rights and of any other ILO instruments in practical work life.

2.2 Needs and challenges for occupational health services (OHS)

2.2.1 Diversity of working conditions in global work life

Of the more than 200 million enterprises in the world, 60 000 are multinationals, and 125 million are micro, small and medium-sized enterprises (SMEs). In addition, some one billion workers are self-employed, and a major part of these work in the informal sector. These numbers describe the challenge of providing occupational health and safety for all workers *'irrespective of the size of the enterprise, mode of employment or any other factor'* (7, 8).

In times of economic crisis, the quality of employment, safety and health is at risk of being compromised. Therefore, special attention needs to be paid to the sustainability and resilience of occupational safety and health (OSH) as a preventive activity.

Most occupational fatalities occur in developing countries and countries in transition, where capacities for controlling and managing risks are less developed (9). There is three-order magnitude difference between the occupational accident risks of the working populations in the least developed countries and those in the advanced industrialized countries. The most advanced industrialized countries have shown a 40−50% risk reduction in fatal occupational accidents and a substantial reduction in the risk of occupational diseases in the past two decades. However, despite such success, the economic loss from occupational risks still amounts to 4−6% of their GDPs, corresponding to a half or more of typical national health budgets (10, 11).

The declining trend in the adverse occupational health and safety outcomes among the best performers continues in spite of the low risk levels already achieved, showing that there is no lowest limit in risk reduction, i.e. zero risk policy. Such ambitious policies are typical for the best economic performers, who take benefits for national and enterprise economies from occupational safety and health and occupational health policies, programmes and practices (5, 8, 12–15). Successful implementation of such national policies, strategies and programmes requires close collaboration between ministries, including those of labour, health, social security, education, industry, agriculture, and financing (16).

The risk of occupational injuries, however, also varies in advanced industrialized countries in terms of the lowest- and the highest-risk occupations. The highest risks are in certain hazardous sectors such as mining, construction and agriculture, small enterprises, and among the self-employed and informal sector workers in developing and transitory countries (17, 18).

Exemptions from the duty to comply with occupational health and safety and health standards by the small enterprises have been applied in many countries and policies. This in fact is paradoxical, as strong scientific evidence speaks for greater occupational safety and occupational health needs among SMEs, the self-employed and informal sector workers. Some actors have proposed enabling strategies instead, which support low capacity performers to comply and develop their health and safety programmes, including the organization of occupational health services (9, 19).

There is much evidence from both the industrialized and developing world of the higher average risk of all accidents, fatal accidents and other hazards in small enterprises than in larger enterprises. In the EU15, a total of 82% of all occupational injuries and about 90% of all fatal accidents are registered in SMEs (20). Due to insufficient competence and capacity to assess risks and manage chemical hazards and ergonomic problems, the risk of occupational and work-related diseases has also been shown to be higher in SMEs, even when under-reporting is assumed to be substantial. On the contrary, the psychosocial conditions of work are reported to be better in smaller than larger enterprises due to closer interaction and social relations within the small working units. As the small enterprises are the only sector with increasing net employment, virtually all advanced economies have given high priority to promoting the generation of SMEs. It is important to integrate strong safety and health programmes in conjunction with such development strategies and set conditions, for example, for the decisions on development aid support, including the criteria of decent work and occupational health services (21–24).

2.2.2 Global burden of occupational accidents and occupational and work-related diseases

Health and safety of working people

Globally occupational hazards and other conditions of work have a pandemic-scale morbidity and mortality impact: occupational accidents are experienced by 313 million workers a year and work-

related diseases by 160 million workers per year. The estimate of fatal occupational accidents amounts to 350 000 annually. Work-related diseases are estimated to be several times more prevalent, amounting to 2.3 million fatal cases a year. Asia, as the most populous continent and with a high number of developing countries, has the highest numbers of victims. (10)

In accident prevention, the best performers report effective action models and impressive prevention successes from the past 20–30 years (10, 25–26). In terms of work-related diseases, however, the trends are different; diseases are to increase as a consequence of, for example, the continuing industrialization, chemicalization, the ageing working populations, the growing risks of pandemic outbreaks, climate change, and growing work stress. This all calls for more efforts on the part of occupational health services for working people (27)

As the cornerstone of work ability and physical, psychological and psychosocial functionality, health is an important determinant of workers' participation in work life. It is the most important determinant of work ability and has a strong impact on one's employability, work experience, workload and performance. On average, two-thirds of EU workers find no association between working conditions and health, while in several jobs, occupations and work arrangements, 30–70% of workers find that work has a negative health impact. On the other hand, one third of workers aged 15–64 in an EU country reported job limitations due to health reasons (28). There is also much evidence of that so called good jobs have a positive health impact (29–30).

Vulnerable workers

An estimated 1.5 billion workers are classified as vulnerable at work to social, economic and occupational health and safety hazards because of their position in the labour market (economically and socially vulnerable workers), risks specific to their jobs, or personal health-related factors. Most vulnerable workers live in developing counties, but can also be found in advanced economies, for example, in the EU (31–34).

Though the definitions of a vulnerable worker may vary depending on the context, the European, ILO and UN experts recognize three main groups of vulnerable workers:

1. *Economically and socially vulnerable workers*, including own account workers, unpaid family workers, young workers, unemployed workers, migrants and working poor, precarious workers, temporary agency workers, and informal sector workers. Their health and poverty situation is multifactorial and they need comprehensive social, health, and occupational health and safety programmes.
2. *Workers employed in jobs with high occupational safety and health risks:* in construction, mining, fishery, agriculture, and small-scale enterprises, and self-employed and informal sector and domestic workers. These workers need protective health and safety measures at their workplaces, particularly in the work environment.
3. *Workers vulnerable because of their health or psychophysiological situation:* workers with chronic medical conditions, and disabilities, as well as female workers, child and young adult workers, older workers, and workers vulnerable because of physiological or psychological factors. These workers require adjustments to their working conditions, work methods, work environment and work tasks to suit their work abilities and other capacities. Careful follow-up of their health at work is needed.

These different groups of vulnerable workers need different preventive, protective and promotional methods and specially adjusted services, which should be tailored according to their personal needs. Properly trained occupational health service personnel is in key position to provide such services.

Ageing of working populations and work ability

The world is ageing rapidly. The world's current 810 million 60+ population will exceed one billion in 2022 and 2 billion by 2050. The ageing of the working populations is one of the most influential global demographic trends and will have a far-reaching impact on work life, the health needs of working populations, work ability, and the need for occupational health services and social security programmes. The ageing process does not challenge only industrialized countries, but all regions in the South and North. The countries of Europe and Japan are forerunners in the ageing workers' trend but will very soon be followed by the emerging BRIC countries (Brazil, Russian Federation, India, China). Ageing inevitably affects health and work ability (35–36).

The ageing of the workforce creates numerous challenges; work stress from growing job demands; competence and skill requirements; expectations of high productivity; the need to adjust to new working practices and continuous changes; problems arising from chronic diseases that affect work ability limitations in heavy physical activity; elevated health and safety risks; and the adverse health effects of shift work, noise, and extremes of temperatures. One third of workers aged over 50 have at least one chronic disease. Their most common chronic diseases are musculoskeletal disorders (MSDs), mental health problems, cardiovascular disorders, respiratory diseases, diabetes, and neurological disorders. Even without disease, physical work ability declines with age by about 1–2% a year (36–38).

The industrialized countries will encounter shortages of labour for several reasons: natural ageing, i.e. lowered birth rates, smaller younger worker cohorts, and the exclusion of older workers from work life through discrimination, obsolete legislation, or due to health reasons and disabilities. In some countries, this will be due to the emigration of younger workers in search of employment and better income abroad, leaving older workers home. As the workforce is decreasing, the productivity pressures among the workers, including seniors, is growing, which may affect interest in remaining employed. In the Organisation for Economic Co-operation and Development (OECD) countries, less than 60% of people aged over 54 are employed, while the labour participation rates of younger age groups may be as high as 75%. The European participation rates are even lower than the OECD average; most countries have 55–64 age group participation rates below 50%, which do not meet the Lisbon strategy objective for 2010 (precisely 50%). However, an ambitious target of 75% has been set by the EU for 2020 (39–40).

Age affects work ability and thus employability. Self-reported symptoms and complaints of lowered health status grow systematically in the course of ageing. The trend is also parallel in the rates of objectively measured morbidity, rates of diagnosed diseases, and the recognized need for long-term medical treatment. The perceived adverse impact of work on health also grows with age.

Ageing workers report more work-related health problems than younger workers, with backache and muscular pain being reported by more than 70% of workers aged 55 and over. This is not surprising, given that the main factor explaining the development of MSDs and other chronic work-related health problems is cumulative exposure to work loads and hazardous factors in the work environment (such as heavy physical work, hazardous substances, etc.).

Occupational health services are recognized among the factors that support health and work ability, thus enabling the participation of older workers in work life. Other 'pull-in factors' are autonomy at work, access to learning and training, balancing of work and family life, horizontal management structures, task rotation, teamwork, and the active participation of workers in decisions concerning their own work, as well as availability of occupational health services. Typical 'push-out factors' are

high-intensity work, rigid work organization, poor training and competence, and a hazardous work environment (36).

Research evidence speaks for longer working careers among ageing workers, if work and working conditions are adjusted to the needs of the workers, and the promotion and maintenance of health and work ability are regular occupational health service activities. Work ability as such is a complex issue, and that of an ageing individual even more multifactorial. The competent and successful maintenance and promotion of work ability needs a multi-professional approach and the active participation of all stakeholders, including occupational health services, employers, workers' representatives and, first and foremost, the worker him- or herself. This also requires comprehensive content and multi-professional competence among occupational health service providers (41).

Nevertheless, older workers have several strengths, including experience which fosters good judgment, high levels of work engagement and employment stability, low rates of sickness absenteeism, good social skills, and abilities to train younger workers in good work practices and serve as role models for them. To meet the needs of ageing workers, workplace policies need to do the following:

- Adjust work procedures and the organization of work to the worker
- Prevent chronic diseases and promote health, starting as early as possible during working careers
- Detect disease early and intervene through effective prevention and treatment
- Limit long working shifts
- Reduce or eliminate work at night and shift work
- Moderate physical workloads, heavy moving and lifting tasks, and repetitive work
- Avoid extremes of temperature
- Ensure rest breaks according to physical and physiological needs
- Develop programmes for maintaining and promoting work ability
- Maintain functional capacities through health promotion, healthy nutrition, and physical fitness programmes (42–43).

In many countries, national and local programmes aim to maintain the work ability, physical and psychological performance, and competence of older workers so they can fully participate in the workforce. These programmes attempt to eliminate older workers' obstacles to participation – obstacles that are related to health, work, the work environment, and/or the outdated or insufficient competence to perform work (lifelong learning). These programmes improve the functional capacities of ageing workers, promote their health, provide training and education, and, most importantly, adjust the work environment and working practices to the needs of ageing workers, including facilitating their return to work after sick leave. Countries throughout the world have responded in different ways to the ageing of the workforce. The European 2020 Strategy of the EU proposes smart, sustainable, and inclusive growth and emphasizes the need to promote active ageing policies, which the EU defines 'as growing old in good health and as a full member of society, feeling more fulfilled at work, more independent in daily life and more involved as citizens'. No matter how old they are, older people can play an important role in society and enjoy a good quality of life. The challenge is to make the most of the enormous potential that older people have, even at a more advanced age. The promotion and maintenance of workers' work ability plays a central role in the EU strategy. An innovation is the Active Ageing Index (AAI) for measuring countries' and communities' statuses in active ageing programmes. The 22 AAI indicators are divided into four main domains: employment, social participation, healthy living, and capabilities and enabling environments. Countries and communities can benefit from the AAI benchmark and receive status reports and information for further development (42–43).

2.2.3 Challenges to occupational health services arising from 'new work life'

Globalization has shown both positive and adverse effects on employment and working conditions. A positive impact has been the formalization of informal work and the reduction of working poverty (44). However, the positive growth in the economy, particularly trade, the liberalization of the economy, financialization of businesses, the associated relative reduction of the value of human work, lowered investment rates, changes in production methods, and the downsizing of production by subcontracting and outsourcing to low-cost countries have also led to growing income gaps between the richest and the poorest, uncertainty in employment, precarious contracts, the fragmentation of enterprises, and growing uncertainties and turbulences in global and national economies.

Other megatrends which are closely associated with and partly enable globalization are the introduction of new technologies, robotization, digitalization, and the growing mobility of all four key factors in economies – capital, products, labour, and services. Parallel and in addition to globalization, the new developments in work life include the introduction of new technologies and new work organizations, growing competition, and increasing occupational stress and job insecurity, together with the demographic changes among the workforce such as ageing, feminization and migration, have increased the need for occupational health services (45–46). The new global economic trends, particularly the global financial crises have, however, been less conducive to the development of occupational health services for all working people (47). The downsizing and outsourcing strategies in modern businesses, together with the concomitant fragmentation of enterprises, outsourcing and commercialization of occupational health services have weakened the infrastructures for occupational health services and in many cases detached the services from client enterprises and their work environments. In the ILO and the International Social Security Association (ISSA) studies and the 27 EU Country survey by the European Agency on Safety and Health at Work (EU-OSHA) in the times of the 2009 financial crisis, 61% of the interviewed Europeans reported that the impact of the global financial crisis had led to deterioration in working conditions (47–50).

In the globalizing economies, countries compete through the quality and productivity of their workforces (51). A well-developed occupational health service system provides support for the development of productivity and the prevention of productivity loss, by supporting the prevention of sickness absenteeism, premature disability, controlling loss from occupational accidents and diseases, extending the working careers of ageing working populations, and improving work organization (49, 51–55). So far, only a few countries have organized occupational health services for most workers (56). The data on the access of the total working population to occupational health services are not systematically collected in most countries. At best, the available statistics on OHS cover only the formal labour sectors, and lack data on the smallest enterprises, the self-employed and the informal sector, i.e. the majority of the global work force.

The effective and sustainable response to the occupational health challenges of globalization requires more emphasis on the occupational health of working people and support for maintaining their work ability in today's rapidly changing labour markets.

2.3 Occupational health policies and instruments of International Organizations – ILO, WHO, ICOH

International Organizations, such as the ILO, the WHO and the ICOH have encouraged countries to organize occupational health services for all working people irrespective of the sector of economy, size of enterprise or type of employment of the worker. The ILO and WHO have based their guid-

ance on the international definition of occupational health, which was first given by these two organizations in the first Joint ILO/WHO Committee on Occupational Health in 1950 and was revised in its 12th session in 1995. According to this definition, occupational health should aim at (57):

- the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations
- the prevention amongst workers of departures from health caused by their working conditions
- the protection of workers in their employment from risks resulting from factors adverse to health
- the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities
- and, to summarize: the adaptation of work to the worker and of each worker to his job.

The Policy Resolutions of International Organizations, such as the

- WHO Global Strategy on Occupational Health for All 1996 (8)
- Millennium Development Goals, MDGs 2000 (12)
- ILO Global Strategy on Occupational Safety and Health 2003 (14)
- WHO Global Plan of Action on Workers' Health 2007 (15)
- UN Sustainable Development Goals, SDGs 2015 (13)

have emphasized the need for occupational health services for all workers.

- The Joint ILO/WHO Committee on Occupational Health 2003 (58)
- ICOH's Centennial Declaration 2006 (45)
- EU OSH Strategic Framework 2014–2020 (59)
- ICOH's Cancun Charter on Occupational Health Services for All, 2012 (60) and
- ICOH's Seoul Statement on the Development of Occupational Health Services for All, 2015 (27)

have called on member countries to strengthen their occupational health services to better respond to the needs of the health and work ability of their working populations. In addition to the formal and well-organized sectors of work life, the development of occupational health services is also seen important for small-scale enterprises, the self-employed and the informal sector workers (5–6, 61).

2.3.1 ILO policies

The ILO is the only tripartite United Nations agency that brings together representatives of governments, employers and workers from 187 countries to jointly shape policies and programmes promoting decent work for all. The ILO conducts four main occupational safety and health, OSH, activities: (i) provision of international standards (conventions); (ii) training of governments, employers, workers, and practitioners in member countries; (iii) dissemination of practical information, exchange of experiences and facilitation of technical co-operation activities, particularly for low-income countries, and (iv) technical assistance to countries.

The 189 ILO conventions include eight 'core' conventions for the protection of human rights at work; four 'governance' conventions for employment policy, labour inspection and social dialogue (62).

The 'technical conventions' include ILO Convention on Occupational Safety and Health (C 155), ILO Convention on Occupational Health Services (C 161) and ILO Convention on Promotional Frame-

work for Occupational Safety and Health (C 187). These three instruments aim for universal coverage of occupational safety and occupational health for every worker and workplace (63), including full coverage of occupational health services.

In 1999, the ILO launched the Decent Work Agenda (DWA) for the development of conditions of work globally. The DWA model integrates the policies and practices of employment, social security, health and safety, equity and human rights, and contribution of social partners, through four pillars: a) productive employment, b) social protection, c) social dialogue, and d) basic rights at work (64–65).

The DWA has been endorsed and supported by several other international bodies, including the UN, the United Nations Development Programme (UNDP), the Food and Agriculture Organization of the United Nations (FAO), the EU, the OECD, and the G20. Its ultimate objective is to ensure decent conditions of work, employability, safety, health, and good work ability for every working individual and, through productive work life, long working careers and a decent life without risk of ill-health, poverty, exclusion or discrimination.

A total of 103 National Decent Work Programmes (NDWP) are on-going or being prepared, particularly in developing and transitory countries, but also in some advanced industrialized economies (66–68).

The DWA constitutes a multidisciplinary and multisectoral response to the challenge of collaboration in occupational safety and health in today's globalizing work life. For practical implementation in developing countries, ILO's low-cost workplace development methods, WISE and WIND and the BOHS for occupational health services can be used in combination for the implementation of the NDWP.

The ILO has developed a multiple set of indicators to measure DWA performance in countries. This includes employment opportunities, adequate earnings, decent working hours, combination of work and family life, work that should be abolished (child work), stability and security of work; equal opportunity and treatment and safe work environment, social security, social dialogue, and the economic and social context for decent work. The DWA and NDWP have shown to have a positive economic impact at national and enterprise levels (69–72).

In 1990, the Finnish Institute of Occupational Health, FIOH, following the example of some multinational corporations, started to develop a strategy of zero accident risks for future development of occupational safety and health in rapidly changing work life. In 2003, FIOH established the Zero Accident Forum for enterprises (73). Later, this initiative was europeanized by the Partnership for European Research in Occupational Safety and Health (PEROSH), Network of the European OSH Institutes and EU-OSHA (74). On the initiative of the Government of Germany, the G7 Summit Meeting in Berlin in 2015 founded the Vision Zero Fund (VZF). This has also recently received the endorsement of the EU and G20 countries. The aim of the Fund is to prevent work-related deaths, injuries and diseases in sectors operating in or aspiring to join global supply chains (GSCs). VZF's main objective is to increase collective public and private action aimed at fostering and enhancing concrete occupational safety and health (OSH) prevention activities in businesses operating in low- and middle-income countries. The VZF is a multi-donor trust fund, and welcomes contributions from governments, intergovernmental or non-governmental organizations, and from private sources including companies, foundations and individuals. The ILO administers and implements VZF projects (75).

2.3.2 WHO policies

In line with its Constitution, WHO has recognized employment and work as one of the central social determinants of health and has accordingly designed global occupational health policies (2, 76–77). In 1950, WHO, jointly with the ILO, launched an international definition of occupational health. In 1996, the WHO Global Strategy on Occupational Health for All (8) was endorsed by the World Health Assembly (78). The emphasis was on the preparation of new occupational health policies, developing and strengthening the necessary infrastructures, information systems, awareness of the needs and possibilities of occupational health activities, development of occupational health services for all working people, and building up the necessary support services and human resources needed for the implementation of the new Strategy. Collaboration within the WHO and with other International Organizations such as the ILO; and non-governmental Organizations, ICOH in particular; as well as with various disciplines relevant to occupational health was encouraged. The WHO 1996 Global Strategy was based on two important principles, universal provision of occupational health services for all workers and comprehensive content of occupational health services.

In 2007, the World Health Assembly endorsed the WHO Global Plan of Action on Workers' Health (GPA) for 2008 to 2017 (15), re-emphasizing the implementation of the WHO Global Strategy on Occupational Health for All. The main objectives of the GPA are to strengthen the governance of national health systems in view of the health needs of the working populations, to establish basic levels of health protection at all workplaces, and to ensure access of all workers to preventive health services linking occupational health to primary health care (PHC), improving the knowledge basis on occupational health, and stimulating the incorporation of occupational health into other policies (79).

The WHO Regional Offices have produced Regional Strategies for Occupational Health and implement the GPA actions at the regional and country levels. Both the WHO Headquarters' actions and regional GPA implementation are supported by the Global and Regional Networks of WHO Collaborating Centres for Occupational Health. A report on the examples of successful cases of implementation of GPA actions is available from the International Network of WHO Collaborating Centres for Occupational Health (80).

The draft of the 13th WHO General Programme of Work 2019–2023 addresses the universal coverage of health services, decent work for health workers, work-related diseases, and the prevention of adverse health impacts of the climate change (81).

In 2003, the 13th session of the Joint ILO/WHO Committee on Occupational Health proposed a new concept, Basic Occupational Health Services, BOHS, in order to extend the services to the 2.5 billion underserved (and vulnerable) workers and their workplaces. The BOHS approach has been experimented in several countries (58, 82–84). WHO also provides policy and technical support for member countries in several occupational health issues, including guidance for combating the most severe occupational diseases such as asbestos-related diseases and silicosis and work stress, and health promotion and tobacco control at the workplace.

The WHO Global Strategy on Occupational Health for All (1995) included the principle of universal occupational health service provision for all working people. A new stimulus for the development of occupational health services was obtained from the UN Sustainable Development Goals Nos. 1 and 3 (13), which call for the availability of specialized or basic occupational health services for all working people. The new WHO initiative on universal health coverage (UHC), for enabling the

achievement of the UN SDGs, when applied to OHS also calls for universal OHS provision for all working people (85).

2.3.3 ICOH policies for occupational health

The mission of ICOH, the leading global professional organization in the field of occupational health and occupational safety and health, includes the development of occupational health. Thus, ICOH works for the development of occupational health research, information, good practices and training and education of occupational health experts and related professionals. ICOH has 37 Scientific Committees for the development of various aspects of occupational health, two of which are particularly important for the development of occupational health infrastructures and services; the Scientific Committee on Health Services Research and Evaluation in Occupational Health (https://eohs-icoh.org/) and Education and Training in Occupational Health.

In several contexts; the ICOH Centennial Declaration, Cancun Declaration, and the Seoul Statement (27, 45, 60), ICOH has called for the organization of occupational health services, either basic or comprehensive, for all working people, thus promoting the principle of universality. For over two decades, ICOH has hosted a Scientific Committee on Health Services Research and Evaluation in OH (earlier SC Occupational Health Services and Evaluation), which has focused on the development of occupational health service research within the ICOH framework.

The ILO, WHO and ICOH have launched models for practical low-cost OSH/OH interventions for small enterprises, the self-employed and the informal sector. These have been found feasible and effective at grass-roots levels (e.g. Work Improvement in Small Enterprises – WISE, WIND, BOHS (19, 82)). Potential channels for systems-wide action are the ratification of ILO fundamental conventions, and the Conventions No. 161, No. 155 and No. 187, and the implementation of WHO's Global Plan of Action (4–6, 15).

2.4 Research on occupational health services

The development of the world of work is dynamic; work life is always changing in the frontline of societal development. It sets great challenges for occupational health research to keep abreast with the rapid development of technologies, new materials and substances, new working methods, changes in working populations, and with the occupational safety and health and health policies. Earlier occupational health research focused mainly on studies of occupational exposures that may cause diseases, on the mechanisms and occurrence of occupational diseases, and on their diagnosis. Later, the scope expanded to research on work ability, work-related diseases, the psychosocial impact of work, health promotion, rehabilitation and return to work, and several other topics including the health impact of new technologies and new types of employment and working contracts, including the health impact of precarious work and unemployment.

In addition to problem- and risk-oriented research, research on the health services in occupational health is also needed in order to design policies and programmes with appropriate occupational health content and service effectiveness. The occupational health organizations have carried out a few surveys on occupational health services: WHO Geneva (86) and the WHO-EURO South East European Survey (87), as have ICOH and some individual researchers or research groups (88–90). National occupational health service profiles have been drawn up by international and local experts on 22 European countries and on 6 Asian, 4 African, 3 European and 2 Latin American countries, and the South Pacific (91–96).

A structured analysis of occupational safety and health, OSH, in 21 developing countries was compiled by Elgstrand in 2010, who also included brief comments on occupational health services. A few countries such as Finland and Japan have established systematic national statistics or periodic nationwide surveys on occupational health services. If collected systematically from all countries, such information would permit a detailed analysis of the status of occupational health services at national, regional and global levels (97–100).

In general, the national and global availability of systematic information on occupational health, occupational health services and, for example, registers on occupational diseases and accidents, is currently not well organized in most countries, compared to, for example, the data systems on environmental health. Countries have not systematically collected information on the contents and activities of occupational health services. In some countries, where occupational health services are available, the content may only include health examinations and provision of fitness-for-work checks, while some other countries have traditionally provided only preventive services. Only a few countries have provided services with comprehensive content as defined by ILO Convention No. 161 and Recommendation No. 171, including prevention, protection, promotion, curative services and rehabilitation, focusing not only on individual workers, but also on workers as a group; the work environment; work organization; and working conditions in general. Several isolated health promotion, health enhancement and wellness programmes, as well as projects for special hazards at work such as stress, have been instituted, particularly in industrialized countries, often on the initiative and actions of experts from outside the work community. Their impact and sustainability has often not survived critical analysis. The conclusion of critical evaluations has been the need for comprehensive, workplace-oriented and working conditions approaches with participation of the enterprise management and particularly workers and their representatives, instead of focusing from outside on workers' lifestyles and health behaviour only (21–23, 54, 101).

3 Survey on occupational health services (OHS) in selected countries of ICOH members

3.1 Objectives of the survey

The first ICOH questionnaire survey on occupational health services was carried out in 2010–2011 among the ICOH National Secretaries. The purpose of the study was to survey through key informants the status of occupational health services at the national level and to assess the national situation and extrapolate it to the global scale. The objectives for the development of occupational health and occupational safety and health have been adopted by the ILO and WHO in their strategies, programmes and standards, which the member countries have committed themselves to implement in order to protect and promote the health of their workers. A short communication on the first survey was published in Scand J Work Environment Health on-line first –article. doi:10.5271/sjweh.3317, later as a hard copy in Scand J Work Environ Health 2013;39(2):212–6. (88)

The objectives of the second ICOH survey focused on the global occupational health service situation in countries, their normative basis, structures, resources, functions, service systems, coverage and future development needs. ICOH National Secretaries served again as key informants also observing changes that may have taken place since the first survey five years earlier. A concise scientific report was published in BMC Public Health (2017) 17:787 DOI 10.1186/s12889-017-4800-z. (102)

This Report contains comprehensive data and analysis of both surveys, particularly the 2015 survey. A part of the data from both surveys have been published in the above scientific reports (Scand J Work Environ Health and BMC Public Health).

3.2 Study design

3.2.1 Research questions

The main research questions set for the survey were: What are the normative basis, structures, coverage, content, and resources of occupational health services in the countries of ICOH members? The main questions were specified through eight domains, with 20 questions in the 2010–2011 survey and 21 questions in the 2015 survey. The eight domains are described in Table 1.

Table 1. Main domains and themes of questions of the occupational health service (OHS) survey (modified from 102)

Domain	Brief title	Themes for questions
1. Normative basis	Policy	• Ratification of ILO Conventions
	Strategy	• National policy and strategy
	Legislation and implementation	• OHS legislation • Steering and enforcement bodies • Implementation of ILO-OSH 2001
2. OHS resources	Institutions and human resources	• National institutions • Professional organizations

		• Human resources (physicians, nurses, hygienists, etc.) • Composition of OHS teams
3. Training and education	Specialties	• Types of specialists • Training institutions • Duration of training (years)
4. Systems and infrastructures	Service provision models and service providers Access for workers to OHS	• Service provision models • OHS coverage • Coverage of OHS' support services • OHS for SMEs and the self-employed • Integration of OHS with PHC • Key actors in OHS
5. Substantive orientation and content of OHS	Principal orientation of OHS (preventive, curative, mix)	• List of OHS activities • Application of BOHS activities • Implementation of ILO-OSH Guideline
6. Finances for OHS	Financing models	• Financing sources (employer, public budget, insurance, etc.)
7. Future developments	Priorities for OHS development	• 3–5 highest priorities for OHS development
8. Changes and developments since the first survey	Developments in OHS since 2011	• Main changes in OHS system in any of the domains described above

3.2.2 Material and methods

The first survey in 2010–2011 (Scand J Work Environ Health 2013;39(2):212–6) (88) was composed of 20 questions within the framework of six domains. To follow up the changes between 2010 and 2015, the Second-round Questionnaire with 21 questions grouped into eight domains was submitted to a total of 58 ICOH National Secretaries during 1 April 2015–15 May 2015. (102)

To ensure the feasibility of the questionnaire form and its instructions, six senior occupational health experts in four countries were invited to fill in and assess the form. Their feedback and proposals for improvement were used for designing the final version of the questionnaire. The Webropol online survey tool was used for the implementation of the survey (103).

A total of 49 forms were received by 31 May 2015 (Table 2). The response rate was 84.5%, which was 7 percentage points higher than that in the 2010–2011 Survey. To provide more information and complete their replies, many of the ICOH National Secretaries also added other documents to clarify the situation related to the structure and functions of occupational health services in their countries.

The response rates were unevenly distributed among the continents; the highest number of respondent countries being from Europe, followed by Africa, Asia and Latin America and the Caribbean. Since 2011, the number of respondent countries in Africa has more than doubled and in the Latin American Region grown slightly, but in Europe, North America and Asia it has decreased.

Table 2. Geographical distribution of respondents, 2015 (2010–2011 in parentheses) (modified from 102)

Continent	No. of respondents' countries	%
Africa	11 (5)	22.4 (10.6)
Asia	8 (9)	16.3 (19.2)
Latin America and the Caribbean	7 (6)	14.4 (12.8)
North America	1 (3)	2.0 (6.4)
Europe	21 (23)	42.9 (48.9)
Oceania	1 (1)	2.0 (2.1)
Total respondents	**49 (47)**	**100 (100,0)**

A total of 13 countries that responded in 2011 and represented 4.9% of the total global workforce, did not respond in 2015. However, 15 new respondents were obtained in 2015, employing 273.4 million workers. Thus, the total study base grew from 1.973 billion workers in 2008 to 2.075 billion in 2014, i.e. by 5.2%. The numerical coverage of the workforce was the broadest in Asia, thanks to the two most populous countries of the world, China and India. Altogether, the respondents of the 2015 survey came from countries with a joint workforce of 2176 million, i.e. 68% of the world's total.

3.2.3 Key informants

The survey was carried out by inviting 58 ICOH National Secretaries to be key informants, of whom 49 replied. The geographical distribution of the National Secretaries is presented in Table 2, and their affiliations in national organizations in Table 3.

Table 3. Affiliations of respondents

Affiliation	n	%
NIOH	9	18.4
Ministry	8	16.3
University	19	38.8
Health centre	8	16.3
Company	5	10.2
Total respondents	**49**	**100**

3.3 Study questions

The 21 questions are described in detail in Table 4.

Table 4. Questions of the occupational health service (OHS) survey 2015

Question 1	What occupational health and safety institutions do you have in your country, e.g. Ministry, Occupational Safety and Health Authorities, Occupational Health and Safety Research Institutes?
Question 2	What professional associations in occupational health and safety, occupational health, and occupational medicine have been established in your country?
Question 3	Does your country have a formally adopted policy for occupational health services (OHS) based on ILO Convention No. 161 and related Recommendation No. 171 or other relevant provisions?
Question 4	Which body has endorsed it?
Question 5	a. Do you have an independent national strategy for Occupational Health Services? b. Do you have a national strategy for Occupational Health Services as a part of the National Occupational Safety and Health Strategy? c. Does your National Strategy have elements for OHS system, Content, Human resources, Finances?
Question 6	Who is in charge of Occupational Health Services (National OHS system) in the country?
Question 7	What is the OHS system like in your country? What service provision options do you have?
Question 8	What are the institutions at the **secondary level** contributing to OHS?
Question 9	What are the institutions at the **tertiary level?**
Question 10	Do you implement the ILO-OSH Management 2001 system?
Question 11	Have Occupational Health Services been fully or in part integrated into primary health care services?
Question 12	What is the content of Occupational Health Services?
Question 13	Do Occupational Health Services in your country contain some of the following activities? 14 activities listed.
Question 14	Has the Basic Occupational Health Services approach been introduced and used in your country?
Question 15	Who are the key actors of OHS in your country at the **national level?**
Question 16	What is the coverage of OHS in your country as percentage of the total workforce? If no statistics are available, can you estimate?
Question 17	How are OHS in your country financed?
Question 18	What are the human resources for occupational health services in your country? If statistics on numbers are not available, please estimate.
Question 19	Training of OHS personnel (This question concerns the potential availability of occupational health specialists in your country including the specialists employed in occupational health services or elsewhere)
Question 20	What are your main national priorities for the development of Occupational Health Services for the next 5 years?
Question 21	The previous ICOH OHS survey was sent on 17 September 2010. Can you name some major regulatory, programmatic or service system changes which have happened in OHS in your country since the previous survey reply?

4 Results

The replies to the 21 questions are presented here by providing the reply data and a brief background to the question.

4.1 National institutions of occupational health and safety

Question 1. *What occupational health and safety institutions do you have in your country, e.g. Ministry, Occupational Safety and Health Authorities, Occupational Health and Safety Research Institutes?*

The National Centre of Excellence plays an important role in the development of occupational health services. Typically, the National Institute of Occupational Health or Institute of Occupational Safety and Health is given this task. These institutes have several functions to support occupational health services: Training and education, information, and expert support such as measuring, sampling and analysis.

Twenty-seven of the respondents' countries had a National Institute of Occupational Health or a respective unit (NIOH or NIOSH). In the present survey, nine respondents were affiliated with national institutions. In many countries, other institutions participate in the development of occupational health services (see Table 3 – respondents).

The national institute was available in the majority of countries with MOH- and joint governance of occupational health services, and lower in the MOL-governance model (Table 5).

Table 5. Existence of a NIOH by governance

Governance	NIOH		Total no. of countries
	Yes	No	
MOH	7	3	10
MOL	10	8	18
Joint	9	9	18
Other	1	2	3
Total respondents	**27**	**22**	**49**

4.2 Professional organizations and associations

Question 2. *What professional associations in occupational health and safety, occupational health, and occupational medicine have been established in your country?*

Professional associations in the occupational health field are important non-governmental (NGO) bodies for the development of the disciplines and for training, education and information of experts in their respective competence areas. In many countries, these are authorized to grant diplomas or certificates of competence to occupational health experts. They also serve to provide a professional opinion to other stakeholders, the government, authorities, academia, and other professional bodies. Their role is important for the overall development of the field. In keeping contact with international professional organizations (e.g. ICOH) and with, for example, inter-governmental organizations such as WHO and the ILO, and the occupational health institutions and disciplines in other

countries they serve as key mediators within national and international occupational health communities.

In most of the respondents' countries, occupational health physicians (OHPs) had an association of their own (43 countries). Similarly, 30 countries had associations for occupational hygienists, 28 for ergonomists/physiotherapists and 33 for safety engineers. Surprisingly, the number of countries with professional associations of occupational health nurses (OHNs) was smaller, at 22. Some of the respondents (12 countries) also had associations for other professionals in the field of occupational health and safety, such as occupational psychologists (Table 6).

Associations of OHPs, occupational hygienists, safety engineers and occupational health nurses were the most common professional associations.

Table 6. Associations of occupational health and safety in the survey countries

Occupational health professions	No. of respondents	% of respondents
OHPs	43	87.8
OHNs	22	44.9
Occupational hygienists	30	61.2
Occupational psychologists	12	24.5
Ergonomists and physiotherapists	28	57.1
Safety engineers	33	67.3
Other	10	20.4
Total respondents	**49**	

4.3 Normative basis and governance

4.3.1 Formally adopted national occupational health service policy

Question 3. *Does your country have a formally adopted policy for occupational health services (OHS) based on ILO Convention No. 161 and related Recommendation No. 171 or other relevant provisions?*

Guidance for policy through ratification of international instruments

The respondent countries have been active in the ratification of ILO Conventions and in drawing up national policies and strategies on occupational health and safety. Some of the countries also reported the use of ILO instruments as guidance for national policies and strategies without ratification.

Several ILO and WHO instruments and documents, guidelines and codes of practice provide substantive content for occupational health services, including descriptions of model occupational health service activities and content. The key international instrument is ILO Convention No. 161 on Occupational Health Services, which requests countries to organize occupational health services for all working people, irrespective of the size of the company, sector of economy, nature of working contracts (employee or self-employed), or location of the workplace. ILO Convention No. 155 concerning Occupational Safety, Health and the Working Environment of 1981 mostly guides occupational safety activities, while Convention No. 161 with related Recommendation 171 guide the development of occupational health services (4, 5, 104).

Convention No. 161 on Occupational Health Services provides guidance on principles of national policy, functions (activities), organization of services, and conditions of operation.

Recommendation No. 171 contains more detailed practical guidance on the above provisions (104).

ILO Convention No. 155 on Occupational Safety and Health provides guidance on occupational safety and health (OSH) policies and activities, and respectively Recommendation No. 112, gives more detailed guidance on implementation.

Convention No. 187 concerning the Promotional Framework for Occupational Safety and Health of 2006 (6) provides internationally accepted systematic guidance for countries on the objectives and ways of developing occupational health policies and strategies for safety and health at national and company levels. The Convention calls on the countries to draw up national policies, profiles and programmes for occupational safety and health, including programmes for occupational health services.

Twenty-five respondents reported having a formally adopted national policy on occupational health services. Another eight respondents reported that occupational health services were included in their occupational safety and health (OSH) policy.

A total of 79% of the countries that had ratified ILO Convention No. 161 reported having a national occupational health service policy, whereas the respective percentage among the non-ratifiers was 63%.

Table 7. Formally adopted national policy in survey countries

	Formally adopted occupational health service (OHS) policy	**OHS included in other relevant provisions**	**Total**
Yes	25	8	33
No	16		16
Total respondents	**41**	**8**	**49**

A total of 23 respondents' countries (47% of the respondents) have ratified ILO Convention No. 155 (35% of all the 66 countries that have ratified this Convention), 14 countries (29% of the respondents) have ratified ILO Convention No. 161 (42% of the total of 33 ratifiers), and 17 countries (35% of the respondents) have ratified ILO Convention No. 187 (39% of the total of 43 ratifiers). Thus, collectively, 38% of all ratifications of the three key OSH-OH Conventions' ratifications have taken place in the respondents' countries.

Governance model and ratification of ILO Convention No. 161

Countries are guided by ILO Convention No. 161 in policy, programming and implementation of OHS. Only 29% of the respondents reported having ratified Convention No. 161 (Table 8). Due to the low overall numbers of ratifications, the figures for the replies were low. The highest rate (50%) of the ratification was in the countries in which the Ministry of Health governed occupational health services, and the second highest (33%) was in the countries in which the ministries of health and of labour jointly governed occupational health services. Several countries reported using the ILO in-

struments as guidance without ratification. The replies indicate that the respondents are well informed of the requirements of the international instruments, and the impact of the instruments goes beyond the scope of formal ratifications.

Table 8. Ratification of ILO Conventions

Ratified ILO C No. 161 Governance	No. of respondents' countries	Ratification of ILO C No. 161			
		Yes		No	
		n	%	n	%
MOH	10	5	50	5	50
MOL	18	3	17	15	83
Joint	18	6	33	12	67
Other	3	-	-	3	100
Total respondents	**49**	**14**	**29**	**35**	**71**

4.3.2 Endorsing bodies for the National Policy for occupational health services

Question 4. Which body has endorsed it? (i.e. the *formally adopted policy for occupational health services (OHS)*

The National Policy and Programme for the development of OHS is requested by ILO Convention No. 161, and policy and strategy by Convention No. 187 (5, 6).

The ILO Conventions guide countries to endorse the occupational health service and occupational safety and health policies in the country at the highest political level. In 69% of the respondent countries, the occupational health service policy is endorsed at a high political level, by the parliament, government as a whole, or by the responsible ministry, as recommended by the ILO. In 22% it is endorsed by the MOH or the MOL separately, or jointly by the two ministries (Table 9). (The endorsement by 'other' is not considered as the highest level.)

Table 9. Endorsement of National Policy

Endorsing body	No. of respondents	%
Parliament	12	24.5
Government	11	22.4
MOH	5	10.2
MOL	4	8.2
Jointly the two ministries	2	4.1
Others	5	10.2
Not endorsed	10	20.4
Total respondents	**49**	**100.0**

4.3.3 National strategy on occupational health services

Question 5a. *Do you have an independent national strategy for Occupational Health Services?*

For the practical implementation of the policies, the International Organizations propose a strategy that is preferably annexed with an action plan. This is to ensure sustainable long-term development of the national occupational health service system.

Over a third, i.e. 19 of the 49 respondents' countries, have an independent National Strategy on Occupational Health Services in place. However, 30 countries do not. (Table 10)

Table 10. Existence of an Independent National Strategy on Occupational Health Services (OHS)

Independent national strategy on OHS	No. of respondents	%
Yes	19	38.8
No	30	61.2
Total respondents	**49**	**100**

Question 5b. *Do you have a national strategy for Occupational Health Services as a part of the National Occupational Safety and Health Strategy?*

An OHS strategy may be drawn up as an independent document, or included as an element in a national occupational safety and health (OSH) strategy. Over a third, 39% of the respondents reported having an independent occupational health service (OHS) strategy, over a half, 28 countries, (57%) reported an occupational health service (OHS) strategy that was integrated with the OSH strategy (Table 11).

Table 11. National OHS Strategy as part of the national OSH strategy

National Strategy on OHS as a part of the OSH strategy	No. of respondents	%
Yes	28*	57.1
No	21	42.9
Total respondents	**49**	**100**
*15 respondents have reported occupational health service (OHS) strategy both as an independent strategy and as part of the OSH strategy.		

Question 5c. *Does your National Strategy have elements of OHS systems, content, HR, finances?*

One question of the survey studied the elements of an occupational health service strategy. MOH governance showed an equal amount of activity in policy-making and strategy planning, while MOL governance focused more on strategy planning than on policy-making.

Table 12. Elements of the national strategy on Occupational Health Services

Elements of the national OHS strategy	No. of respondents	%
OHS system	31	63.3
Content	32	65.3
HR	27	55.1
Finances	19	38.8
Total respondents	**49**	

The existing strategies in the majority of the replies included OHS systems, substantive content and human resources, while only one third of the respondents reported financing (Table 12).

4.3.4 Ministry in charge of OHS

Question 6. *Who is in charge of Occupational Health Services (National OHS system) in the country?*

Occupational health services is a service system that concerns several stakeholders, usually the ministries of health, labour, social security, industry, agriculture, etc. and social partners. In most countries they collaborate within the framework of the National Advisory Council/Committee for Occupational Health or Occupational Safety and Health. However, it has been found that it is important that a responsible body (or joint one) can be clearly recognized.

In 18 of the 49 respondents' countries, the responsibility for occupational health services is shared by the MOH and MOL. In 18 countries, the responsible Ministry is MOL and in 10 countries the MOH is in charge of occupational health services alone. In three countries, the responsible Ministry was the Ministry of Economics, the Ministry of Social Development, and the Labour Inspectorate (Table 13).

Table 13. Ministry in charge of occupational health services

Ministry in charge of OHS	No. of respondents	%
MOH	10	20.4
MOL	18	36.7
Joint responsibility	18	36.7
Other arrangement	3	6.2
Total respondents	**49**	**100.0**

To summarize, Table 14 describes the roles of the different ministries in charge of policy and strategy. The international instruments require both policy design and strategy planning by governments (i.e. ministries) for occupational health services in the countries.

MOH governance was almost equally active in both, policy-making and strategic planning, whereas MOL focused more on strategy planning. The joint model also did both activities equally (Table 14).

In all, 33 countries (67%) had a national OHS strategy: nine of the ILO Convention 161 ratifying countries and 24 of the non-ratifying countries.

Table 14. Governance, policy and strategy – a summary

Governance	Policy				Strategy			
	yes		no		yes		no	
	n	%	n	%	n	%	n	%
MOH	6+2	16.3	2	4.1	7	14.3	3	6.1
MOL	7+4	22.4	7	14.3	13	26.5	5	10.2
Joint	11+2	26.5	5	10.2	12	24.5	6	12.2
Other	1	2.0	2	4.1	1	2.0	2	4.1
Total	**25+8=33**	**67.2**	**16**	**32.7**	**33**	**67.3**	**16**	**32.7**

Most of the survey respondent countries have an officially adopted OHS policy, strategy or both, not necessarily as a separate policy document, but spelled out in the justification documents for labour legislation. These are not necessarily available as separate policy documents, but included

in the legislation on the Labour Code. As many as 25 countries (51%) have, however, a separate policy document for occupational health services. In addition, eight countries reported occupational health service policy elements in other relevant provisions.

4.4 OHS system and infrastructures

Question 7. *What is the OHS system like in your country? What service provision options do you have?*

4.4.1 Occupational health service provision models

Front-line services

The provision of OHS for several different types of workplaces, groups of workers and different geographical areas requires, according to national experiences, the use of multiple channels for service provision.

Most of the countries have organized service provision through multiple models (Table 15a). A total of 92% of the respondent countries utilized the big industry model. Sixty-five per cent of the respondents also utilized group services. A total of 76% of the respondents' countries also utilized services provided by the primary health care units. Half of the respondents used hospital polyclinics services. Private services were also common, used by 84% of the respondents' countries.

Table 15a. Service provision models used in the respondents' countries (modified from 102)

Provision model	No. of countries	% of respondents	Description
Big industry in-plant service	45	92	company-specific OHS unit serving enterprise ≥ 500 workers
Group service	32	65	services organized jointly by several, usually medium-sized or small companies
Primary health care - PH service model	37	76	service provided by frontline local PHC units or public health service
Hospital polyclinics	26	53	grassroots OHS provided by local or regional hospital polyclinics
Private services	41	84	OHS provided by private health service centres or by individual occupational health physicians on commercial basis
Other model	15	31	numerous other models, e,g, NGOs, trade unions, professional associations
Total respondents	**49**		

Support services

Question 8. *What are the institutions at the **secondary level** contributing to OHS?*

The respondents were asked to indicate the organizations at the sub-national (secondary) level providing support to occupational health services (for example, for diagnosis of occupational diseases). Replies were received from 43 countries (88% of the respondents).

Table 15b. Organizations providing support to occupational health services at subnational level

Institution	No. of respondents	%
Private hospitals and clinics	7	9.7
OHS system	5	6.9
University and other public hospitals	13	18.0
Public Health departments	9	12.5
Occupational Disease and Occupational Medicine Centres or respective organizations	6	8.3
Insurance institutions	6	8.3
Regional and local occupational health departments and service	16	22.2
National Institute of Occupational Health	8	11.1
Trade Unions	2	2.8
Total responses	72	99.8

High variety of support organizations was available at the subnational level, the most common being Regional and local occupational health departments and services, university hospitals and other public hospitals and public health departments (Table 15b).

Question 9. *What are the institutions at the **tertiary** level?*

The Questionnaire gave four options for naming the tertiary (national level) level support services for occupational health services, one of which was an open option, 'Other'. Replies were received from 45 countries (92% of respondents).

Table 15c. Tertiary (national) level organizations providing support to occupational health services

Institution	No. of respondents	%
National Institute of Occupational Health or respective	24	23.3
University departments	35	34.0
Private consultancies	28	27.2
Other	16	15.5
Total	103	100.0

University departments were the most common tertiary level support organizations of occupational health services, followed by private consultancies and National Institutes of Occupational Health. The 'Others' comprised several different types of private and public organizations.

4.4.2 Coverage of OHS

Question 16. *What is the coverage of OHS in your country as percentage of the total workforce? If no statistics are available, can you estimate?*

In the annex of the questionnaire, the 'coverage' in this survey was defined as the percentage of workers with access to occupational health services of the total working population, including all employees and self-employees in all branches and sectors of the economy, e.g. manufacturing industries, construction, services and public sector workers. Agricultural workers and informal sector workers are also included, where they can be identified.

The guidance provided by ILO Convention No. 161 on Occupational Health Services and the WHO Global Plan of Action on Workers' Health (WHA60.26), as well as the ICOH Centennial Declaration

in principle call on the countries to provide occupational health services for all working people, i.e. universal service provision for all types of enterprises and all sectors, including small-scale enterprises, the self-employed and the informal sector. In the present ICOH survey, the coverage of occupational health services varied from an estimated 0.5% to close to 100% coverage of employees. Table 16 below presents the coverage categories**.**

Table 16. Coverage of labour force in respondents' countries

Coverage of labour force	No. of countries	%
1–10	10	20
11–30	10	20
31–50	13	27
51–70	3	6
71–90	9	16
91–100	3	8
N/A	1	2

The summative coverage of OHS among the respondents' countries in the present survey was 24.8% (5.8% higher than in the 2010–2011 survey). There was a wide variation (0.5%–100%) in coverage between the countries. The governance structure had no impact on the coverage; unexpectedly MOH governance did not show higher occupational health service coverage than MOL or joint governance. Thus, the lead ministry or joint governance by the two ministries was not associated with the availability of occupational health services to workers. The increase in coverage in the 2015 survey was due to the higher coverage of the new respondents than in the 2010–2011 survey. Thus, it cannot be concluded that the global coverage of occupational health services has increased, but it was due to the change in the study base.

A total of 31% of the respondent countries have coverage of over 50% of employees, while that of the majority is lower or they did not provide data on coverage (Figure 1). A few countries carry out regular surveys (annually, triennially or less frequently) to investigate the real coverage of OHS in practice. However, most of the countries have no reliable statistics on these figures. The vast majority of respondents' countries estimated the coverage percentage. One country had no data available on its OHS coverage.

An estimate of worker population with access to occupational health services among the respondents' countries is approximately 585 million, thus giving an average coverage of 24.8% of the total employed population of 2.36 billion in the surveyed countries. A majority of workers, 75.2%, in the surveyed countries, however, do not have access to occupational health services.

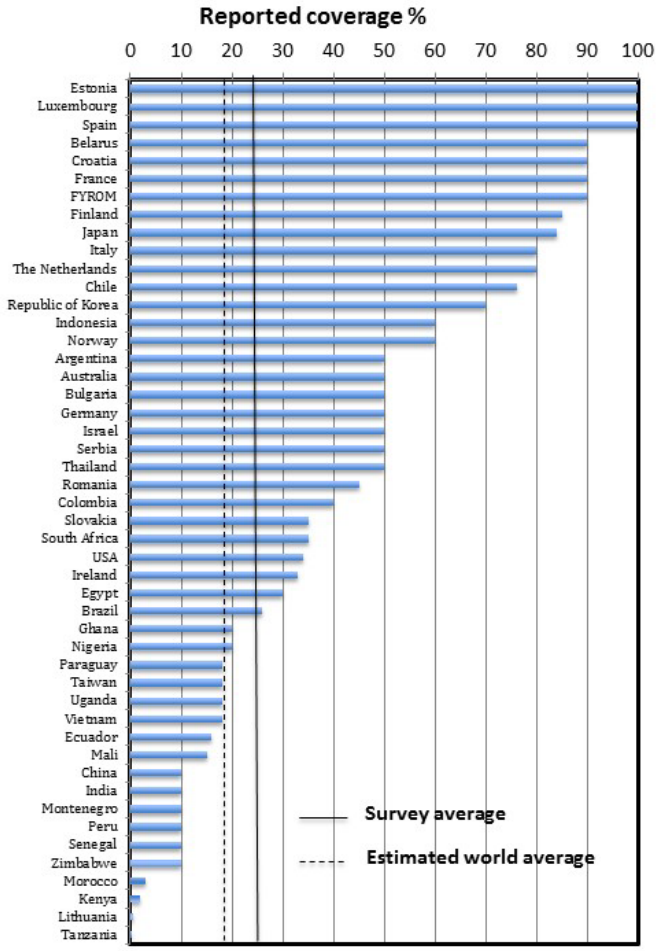

Figure 1. Estimated coverage of occupational health services reported by 48 respondents' countries (Source: 102)

4.4.3 Integration of OHS with primary health care

Question 11. *Have Occupational Health Services been fully or in part integrated into primary health care services?*

The extension of OHS to less organized sectors of economy, small-scale enterprises, the self-employed, agricultural workers and the informal sector workers needs organization of occupational health services through the primary health care (PHC) system, with the widest possible geographical and population coverage. WHO has recently emphasized the revitalization of PHC and integration of health services at the grassroots level (105). In order to ensure the widest possible coverage of occupational health services, a new approach, Basic Occupational Health Services, BOHS, was introduced as a joint area of collaboration between the ILO, WHO and ICOH (82). (Table 17)

Table 17. Integration of OHS with PHC in respondents' countries

Integration of OHS with PHC	No. of countries	%
Yes	22	44.9
Yes, partially	1	2.0
No and N/A	26	53.1
Total respondents	**49**	**100**

Half (47%) of the respondent countries have either fully or partially integrated the provision of occupational health services with their primary health care system. The model for integration varies depending on the country.

Governance and PHC integration – summary

In the interest of expanding the coverage of occupational health services and supporting the WHO general strategic principle of integrated health services, the integration of occupational health services has long been a policy objective for WHO.

Half of all respondents' countries (47%) reported that OHS were integrated with PHC. The majority of the countries with MOH (70%) and joint governance (61%) of occupational health services integrated it with PHC, whereas less than one third (28%) of those with MOL governance did so (Table 18).

Table 18. Governance and PHC integration – summary (percentages counted from all respondents)

Governance	**PHC integration**			
	yes	**%**	**no**	**%**
MOH	7	14.3	3	6.1
MOL	5	10.2	13	26.5
Joint	11	22.4	7	14.4
Other	-	-	3	6.1
Total respondents	**23**	**46.9**	**26**	**53.1**

Integration of occupational health services has long been a policy objective for WHO and several national health administrations. As can be expected, the primary health care system integration was more prevalent under MOH governance and particularly under joint governance.

4.4.4 Key actors of occupational health services

Question 15. *Who are the key actors of OHS in your country at the* ***national level?***

OHS are typically part of a service system, that falls under the interest of several jurisdictions, most often the MOH and MOL and the social partners, employers and trade unions.

All respondent countries listed the government as the actor, two thirds of the countries listed social partners and social security, and half of the countries reported national OSH councils as actors in occupational health services(Table 19).

Table 19. Key actors of OHS in respondents' countries

Key actor	No. of countries	%
Government	48	100
Employers' federations	30	63
Trade unions	33	69
National OSH Committee	24	50
National OHS Committee	6	13
Social Security Institution	24	50
Other	16	33
Total respondents	**48**	**100**

4.4.5 Implementation of ILO-OSH 2001

Question 10. *Do you implement the ILO-OSH Management 2001 system?*

The ILO-OSH Management System provides a systematic approach to the organization of occupational health and safety activities, which can easily be expanded to cover basic occupational safety services.

Half of respondents' countries had implemented the ILO-OSH Management System (106) (Table 20).

Table 20. Implementation of the ILO-OSH Management Systems 2001

Have implemented the ILO-OSH Management Systems 2001	No. of countries	%
Yes	24	49
No	25	51
Total respondents	**49**	**100**

4.5 Content and activities of OHS

Question 12. *What is the content of Occupational Health Services?*

The substantive content of occupational health services is guided by several international instruments and by numerous national guidelines. In an optimal case, the occupational health services provide preventive, protective, promotion, curative and rehabilitative services, including the surveillance of the work environment, the surveillance of workers' health, risk assessment, prevention of occupational injuries and diseases, first aid, curative care, maintenance of work ability and rehabilitation, health promotion and health education, and workplace development services, i.e. comprehensive occupational health services.

4.5.1 Content of OHS

One of the questions of the survey looked at the main orientation of the occupational health services by content; whether the contents are preventive only, curative only, or a combination of the

two. The preventive component of occupational health services is present in the occupational health services of all respondent countries, except for one.

In 34 respondent countries (69%), the main orientation is a combination of both preventive and curative activities, and in 14 countries (29%) preventive only. One of the respondents reported curative activities only (Table 21).

Table 21. Main contents of OHS in the respondent countries

Main contents	No. of countries	%
Preventive only	14	28.6
Curative only	1	2.0
Mix	34	69.4
Total respondents	**49**	**100**

Governance vs. content and activities of occupational health services

The influence of the governance model on the content and activities of occupational health services was studied by eliciting the number of activities included in typical occupational health service programmes. Services with 13 activities or more were classified as 'comprehensive', typically including, for example, the promotion of work ability and considering work-related diseases. Countries with 10–12 activities were named 'Standard' services (covering the activities stipulated by ILO Convention No. 161) and the programmes with nine activities or fewer were called 'limited'. (Table 22)

The comprehensive model was most common (51%) among all respondent countries, followed by the 'standard' content (30.6%).

Numerically, the MOL governance model showed the highest occurrence of comprehensive content (72% of all MOL), while the MOH governance model showed 50% occurrence. In terms of all respondents, the 'standard' content was much less prevalent (30.6% of all).

Table 22. Governance model and content of OHS

Governance model	No. of countries	Comprehensive	ILO Standard	Limited
MOH	10	5	3	2
MOL	18	13	3	2
Joint	18	7	7	4
Other	3		2	1
Total respondents	**49**	**25**	**15**	**9**

Content categories:
13–14 Comprehensive activities (including prevention, protection, promotion, full curative services and rehabilitation)
10 –12 Activities corresponding to ILO Standard (including prevention, protection, first aid, rehabilitation, information, training, etc.)
1–9 Limited activities (typically only preventive or only curative)

Ratification of ILO Convention No. 161 did not seem to have a major impact on the comprehensiveness of the content of occupational health services (Table 23).

Table 23. Content of occupational health services

Ratified ILO Convention No. 161 No. of countries		Content of OHS		
		Comprehensive	ILO 161 Standard	Limited
Yes	14	7	5	2
No	35	18	10	7
Total	**49**			

4.5.2 Activities of occupational health services

Question 13. *Do Occupational Health Services in your country contain some of the following activities?*

The ILO instruments and WHO guidance and textbooks list numerous different activities to occupational health services. The lists of activities vary widely in different countries, and depend on the national law, practice and tradition. The number and content of activities differentiate the services with comprehensive, standard and limited content (Tables 23 and 24).

Table 24. Activities of OHS in respondent countries (modified from 102)

Activities of OHS	No. of countries	%
Surveillance of the work environment	46	93.9
Surveillance of workers' health	46	93.9
Information and education	45	91.8
Assessment of health and safety risks	44	89.8
Promotion of health and work ability	43	87.8
Record keeping	43	87.8
Preventive actions	42	85.7
Prevention of accidents	42	85.7
First aid	42	85.7
Diagnosis of occupational and work-related diseases	42	85.7
Orientation and planning	39	79.6
Evaluation and auditing	33	67.3
General health care	30	61.2
Curative care and rehabilitation	30	61.2

A higher percentage of countries with MOL governance (89.5%) and joint MOH and MOL governance (78.0%) followed the comprehensive content model of services, while 70% of those with MOH-governed occupational health services had such a wide content.

Almost all countries include ‘classical OHS activities’ in their programmes: surveillance of the work environment, surveillance of workers’ health, risk assessment, information and education. Prevention of accidents, diagnosis of occupational diseases, first aid, record-keeping and promotion of health and work ability were reported by over 85% of the respondents (Table 24).

Comprehensiveness of occupational health services was measured by the number of different types of activities (out of the 14 listed in the questionnaire) included in the occupational health service programme. The services with 13–14 activities including prevention, promotion, curative care, rehabilitation, information and training and education were considered comprehensive; services with

10–12 activities were regarded as 'standard' content, corresponding roughly to the contents stipulated by ILO Convention No. 161; and services with 1–9 activities were classified as limited.

The multidisciplinary content of services was common in the replies; over 85% of respondents reported a total of 10 or more different occupational health services activities, including prevention, risk assessment, health education and information, surveillance of the work environment and workers' health, diagnosis of occupational diseases, and prevention of accidents. The provision of such content requires multidisciplinary OHS staff. Ninety-four per cent of respondents use three or more expert categories in occupational health services. The international instruments particularly emphasize the prevention of occupational health and safety hazards as the key content of services.

Question 12 elicited the main orientation of OHS. One country reported curative activities as the only content of their OHS. Question 13 listed 14 activities of OHS of which half were preventive (according to ILO Recommendation No. 171 and the BOHS guideline) (82, 104).

4.5.3 BOHS

Question 14. *Has the Basic Occupational Health Services approach been introduced and used in your country?*

Basic Occupational Health Services were launched by the Joint ILO/WHO/ICOH initiative for the expansion of coverage of OHS and to reach the underserved groups of workers in SMEs, among the self-employed and informal sector workers.

The majority, 55% of respondents reported use of the BOHS approach; 24% reported its use as a separate service, and 35% used it as a service integrated with PHC, meaning that some countries organized BOHS by using both settings (Table 25). BOHS integration was found in all governance models, but was more likely in the MOH jurisdiction

Table 25. Introduction of BOHS in respondent countries

BOHS introduced? Yes, and if yes, at what level	No. of countries	%
Yes	27	55
As a separate OHS	12	24
Integrated with PHC	17	35
No	22	45

4.6 Human resources for OHS

4.6.1 Numbers of occupational health experts

Question 18. *What are the human resources for occupational health services in your country? If statistics on numbers are not available, please estimate.*

The numbers of six OHS expert categories were calculated on the basis of replies by the National Secretaries (including safety engineers, who may be available on a part-time basis for occupational health services in accident prevention, though assigned mainly on the basis of OSH law for overall safety purposes).

Data on the numbers of various occupational health experts were available in 42 countries (86% of respondents). For most countries, the total numbers of experts were available, but not the full-time equivalents. The density of experts, i.e. the average number of served workers per expert, for example, an occupational health physician (OHP) per the number of workers, varied substantially between the respondent countries.

The largest work input is that by the OHPs who represent one third of the total expert personnel for occupational health services (Table 26). Numerically, the largest expert group was safety engineers, but due to their main role being that of safety, their time contribution to OHS is far below full time, estimated as a few per cent of the total. The nurses' work input was the second largest, but was only a half of the input of doctors. As the data on full time/part time allocation are not available, the real work input of OHPs and OHNs may be more equal. The resources for occupational hygienists, and particularly of ergonomists and psychologists, are very low, as is the availability of these experts in relation to the average number of served workers.

Table 26. Total numbers of professionals in occupational health services in respondents' countries (modified from 102)

Profession	No. of respondents	No. of professionals	% of total	Density of professionals (no. of workers per expert)
Physicians in occupational health	43	143 522	34	1/16 416
Nurses in occupational health	29	75 365	18	1/31 261
Occupational hygienists	29	35 290	9	1/66 761
Safety engineers	28	149 147	36	1/15 796
Ergonomists/ Physiotherapists	24	9 753	2	1/241 567
Psychologists	19	2 953	1	1/797 833
Total		**416 030**	**100**	**1/5 663**

The availability of various expert groups in countries was elicited to assess the distribution of the different competences in the countries. OHPs were available in all countries and OHNs, safety engineers and occupational hygienists in 71–80% of the countries, whereas ergonomists were available in only 65% and psychologists in fewer than half (Table 27). As indicated in Table 26, quantitatively the contribution of the last three expert groups is small. The ratio of occupational health physicians to nurses working in occupational health services is 1.9:1.

Table 27. Human resources for occupational health services

OH&S professional groups	No. of respondents' countries	%
OHPs	49	100
OHNs	34	71
Occupational hygienists	34	71
Safety engineers	40	80
Ergonomists/physiotherapists	31	65
Occupational psychologists	24	49
Other	20	41

4.6.2 Availability of specialties for occupational health services

Question 19. *Training of OHS personnel (This question concerns the potential availability of occupational health specialists in your country including the specialists employed in occupational health services or elsewhere)*

The competence of occupational health service expert resources was studied by inquiring about the availability of specialties for various expert groups.

Forty-four of the countries (90% of the respondents) have a specialty in occupational medicine or occupational health, and special training for occupational health nurses is organized in 21 countries (43% of the respondents) and for occupational hygienists in 28 countries (57% of the respondents). Professional associations or medical chambers or specialty boards, in which the associations and universities participate, examine and grant the specialties and diplomas to experts (Table 28).

Table 28. Specialties related to occupational health services in respondents' countries

Specialty	No. of countries	%
Specialty in Occupational Medicine/OH	44	90
Specialty for OHNs	21	43
Specialty in Occupational Hygiene	28	57
Specialty in Occupational Psychology	13	27
Specialty for Ergonomists/Physiotherapists	24	47

4.6.3 Occupational health service teams

One of the basic principles in the development of occupational health services according to ILO Convention No. 161 is to organize services by multidisciplinary teams. An optimal team would comprise an OHP, OHN, occupational hygienist, ergonomist, safety engineer, occupational psychologist and other disciplines closely related to occupational health and safety.

The multiprofessional (and consequently, multidisciplinary) approach to occupational health services was measured by counting the number of different professionals in OHS. The professionals counted were OHPs, OHNs, occupational hygienists, ergonomists, occupational psychologists, safety engineers and others. Four different areas of expertise or more was considered multidisciplinary, three or less was counted as monodisciplinary as in most cases this means an OHP and an OHN, and in some cases also an occupational hygienist, but no other professionals.

In most countries, the competence profiles of the occupational health service teams were multidisciplinary, as proposed by the ILO. In seven countries seven and in 12 countries six disciplines were available (Table 29). The most common number of professions in occupational health teams was six. Altogether 92% of the respondents reported three or more specialists being available for occupational health services. Some of the expertise was available only occasionally, while the physicians' and nurses' services were more regularly available.

The majority, 81.6% of all respondents, reported a multidisciplinary competence structure (four different areas of expertise or more) of occupational health service personnel; 70% of the countries with the MOH governance model, 94% with the MOL governance model and 78% of the countries with the joint model. (Table 30). This is in line with the occurrence of comprehensive and standard

contents of services, which both require multidisciplinary staff for implementation. However, quantitatively the densities of various experts in the countries indicated less possibilities for implementation in practice (Table 31).

The expertise of OHPs was available in all the countries, and that of OHNs in 71% of the countries. Occupational hygienists and safety engineers were also well available (60% and 82%, respectively), while the availability of ergonomists and psychologists was lower (63% and 49%). Table 26 shows the total numbers of reported OHS experts in the countries of the respondents.

Table 29. Occupational health teams

Professions	No. of countries	% of respondents
7	7	14.3
6	12	24.5
5	10	20.4
4	11	22.4
3	5	10.2
2	3	6.1
1	1	2.1
Total respondents	**49**	**100.0**

Table 30. Multidisciplinarity in occupational health services in different governance models

Governance	Multidisciplinary (4–7 different experts)	Monodisciplinary (1–3 different experts)
MOH	7	3
MOL	17	1
Joint	14	4
Other	2	1
Total respondents	**40**	**9**

Table 31. Governance and professions in occupational health service team – summary

Professions/ Governance	7	6	5	4	7–4 (%)	3	2	1	3–1 (%)
MOH	3	2	1	1	7 (70)	2	1		3 (30)
MOL	2	8	2	5	17 (94)	1			1 (6)
Joint	2	2	5	5	14 (78)	1	2	1	4 (22)
Other			2		2 (67)	1			1 (33)
Total	**7**	**12**	**10**	**11**	**40**	**5**	**3**	**1**	**9**

Governance and professions in OHS team – summary

In the 2010–2011 survey (88), numerous experts belonging to the 'others' category were reported in 20 countries, including professionals such as occupational safety consultants, occupational inspectors, occupational therapists, chemists, physicists, work environment measurement specialists, audiometry and lung function technicians, social workers, health promotion personnel, agricultural technicians, opticians, dieticians, speech therapists, intervenists for the prevention of occupational hazards, environmental engineers, and work organization experts.

4.6.4 Training of OHS personnel

Question 19 inquired about the specialist training for occupational health services. The figures follow the availability of specialties in the countries (Table 28). The most prevalent specialist training programmes are found for OHPs, occupational hygienists and OHNs.

Training is provided by university medical faculties for the basic curricula of OHPs and by nursing schools, universities and polytechnics for OHNs. The professional associations contribute together with universities to complementary training.

The majority of physicians in occupational health services do not have specialist training in occupational health/occupational medicine, but have some training in occupational health. Among the nurses, a few months to one year of training in occupational health was common, while proper specialist training of three to four years or more was rare.

4.7 Financing

Question 17. *How are OHS in your country financed?*

According to ILO Convention No. 161, the primary responsibility for financing rests on the employer. There are several mechanisms through which such responsibility can be met, for example, direct financing by the employer or different intermediate systems, such as insurance financing or group services.

The survey elicited the financing systems by providing the most common financing system models in the questionnaire. Several financing models are in parallel in use in many countries. In the majority (65%) of the countries, financing uses mixed employer and insurance funding (combination), which is also a relatively 'well organized model' (Table 32). Occupational health services in one third of respondents' countries are financed exclusively by the employer, which suits big industries well, but lacks the 'pooling the risk principle' of financial responsibilities, which are achieved through insurance. Such pooling is important for smaller enterprises.

Table 32. Financing mechanisms of OHS in respondents' countries (Modified from 102)

Financing mechanism	No. of countries	%	Description
Employers only	16	31	Employers cover directly all the costs incurred from OHS
Public sector only			All costs of OHS covered by public health budget
OSH Insurance	1	2	OHS costs covered by occupational accident and disease insurance
Special Insurance			Special insurance organized exclusively for OHS (has been earlier available in some countries)
General Social Insurance	1	2	OHS funded from the General Social Insurance of the whole population, or employed population
Combination of some of the above	31	65	Several different combinations are available in various countries
Other			
Total respondents	**49**	**100**	

4.8 Future priorities

Question 20. *What are your main national priorities for the development of Occupational Health Services for the next 5 years?*

In the rapidly changing work life, OHS also need continuous development. The survey elicited the countries' priorities in future development through an open question.

The respondents were asked to mention three to five priorities for the future development of occupational health services. Respondents from 44 countries (90%) replied to the question of future priorities and gave a total of 154 priority items. Seven groups of priorities were recognized (Figure 2):

1. The development of the content of OHS; prevention in general, risk assessment, development of substantive content of OHS, development of quality of OHS, workers health promotion, safe design of workplace, prevention of occupational diseases, research on occupational health,
2. Development of infrastructures; strengthening of institutions for OHS, expansion of coverage of OHS,
3. Development of OHS functions, such as mainstreaming of OHS in public policies, developing information systems, registration of occupational diseases, development of collaboration in OHS, development of OHS functions and activities,
4. Capacity building, particularly training of OHPs, OHNs and other occupational health experts, as well as the integration of OHS elements into the curricula of other experts and the development of OHS skills,
5. Development of governance of OHS; development of enforcement of regulations, endorsement of ILO Conventions, strengthening of financing of OHS, enhancing the role of social partners,
6. Development of policies and regulations; development of workers compensation regulations, regulations for comprehensive OHS, development of OHS legislation,
7. Development of strategies and programmes; drawing up policy and programmes for OHS, production of national action plan for OHS.

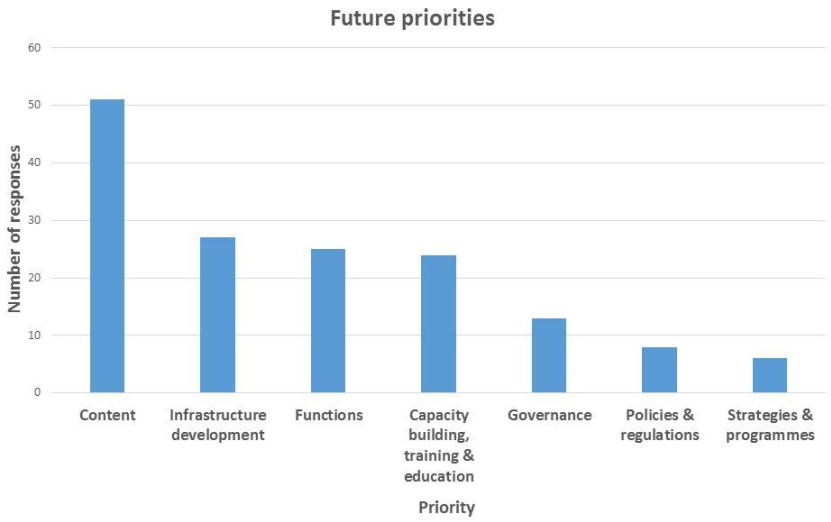

Figure 2. Future OHS development priorities of the respondents' countries (Source: 102)

The respondents identified many priorities for the future development of OHS. The priorities were principally directed towards strengthening the prerequisites, infrastructures, capacities and content of services, i.e. means of implementation, whereas the development of policy or strategy were located later on the list.

4.9 Major changes

Question 21. *The previous ICOH OHS survey was sent on 17 September 2010. Can you name some major regulatory, programmatic or service system changes which have happened in OHS in your country since the previous survey reply?*

The respondents were asked to report on the major changes and developments in their countries since the first questionnaire survey in 2010–2011 (88). Respondents from 42 countries replied. Changes have mainly taken place in the OHS regulation and policy; almost half, 20 respondents, reported on development in OHS legislation and 10 in national policy, profiles and programmes. Nine countries reported improved organization of OHS and improvement of OHS strategy /policy. Developments in training were also reported (Table 33).

Table 33. Five most common major changes in occupational health services since 2010–2011.

Major change	No. of respondents	%
Improvements in legislation	20	47.6
National policy, profile, programme	10	23.8
Improved OHS organization	9	21.4
OHS strategy/policy	9	21.4
Training programmes developed	4	9.5

5 Discussion

5.1 General issues

The key international instruments for the development of occupational health services in countries comprise ILO Recommendation No. 112 on occupational health services (107), ILO Convention No. 161 on Occupational Health Services and related Recommendation No. 171, the WHO Global Strategy on Occupational Health for All and the WHO Global Plan of Action on Workers' Health. A request for occupational health services is also mentioned in ILO Convention No. 155 on Occupational Safety and Health and in Convention No. 187 on Promotional Framework for Occupational Safety and Health (4–6, 104, 107).

The unique location of OHS between the two jurisdictions of labour and health has led to legislation stipulation on OHS in OSH laws, and in many countries to joint governance. This makes policy making, strategy planning, steering and resource allocation more complex than in monosectoral settings: usually, the MOL controls the compliance of employers and the MOH provides the services and controls the substantive content, quality and competence of the OHS personnel. The social partners, employers and workers, play an important role in practical implementation.

ILO Convention No. 187 and the WHO Global Plan of Action on Workers' Health call for drawing up a national policy framework and strategy on occupational safety and health and workers' health. Drawing a national OHS profile would facilitate its implementation by providing equal information for all partners in the governance of OHS and would reveal both the strengths of the system and its needs for development (Figure 3) (95, 108–109).

An experiment to create an eight-domain profile using data from four countries in the ICOH survey is presented in Figure 3.

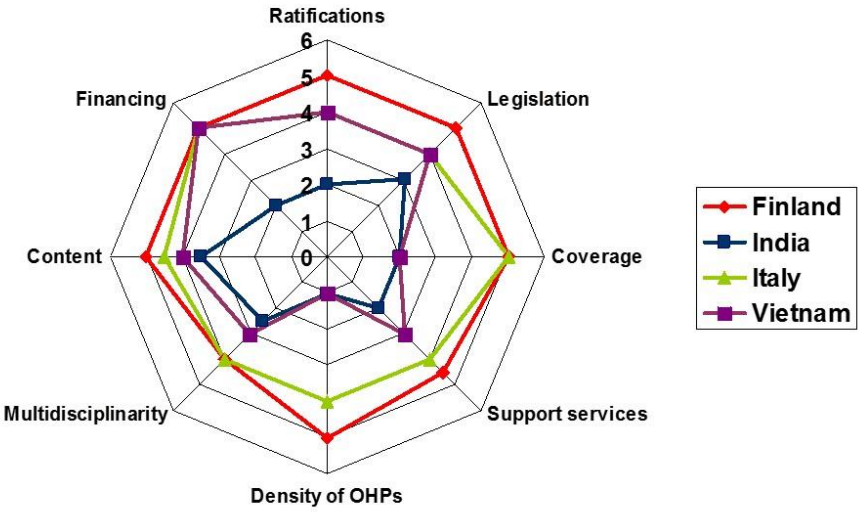

Figure 3. Arbitrary eight-domain profiles of four countries drawn up on the basis of the survey. (Scaling criteria provided in Annex 2) (Source: 102)

5.2 Specific issues

This survey was carried out using the ICOH National Secretaries as key informants. Key informant surveys have been widely used in the research of health services systems (110–113). The present survey used the definition of the key informant by Parsons et al.: "the key informant within the context of survey research refers to the person with whom an interview about a particular organization, social programme, problem, or interest group is conducted. In a sense, the key informant is a proxy for her or his associates at the organization or group. Key informant interviews are in-depth interviews of a select (non-random) group of experts who are most knowledgeable of the organization or issue". The use of proxy in the survey research has been extensively discussed by Parsons et al., 2000 (113).

ICOH National Secretaries as key informants

ICOH National Secretaries are specially appointed by the ICOH President for three-year tenures from among active ICOH members who are known to have good contacts with occupational health communities, stakeholders and actors in their countries. The majority of the appointments are renewed for another term, thus providing a total term of six years. The National Secretaries are elected by the ICOH members in countries, in which more than 15 ICOH members are registered. For countries with 15 ICOH members or less, the National Secretary is appointed by the ICOH President after consultation with the registered ICOH members in the country. The respondents' countries represent 75% of the whole ICOH membership.

Thirty-six per cent of the responding ICOH National Secretaries were affiliated with universities, 19% with national institutes and 17% with ministries. The share of national associations was 9% and the rest comprised several other OHS-related institutions, including industries, OHS providers, research institutes and consultancies. Thus, the responding National Secretaries were distributed in both public and private sectors and in numerous economical or industrial activities. Due to the special structure of ICOH national representation, only one key informant per country was available for the survey, which may have limited the scope of information provided in the replies.

The majority (89%) of the respondents had participated in ICOH and WHO meetings or courses during the past eight-year period, in which key aspects of OHS were an agenda item. ICOH also has members in 37 additional countries which do not have an ICOH National Secretary.

The response rate of the ICOH National Secretaries was high, at 84.5%. The number of ICOH members in the country refers to the size of the occupational health community in the country and the size of the occupational health community can be assumed to reflect the size of the occupational health service system. A total of 41% of respondents were 'small' ICOH countries with up to 15 ICOH members, and 59% were 'large', with 16 members or more. The higher number of ICOH members was associated with a higher response rate, which further increased the relative weight of the countries with well-organized occupational health communities

Limitations of the method

The survey questions were designed using the questions of several other surveys and their verbiage as a starting point (86, 89, 90, 114). In addition, the questionnaire offered space for clarification for eight question items, because often the pre-set options were not sufficient to interpret the situation correctly. Complementary information and documents on the occupational health services in

the countries were used for interpreting the reply data. Interactive communication was offered to respondents for clarification of possible problems in filling in the form. The high response rate (84.5%) and the low rate of 'not available' replies speak for reasonably good feasibility of the questionnaire form.

Three factors may have caused a positive bias in the current survey results. First, the proxy respondents were assumed to interpret the situation more positively than the constituents. This was likely true of their assessment of the situation in small-scale enterprises and among the self-employed. Second, the size and activity of the occupational health community in the country was reflected in active ICOH membership; so the ICOH National Secretaries were likely to represent countries with better than average OHS systems. Third, the replies were in principle mainly qualitative. For example, as the comprehensive content of OHS is reported by high numbers of countries, the result cannot be interpreted as nation-wide coverage of comprehensive OHS, but as an identifiable part of OHS that has such content. On the other hand, such replies indicate that the comprehensive content of services is not prohibited in the country (as it has been in the past in some countries). Thus, the study basis can be assumed to represent a better level than the world average in the development of occupational health services. Therefore, conclusions on the average global situation on the basis of the current survey should be drawn with caution. The potential bias in reporting multidisciplinary content will be discussed below in points 'Human resources' and 'Content and activities'.

Policy, strategy and legislation

The key international instruments for the development of occupational health services in countries comprise ILO Recommendation No. 112 on occupational health services, ILO Convention No. 161 on Occupational Health Services and related Recommendation No. 171, the WHO Global Strategy on Occupational Health for All and the WHO Global Plan of Action on Workers' Health. ILO Convention No. 155 on Occupational Safety and Health also requests occupational health services, as does Convention No. 187 on Promotional Framework for Occupational Safety and Health. Several ILO and WHO documents and guidelines and codes of practice provide substantive content for OHS, including a description of model occupational health service activities and content (5, 104, 115). The respondents' countries have been active in their ratification of ILO Conventions as well as in drawing up national policies and strategies. Some of the countries also informed us of the use of ILO instruments as guidance for national policies and strategies without ratification. ILO Convention No. 187 calls the countries to draw up national policies, profiles and programmes for occupational safety and health, including programmes for occupational health services. A total of 15 respondent countries have ratified Convention No. 187, but 33 countries (70% of respondents) have drawn up national policies or strategies and programmes for OHS. The replies indicate that the respondents are well informed of the requirements of the international instruments and the impact of the instruments has been greater than that of formal ratifications.

A new stimulus for the development of occupational health services was obtained from the UN Sustainable Development Goals Nos. 1 and 3 (13), calling for availability of specialized or basic occupational health services for all working people. When applied to OHS, the new WHO initiative on universal health coverage (UHC) for enabling achievement of the UN SDGs, also calls for universal OHS coverage for all working people (85).

ILO Convention No. 161 calls for drawing up a national programme for occupational health services. The occurrence of policies for occupational health was wider than that of strategies and programmes. This reflects the challenges to the practical implementation of policies in countries ('implementation gap').

The majority of the respondents' countries stipulate through occupational safety and health (OSH) legislation the obligation of employers to organize occupational health services to the workers. An independent stand-alone law on occupational health services only exists in Finland, whereas several countries, for example, Italy and Thailand authorize health centres by law to provide occupational health services. Several OSH laws include provisions for collaboration and joint decisions by the MOL and the MOH.

Service provision models

Six different service provision models are listed in Table 15. Several others may be available in some countries, depending on national law, practice and tradition; for example, an individual OHP working as a kind of 'family doctor' for companies. The experience from countries with well-developed OHS speaks for the need of several alternative models in order to maximize the coverage of services for all workers; a single or a few models do not meet the needs of workers and workplaces working and operating under different conditions and in variable environments, e.g. densely populated and highly industrialized big cities versus sparsely populated rural areas or remote worksites for e.g. mining or lumbering.

Several combinations of service provision may also be available. In Croatia, for example, special occupational health service personnel is located in the community health centre, but they carry out only occupational health services and the OHPs are specialists in occupational medicine. In Finland, the occupational health staff in municipal health centres may be full-time workers in occupational health services or their working time may be divided between occupational health services and other primary health care activities. Finland has moved a substantial part of occupational health services formerly provided by municipal health centres to municipally owned occupational health companies, working as enterprises. In Italy, the community health centres provide occupational health services for a substantial part of the enterprise population. In Vietnam, the provincial preventive medical centres and district public health centres provide occupational health services particularly for small-scale enterprises. In Serbia, the community primary health care service has organized occupational health service units which exclusively or mainly serve only a single big company and are even located within the facilities of the company, but a major part of OHPs in community health centres provide only primary health care services.

In Thailand, the whole community health service system in 75 provinces has integrated BOHS as a component into the primary health care service provision (with special training of assigned primary health care workers in BOHS) (83). In Brazil, the primary health care units provide OHS on a geographical basis. In FYR Macedonia and Montenegro, PHC units are major producers of OHS. These examples demonstrate the feasibility of OHS in general and also the BOHS approach for service provision in the primary health care system.

A total of 92% of respondents have three or more service provision models available, the big industry, private centre model and the primary health care centre model being the most common. Thus, the availability of alternative service provision models enables serving several different types of enterprises. Further delegation of occupational health to PHC staff or General Practitioners (GPs)

has been proposed. This is, however, likely to be unrealistic, as the reports by WHO speak of forty-million shortage in health personnel in general in the world and particularly in primary health care. Even in well-developed health system as in Finland, the PHC services are heavily overloaded by PHC tasks.

Coverage of services

The key aspects in infrastructures are the coverage, service provision capacity and contacts of OHS with workers, employers and workplaces. Coverage can be assessed in several domains, including, for example, legal coverage, coverage of workers in formal sectors, coverage of the total employed population, coverage of enterprises, coverage of individual workplaces, and substantive coverage by various OHS activities. Survey question No. 16 inquired about the coverage of workers as a percentage of the total employed population, i.e. the proportion of workers with access to occupational health services. The coverage of workers with OHS in the surveyed countries is insufficient, with only a few exceptions. The coverage gap is particularly seen among workers in small-scale enterprises, and among the self-employed, agriculture and the informal sector workers. The WHO Global Strategy on Occupational Health for All and ILO Convention No. 161 request universal provision of OHS for all working people. As on average 75% of the total working population in the respondents' countries have no access to occupational health services and at least 81–90% of the total working population of the world are not covered, special and intensive actions are needed to expand coverage. As the countries often set the formal employed population only as the denominator and leave out unorganized sectors, the real coverage figures in the current survey are most likely to be over-estimates. Poor registration and statistics of OHS may lead to the same direction of bias. A few countries, however, with high coverage and good regular surveys, or registration-based statistics on coverage, and sufficient human resources and activities of OHS show coverage levels over 80%, which correspond to the true situation. But even here, a gap is found among SMEs, the self-employed and the informal sector workers.

Wilson et al. (2006) found a statistically significant association between ratification of relevant ILO Conventions (Convention No. 161 in particular) and lower occupational accident fatality rates in ratifying countries than in non-ratifying countries (116). The fatality rates were associated with ratification, and ratification may make occupational health services more available. However, the average coverage in the world is still low. Assuming that the coverage of occupational health services has not substantially declined in the 13 countries that responded in 2010–2011, but did not reply to the 2015 survey, and considering the 127 million coverage of the 15 'new' respondents of the 2015 survey, the estimated global coverage would amount to 18.8%.

In view of the requirements of international instruments and often of the applicable laws in the countries, the occupational health service coverage of workers in the surveyed countries is insufficient, with only a few exceptions ('coverage gap'). ILO Convention No. 161 and the WHO Global Strategy on Occupational Health for All request the universal provision of occupational health services for all working people. Poor registration and occupational health service statistics may lead to inaccuracies in coverage estimates.

ILO Convention No. 161 has been in force for close to 30 years. The Convention and its Recommendation No. 171 provide good guidance for countries in all main principles on how to organize the provision of occupational health services at the country level. However, although 33 countries have ratified ILO Convention No. 161, and many others have used Recommendation No. 171 in developing their occupational health service system, the coverage of occupational health services in the

world remained low. To expand the coverage of occupational health services, BOHS was introduced as a joint priority of development and collaboration between the ILO, WHO and ICOH (58). Moreover, the UN Sustainable Development Goals now emphasize the need to provide occupational health services for all (SDG 3) (13), including BOHS. The aim of this approach is to follow the principles of ILO Convention No. 161, but try to extend the services at the grassroot level also to those who are underserved and who work in small enterprises, as the self-employed and in the informal sector.

It seems on the basis of the replies of the present survey that many countries have already adopted the approach of also utilizing the Primary Health Care system in the provision of occupational health services. Some comments from countries with this already long used practice indicate that primary health care providers need additional training in order to be able to provide competent occupational health services. There are promising results from Thailand, for instance, which show the feasibility of this approach.

In Thailand the whole community health service system in 75 provinces has integrated basic occupational health services (BOHS) as a component in the primary health care service provision (with special BOHS training of assigned primary health care workers) (83). In Brazil, the primary health care units provide OHS on geographical basis; in Croatia, virtually all OHS is provided from primary health care centres by occupational medicine doctors. In Finland, the municipal health centres produce occupational health services for 61% of enterprises or the self-employed and take a share of 32% of workers. In FYR Macedonia and Montenegro, PHC units are major producers of OHS.

The emerging economies with large working populations; China, India and Brazil together employ 68% of the workers of the total surveyed working population. The coverage was 26% in Brazil, 10% in China, and less than 10% in India. Many of the countries with high coverage (75% to 97%), e.g. Croatia, Finland, FYR Macedonia and the Netherlands are relatively small. However, coverages exceeding 75% were also reported, for example, in France, Italy and Japan. These examples demonstrate the feasibility of the OHS in general as well as the BOHS approach for service provision from the primary health care system (83, 87, 117, 118).

Human resources

In several countries with advanced occupational health service systems; for example, France, Japan, the Netherlands, and Croatia, well-developed human resources are available with specialist OHPs and often also specialist OHNs. In the majority of countries, however, the shortage of human resources for OHS constitutes a severe obstacle to the achievement of universal provision of services ('capacity gap'). Filling the global coverage gap in OHS to reach the average level of the 48 respondents' countries of this survey would require approximately 35 000 additional OHPs.

Many countries have a long tradition in the training and education of specialists in occupational medicine (119), but the occupational health services also need competence, practice and skill in occupational health, including for example, the prevention of risks and the promotion of work ability, and initiating and guiding improvements at the workplace for better occupational health and safety (i.e. work environment activities). Curricula providing such competences for OHPs and OHNs are rare, and ICOH has begun actions to improve this situation (120).

The most important obstacles to the provision of services for small-scale enterprises, the self-employed and informal sector workers are the lack of service infrastructures and the shortage of

trained occupational health personnel. A total of 49 countries reported the availability of OHPs. The formal specialty in occupational medicine/occupational health is available in 90% of the respondent countries, but the absolute numbers of the specialists are very low. OHNs were available in only 34 respondents' countries. In many countries the profession of an OHN is non-existent, while in some countries they constitute the most important expert group of occupational health services.

As the global availability of well-trained occupational health resources (together with other OHS experts), at least in a short-term perspective, is unrealistic, innovation in the form of alternative strategies for OHS provision for currently uncovered workers is needed. For this, WHO has proposed delegating occupational health services to primary health care physicians. The ILO/WHO/ICOH have proposed an initiative for the BOHS approach, which ensures certain minimum competence and content of such grassroots-level OHS (58, 82).

In many countries, the available number of occupational health experts is so limited that the level of reported coverage in this survey is impossible to achieve in practice. Proposals for the delegation of OHS to primary health care staff has been offered as a solution. Such a solution in the present global situation may not be realistic. Even the coverage of PHC services in the world is insufficient, leaving one billion people without essential health services. Experiences of the integration of occupational health services with primary health care (PHC) have identified a need for additional training in occupational health for the primary health care personnel as a critical prerequisite for the provision of BOHS by the PHC units (15, 85, 105). Some countries commented on the urgent need for occupational health training of occupational health service providers within the primary health care system in particular. In Finland, high numbers of occupational health physicians in municipal health centres are specialists in occupational health or have special training in occupational health services (62%) (98).

The densities of experts in relation to the total employed population varied in orders of magnitude range. For example, the highest densities of occupational health experts were reported in Finland, one OHP per 1613 employees and one OHN per 945 employees, and in Poland one OHP per 2257 employees, while the lowest densities were recorded in developing countries; India had one OHP per 700 000 workers and some African countries one OHP per 1–4.5 million employees.

A minimum density of occupational health experts of one OHP and 2 OHNs per 5,000 workers has been proposed on the basis of practical experience (82, 104). The present average density of physicians and nurses working in occupational health in the respondents' countries is one expert per 10764 workers. Covering the capacity gap in the respondents' countries would require doubling present resources, and filling the gap in the whole world would mean a three-fold number of OHPs, and OHNs in particular. In the present survey, the ratio between physicians and nurses in occupational health services was 1.9:1 whereas it according to the health service researchers should be 1:2.

In addition, sufficient numbers of other OH experts (occupational hygienists, psychologists, ergonomists) should be available.

The UN High-Level Commission on Health, Employment and Economic Growth (2016) has proposed 40 million new health and social workers by the year 2030 (121). Full coverage of occupational health services for all working people would require 1.5% of this resource for occupational health (0.6 million).

Content and activities of OHS

The multidisciplinary content of services was common in the replies; over 86% of the respondents reported a total of 10 different occupational health service activities, including prevention, risk assessment, health education, surveillance of the work environment and workers' health, health education and information, diagnosis of occupational diseases, and the prevention of accidents. The provision of such content requires multidisciplinary OHS staff. Ninety-four per cent of the respondents use three or more expert categories in OHS. The absolute numbers of various expert categories, however, are still limited. The international instruments especially emphasize the prevention of occupational health and safety hazards as the key content of services.

Two biases are likely to have affected the results: First, in some countries OHS activities mainly focus on workers' health examinations and consider OHS to be primarily preventive, with minimal or no workplace-oriented activities. Second, the qualitative information does not describe the national coverage of comprehensive multidisciplinary services. As the densities of the experts, such as occupational hygienists, ergonomists and occupational psychologists in the survey material is 10 to 50 times lower than the density of OHPs and OHNs, the average availability of preventive and comprehensive services remains limited to the best organized sectors and the largest enterprises only. A remarkable 'content gap' prevails in most countries. There is reason to differentiate between the 'nominal content' and 'real content' in the discussion on occupational health services.

The most common orientation of occupational health services among the respondents was mixed (preventive and curative). Question 13 listed 14 activities of occupational health services of which a half were preventive (according to the ILO Recommendation No. 171 and the WHO/EURO proposal 1990 (115). The multidisciplinary content of services was common in the replies; over 82% of respondents reported a total of 10 or more different activities for occupational health services, including prevention, risk assessment, surveillance of the work environment and workers' health, health education and information, diagnosis of occupational diseases, and prevention of accidents. The provision of such content requires multidisciplinary occupational health service staff. A total of 92% of respondents use three or more expert categories in occupational health services.

The legal provisions concerning the main orientation of OHS (preventive/curative) were different depending on the governance model. As in the MOH-governance model, the preventive only and mixed (preventive + curative) were equally represented. The vast majority (over 70%) of MOL and joint models favoured the mixed content. This is opposite to the assumption that MOL governance leads to limiting the content of services to prevention only. (Some trends in the countries have shown increasing interest in making the content of OHS more versatile, for example, because of the ageing workforce and the psychosocial aspects of work).

Financing

The ILO principles stipulate that the primary responsibility for financing occupational health services rests on the employer. This responsibility can be met by either direct financing or through employer payment of insurance premiums. The combination of these two is also possible so that the employer finances a part directly and a part through insurance. Such 'combined financing' was the most common alternative (65% of the respondents), whereas the 'employer only' financing the services was another main type (31% of the respondents). None of the countries financed occupational health services from public funds only.

In Thailand, the BOHS services provided by primary health care units are financed from public sources. In Croatia, a special insurance for health protection at work covers all the costs of occupational health services financed from the premiums paid by the employers. In Finland, the employer is responsible for financing preventive services and can also voluntarily provide curative services for employees. Social security reimburses 60% of the costs of preventive services and 50% of the costs of curative services. The funding for reimbursement is drawn from insurance premiums paid by the employer.

Mixed and insurance-based financing systems are typical of the well-organized sectors of work life, but most of the workers in the 'coverage gap' are employed in less organized settings, often without any social protection and insurance and a major part has no formal employment contract, and thus no employer. Organizing funding for such sectors requires public interventions, either through direct action by the government or through public social insurance. As government budgets tend to fluctuate according to the economic situation, the social insurance model may provide more long-term stability and sustainability for services. Some countries have organized insurance-based funding of OHS on the principle of solidarity, i.e. the sectors and enterprises that are able to contribute pay slightly higher premiums than their mathematical share to cover the costs of the non-contributing sectors. A major question in the global OHS policy is the financing of OHS for the sectors currently uncovered. As the market system is not likely to lead to the improvement of their coverage, the achievement of full coverage as requested by the international instruments needs a large-scale public intervention.

The reported occupational health service coverage data were correlated with the UNDP Human Development Index (122) (Figure 4). The HDI in high-OHS coverage countries is better than that in the low-coverage countries.

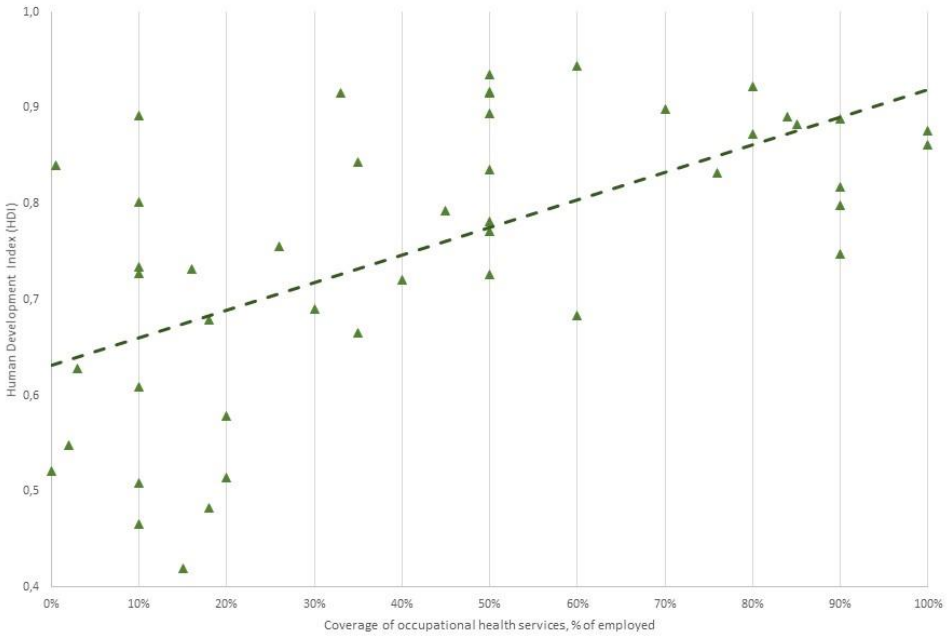

Figure 4. Correlation between coverage of occupational health services and the UNDP Human Development Index, 2014 (HDI) ($R = 0.62$, $p < 0.001$) (122) (Source: 102).

The reported coverage figures were also compared with the World Economic Forum competitiveness indices (123) (Figure 5). The competitiveness index in high-OHS coverage countries is better than that in the low-coverage countries. The growing coverage does not negatively affect the competitiveness of the countries.

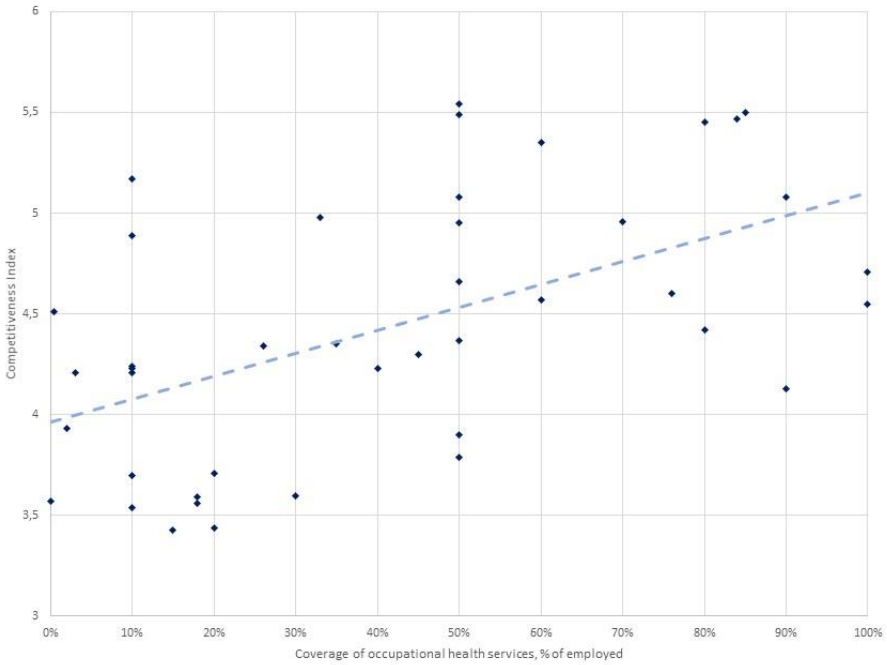

Fig. 5. Correlation between coverage of occupational health services and World Economic Forum Competitiveness Index, 2014 ($R = 0.54$, $p < 0.001$) (123) (Source: 102).

The financial loss from occupational accidents and diseases has been estimated to be 4–5.9% of gross domestic product (GDP) (9–11) in advanced economies. Such a percentage corresponds to about half of the total health budgets of many countries. Although data are not available, the loss among small enterprises and the self-employed may even elevate the loss estimate. The development of occupational health services and its growing coverage do not negatively affect the sustainability, competitiveness or the economy of the countries. The countries with best economic performance seem to invest most in development of occupational health services.

The UN High-level Commission on Health, Employment and Economic Growth (121) has estimated the return on investment (ROI) in health to be 9:1 and one-year increase in life expectancy, increasing GDP by 4%. It can be assumed that the improvement of health and life expectancy of the working population forms a larger part of this positive impact. For example, providing good occupational health services for the health sector would add to the existing health workers' input by 19–20%, without adding new personnel (124).

Future priorities

The respondents identified high numbers of priorities for future developments of OHS. The priorities were principally directed to strengthening of prerequisites, infrastructures, capacities and content of services, i.e. means of implementation rather than to policy or strategy needs. The replies

suggest that there is more need for the implementation of the available international instruments and national policies, strategies and programmes rather than for generation of new documents. This may reflect the identification of the implementation gap among the responding experts. The replies to question in major changes in 2010–2015 indicated most of the changes happened in the policies and strategies, which may partly explain their need may have been partly met in the past five years and it is the time for implementation into practice.

Additional notes

The key international instruments for the development of occupational health services in the countries comprise ILO Recommendation No. 112 on occupational health services, ILO Convention No. 161 on Occupational Health Services and related Recommendation No. 171, the WHO Global Strategy on Occupational Health for All and the WHO Global Plan of Action on Workers' Health. A request for occupational health services is also mentioned in the ILO Convention No. 155 on Occupational Safety and Health and in the Convention No. 187 on Promotional Framework on Occupational Safety and Health.

ILO Convention No. 187 and the WHO Global Plan of Action on Workers' Health call for drawing up a national policy framework and strategy on occupational safety and health and workers' health.

6 Summary and conclusions

The ICOH National Secretaries served well as key expert informants on occupational health services in their countries. The replies to surveys such as the present one are, however, affected by the almost universal lack of statistics and systematically collected information on occupational health services. There is a need to develop the national information and statistics systems on OHS policies, institutional, human and financial resources, structures, coverage, contents, activities and impact of occupational health services in the countries in order to enable more quantitative information.

International instruments of the ILO and WHO are widely used as guidance for national policies and programmes. They request the member states to organize occupational health services for all workers regardless of the occupation, size or type of workplace or type of employment, including the self-employed and all other types of workers. The international standards are still valid and provide good guidance for the development of OHS at the national level.

Although 75% of the respondents have adopted an OHS policy at a high level, only one third of the surveyed countries have organized occupational health services for more than half of their employed populations and developed the content in the direction requested by the international instruments. In two thirds of the respondent countries, a wide gap in implementation, however, leaves the majority of the workers without access to OHS in spite of the available international policies and national policies and programmes. The 'implementation gap', found mainly among SMEs, the self-employed and informal sector workers, is associated with the limitations in the availability of the necessary infrastructures, low coverage (coverage gap) of occupational health services, and a shortage of human resources for OHS.

Two thirds of the surveyed countries have both a qualitative (lack of multidisciplinary experts) and quantitative shortage of expert human resources ('capacity gap') as the key obstacle to the achievement of full coverage of OHS. The shortage also affects the content of occupational health services ('content gap'). As the surveyed countries represent the most advanced level of OHS, the global average coverage is lower. The total numbers of uncovered workers in the respondents' countries and the countries that were not surveyed mean that, the estimates of 10–15% average global OHS coverage presented in the past, are likely to be close to the reality ('coverage gap').

The countries have recognized well the future priorities for developing their OHS systems, which emphasize the need to develop the prerequisites for the practical implementation of OHS; to expand the coverage of services to enable access to small-scale enterprises, the self-employed and the informal sectors; to develop comprehensive, multidisciplinary content; and to increase the numbers of and train more OHS experts. In order to expand the coverage, half of the countries have undertaken actions to integrate OHS with primary health care and have introduced the BOHS approach in their OHS system.

Providing universal access to occupational health services for all working people is justified in view of their occupational health needs, derived from their exposures to occupational health hazards, risks and related diseases.

Occupational health services are an important investment in ensuring the work ability of the 61% fraction of the total population (workforce), which through its productive work provides all the resources available for sustaining national economies, as well as provides a material basis for societal, community and family life (8, 77).

Well working and competent occupational health services are considered to support economic development and to be an instrument in the management of social determinants and inequalities in health among the working people: They are a key instrument in prevention of illness and accidents at work, loss of productive working hours and sickness absenteeism.

All countries, particularly those with low coverage, should give a higher policy priority to occupational health services and ratify ILO Convention No. 161; strengthen their governance, regulation and implementation; expand their service coverage to provide occupational health services for all working people, including small enterprises, the self-employed and informal sector workers; strengthen human resources for occupational health services; generate sufficient, well-working financial models; and continuously develop the service system to meet workers' health needs and the rapidly changing needs of workplaces in the globalizing work life. This requires efforts to close the implementation gap, coverage gap and capacity gap in occupational health services.

The efforts of the ILO and WHO to enhance systems for occupational health services are well justified. National and international policy-makers should pay more attention to the fact that the majority of workers in the world still have no access to occupational health services, and particularly in the sectors, in which high risks are realized and the human and economic loss from unhealthy conditions of work burden the workers', enterprises' and countries' economies. The closure of the implementation gap, coverage cap and capacity gap needs a large-scale public intervention in virtually all countries of the world and the governments and international organizations should give higher priority for the development of occupational health services for all working people.

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Availability of data and materials
All data generated or analysed during this study are available from the authors.

Declaration of interest
All authors are active in ICOH, Professor Jorma Rantanen having served as ICOH President (2003–2009) and Suvi Lehtinen as ICOH Vice President (2009–2015). Professor Sergio Iavicoli holds the position of the Secretary General of ICOH since 2003.

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Annex 1.

Ratifications of ILO Conventions 155, 161 and 187

Convention / Country	C No. 155	C No. 161	C No. 187
Argentina	13.01.2014		13.01.2014
Australia	26.03.2004		
Belarus	30.05.2000		
Bosnia Herzegovina	02.06.1993	02.06.1993	09.03.2010
Brazil	18.05.1992	18.05.1990	
Bulgaria		01.03.2012	
Chile		30.09.1999	27.04.2011
China	25.01.2007		
Colombia		25.01.2001	
Croatia	08.10.1991	08.10.1991	
Ecuador			
Egypt			
Estonia			
Finland	24.04.1985	27.04.1987	26.06.2008
France			29.10.2014
FYROM	17.11.1991	17.11.1991	03.10.2012
Germany		17.10.1994	21.07.2010
Ghana			
India			
Indonesia			31.08.2015
Ireland	04.04.1995		
Israel			
Italy			
Japan			24.07.2007
Kenya			
Lithuania			
Luxembourg	21.03.2001	08.04.2008	
Mali	12.04.2016		
Montenegro	03.06.2006	03.06.2006	18.09.2015
Morocco			
Nigeria	03.05.1994		
Norway	22.06.1982		09.11.2015
Paraguay			
Peru			
Republic of Korea	20.02.2008		20.02.2008
Romania			
Senegal			
Serbia	24.11.2000	24.11.2000	16.09.2009
Slovakia	01.01.1993	01.01.1993	22.02.2010
South Africa	18.02.2003		
Spain	11.09.1985		05.05.2009
Taiwan			
Tanzania			

Thailand			23.03.2016
The Netherlands	22.05.1991		
Uganda			
USA			
Vietnam	03.10.1994		16.05.2014
Zimbabwe	09.04.2003	09.04.2003	
Total	23 all ratifications 66	14 all ratifications 33	17 all ratifications 43

Annex 2

Instructions, concepts and definitions related to this survey

We kindly ask you to read the concepts and definitions before filling in the questionnaire. If there is a need to consult other experts in the country that are key actors in this field, please feel free to work together in replying. Please indicate the names of all the contributors.

Occupational health: (1)

Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job.

The main focus in occupational health is on three different objectives: (i) the maintenance and promotion of workers' health and work ability; (ii) the improvement of working environment and work to become conducive to safety and health; and (iii) development of work organizations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings. The concept of working culture is intended in this context to mean a reflection of the essential value systems adopted by the undertaking concerned. Such a culture is reflected in practice in the managerial systems, personnel policy, principles for participation, training policies, safety and quality management of the undertaking. (2)

Coverage of occupational health services (OHS)

Coverage can be a measure of several aspects of OHS. In this study, the coverage of OHS is defined as a measure of availability and accessibility to OHS for workers. It is indicated as a percentage of workers with access to occupational health services out of the total number of working population, including all employees and self-employees in all branches and sectors of economy, including e.g. manufacturing industries, construction, services and public sector workers. Agricultural workers and informal sector workers are also included, where they can be identified.

OHS Functions (3)

Occupational health services shall have such of the following functions as are adequate and appropriate to the occupational risks of the undertaking:

(a) identification and assessment of the risks from health hazards in the workplace;
(b) surveillance of the factors in the working environment and working practices which may affect workers' health, including sanitary installations, canteens and housing where these facilities are provided by the employer;
(c) advice on planning and organisation of work, including the design of workplaces, on the choice, maintenance and condition of machinery and other equipment and on substances used in work;
(d) participation in the development of programmes for the improvement of working practices as well as testing and evaluation of health aspects of new equipment;
(e) advice on occupational health, safety and hygiene and on ergonomics and individual and collective protective equipment;

(f) surveillance of workers' health in relation to work;
(g) promoting the adaptation of work to the worker;
(h) contribution to measures of vocational rehabilitation;
(i) collaboration in providing information, training and education in the fields of occupational health and hygiene and ergonomics;
(j) organising of first aid and emergency treatment;
(k) participation in analysis of occupational accidents and occupational disease

In addition, the Joint ILO/WHO Committee on Occupational Health (1) added as one of the activities of OHS the maintenance and promotion of workers' health and work ability.

Occupational health practice

is multidisciplinary activity involving in addition to occupational health and occupational safety and health professionals, other specialists both in the enterprise and outside, as well as competent authorities, the employers, workers and their representatives. Depending on national law and practice, occupational health practice can be a single comprehensive, multiprofessional practice or a combination of several professional activities, such as occupational health services, occupational hygiene, ergonomics, occupational psychology, and occupational safety. Such involvement requires a well-developed and well-coordinated system at the workplace. The necessary infrastructure should comprise all the administrative, organizational and operative systems that are needed to conduct the occupational health practice successfully and ensure its systematic development and continuous improvement. (4)

Occupational health system

A group or combination of interrelated, interdependent, or interacting elements forming a collective entity for governance and provision of occupational health services.

In occupational health services the system means the whole structure of occupational health services, starting from policies, regulations, institutions, infrastructures, service provision organizations, different types of support services, financing sources and the staff.

Levels in the occupational health service system

Primary level
The primary level includes the workplace and the community level OHS working in direct contact with enterprises, workplaces, employers and workers, and Safety and Health Committees of the enterprises.

Secondary level
The secondary level services (often called as support services) are services for technical and professional support of primary level services, e.g. in diagnosis of occupational diseases (occupational medicine service), psychology, ergonomics, occupational hygiene, occupational safety, etc. The secondary level services may be provided by regional or provincial institutions, or national research and service institutions, as well as by occupational safety and health authorities.

Tertiary level
Tertiary level services constitute the national institutional system for the most demanding services needed in occupational health practices, such as diagnosis of complex occupational diseases and rare diseases,

training and education, development and evaluation of methodologies, research and development programmes, etc. Usually the tertiary level services are organized at the national institutes of occupational health or in national institutes of occupational safety and health, and by universities or social security institutions, or by occupational safety and health authorities.

Infrastructure

The basic facilities, services, and installations needed for the functioning and provision of occupational health services at the various levels of the societal system.

Financing

Part of the occupational health system providing financial resources for maintenance and functions of infrastructures, human resources, equipment and facilities, and operating costs for occupational health services. In principle, the primary responsibility for financing of occupational health services rests on the employer. Full coverage and equal access to all workers may in addition need government or other public financing. Technically, the financing may be organized through social or private insurance, revenues of social security fees by employers, or by various combinations of the above. According to the ILO Convention No. 161, provision of legally stipulated occupational health services shall not cause any costs to the employee.

Human resources in occupational health

Are persons who have been accredited through appropriate procedures to practise a profession related to occupational health or who provide occupational health services according to the provisions of relevant regulations. Occupational health professionals include all those who by profession carry out occupational health activities, provide occupational health services or who are involved in occupational health practice, on full-time or part-time basis. They may be occupational health physicians, occupational health nurses, occupational safety and health inspectors and experts, occupational hygienists, occupational psychologists, ergonomists, and physiotherapists, accident prevention experts and experts for improvement of the working environment. Researchers in occupational health and occupational safety and health are also included. Many others, in addition to occupational health and safety professionals, are involved in the protection and promotion of the health of workers, e.g. management and workers' representatives. (2)

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Annex 3

Criteria for OHS Index

Criterion	Scale	Score for country

1. Ratification, Policy, Strategy

ILO convention 161 + National OHS Policy & Programme endorsed + implemented	5	
Not ratified but principles of ILO Instruments C 161 and R 171 and WHO GPA used as guidance and National OHS Programme drawn up + implemented widely	4	
National Policy, Strategy and Programme available and implemented	3	
Limited scope for OHS Programme (selected sectors or other target groups)	2	
No formally approved Policy, Strategy or Programme nor reference to ILO or other international instruments in national policy	1	

2. Legislation for OHS

Special OHS law available and implemented widely	5	
Provisions for OHS in other legislations e.g. OSH law and implemented widely	4	
Limited obligations for the employers for organization OHS (e.g. size limits for companies or only for high risk groups)	3	
Collective agreement by social partners on OHS	2	
Totally voluntary OHS	1	

3. Coverage of OHS (i.e. access to services in everyday practice, not just legal text)

Coverage of total employed population 80-100%	5	
Coverage of total employed population 60-79%	4	
Coverage of total employed population 30-59	3	
Coverage of total employed population 10-29%	2	
No organized government governance below 10%	1	

4. Support services at secondary and tertiary levels

Well organized and institutionalized multidisciplinary support services available universally at national and provincial/regional /district levels	5	
Well organized institutionalized multidisciplinary support services at national but not universally at provincial/regional /district levels	4	
Sporadic support services by public or private organizations (e.g. consultancies)	3	
Support available on limited disciplines e.g. occupational medicine only	2	
No organized system for support services	1	

5. Density of occupational health physicians (in service provision at grassroots level)

Density of OHPs 1/1000-1/2000	5	
Density of OHPs 1/2001-1/5000	4	
Density of OHPs 1/5001-1/7500	3	
Density of OHPs 1/7501- 10000	2	
Density of OHPs lower than 1/10000	1	

6. Multidisciplinarity of OHS staffs

5-6 specialists e.g. OHP, OHN, Occupational hygienist, Psychologist, Ergonomist, Safety engineer or OD expert available widely throughout whole OHS system	5	
3-4 specialists including OHP and OHN widely available	4	
OHP and OHN	3	
OHP only	2	
No experts trained in OH	1	

7. Content and activities of OHS (in practical service provision, not just in regulations)

Comprehensive service with prevention of accidents and diseases and first aid, risk assessment, promotion of health and work ability, curative services, development of work organization, rehabilitation & return to work (RTW)	5	
Preventive and limited other activities	4	
Prevention only	3	

Health examinations and curative activities only	2	
Health examinations only	1	

8. Financing for sustainable OHS system

Legislation-based financing with employers primary responsibility and/or pooling their contributions through insurance and public financing for non-contributors	5	
Legislation-based financing for organized sectors only (directly by employer or through insurance)	4	
Financing from public sources only without contribution of employers	3	
Voluntary employer or insurance financing	2	
Sporadic financing by the employer	1	

Annex 4

Questionnaire of the ICOH OHS Survey in 2015

Questionnaire to ICOH National / Area Secretaries

Part I. Occupational health and safety institutions

Break

1a. What occupational health and safety institutions do you have in your country, e.g. Ministry, Occupational Safety and Health Authorities, Occupational Health and Safety Research Institutes? *

Please indicate the names and the www-addresses / email-addresses

5

6

Break

1b. Attach separate document if needed.

You may add one or more attachments from your files. Browse and open the wanted file. To remove the file, click the recycle bin on the form.

Browse...

Break

2. What professional associations in occupational health and safety, occupational health, and occupational medicine have been established in your country? *

- Occupational health physicians
- Occupational health nurses
- Occupational hygienists
- Occupational psychologists
- Ergonomists / physiotherapists
- Safety engineers
- Other, what? (please indicate the names and contact information)

Break

Part II. Status of occupational health services (OHS)

Policy and mission of occupational health services

Break

3. Does your country have a formally adopted policy for occupational health services (OHS) based on ILO Convention No. 161 and related Recommendation No. 171 or other relevant provisions? *

- yes ILO C161 and R171
- yes, other relevant provision, which
- no

Break

4a. Which body has endorsed it? *

- Parliament
- Government
- Ministry (which?)
- Collective agreement

- Other, which?

Break

4b. Please clarify the endorsement, if needed.

Break

5a. Do you have an independent national strategy for Occupational Health Services? *

- Yes
- No

Break

5b. Do you have a national strategy for Occupational Health Services as a part of the National Occupational Safety and Health Strategy? *

- Yes
- No

Break

5c. Does your National Strategy have elements for *

	Yes	No
Development of OHS system, including extension of coverage		
Development of activities and content of OHS		
Development of quantity and quality of human resources		
Development of financial system for OHS		

Break

5d. Please clarify the National Strategy elements, if needed.

Break

6. Who is in charge of Occupational Health Services (National OHS system) in the country? *

- Ministry of Labour
- Ministry of Health
- Other, which?

Break

OHS system and infrastructures

Break

7. What is the OHS system like in your country? What service provision options do you have? *

You may tick several

	Yes	No
Big-industry in-plant service		
Group service owned or organized by several companies jointly		
Primary health care units or other public health service		
Hospital polyclinics		
Private commercial OHS and private consultants		
Other model, what?		

Break

8. What are the institutions at the secondary level contributing to OHS? *

Break

9a. What are the institutions at the tertiary level?
*

	Yes	No
National Institute of Occupational Health or respective	○	○
University department	○	○
Private consultancies	○	○
Other institutions, what?	○	○

Break

9b Please attach an organigram of the occupational health service system, if available.

You may add one or more attachments from your files. Browse and open the wanted file. To remove the file, click the recycle bin on the form.

Browse...

Break

Stepwise development of the OHS system

Break

10. Do you implement the ILO-OSH Management 2001 system? *

http://www.ilo.org/safework/info/standards-and-instruments/WCMS_107727/lang--en/index.htm

- ○ Yes
- ○ No

Break

11a. Have Occupational Health Services been fully or in part integrated into primary health care services? *

- ○ Yes
- ○ No

Break

11b. Please clarify

5

Break

Activities and content of OHS

Break

12a. What is the content of Occupational Health Services? *

- Preventive only
- Curative only
- Mix

Break

12b. Please explain

Break

13a. Do Occupational Health Services in your country contain some of the following activities? *

	Yes	No
Orientation and planning of OHS		
Surveillance of the work environment		
Surveillance of workers' health (health examinations)		
Assessment of health and safety risks		
Information and education on risks and advice on the need for preventive and control actions (safe working practices)		
Preventive actions for the management and control of health and safety hazards and risks		
Prevention of accidents		

Maintaining preparedness to first aid and participation in emergency preparedness		
Diagnosis of occupational and work-related diseases		
Promotion of health and work ability		
General health care		
Curative and rehabilitation services		
Record keeping		
Evaluation and auditing of OHS activities		

Break

13b. Other OHS activities, what? Please clarify.

Break

14a. Has the Basic Occupational Health Services approach been introduced and used in your country? * (www.ttl.fi/BOHS)

- Yes
- No

Break

14b. If yes, please indicate:

	Yes	No
BOHS is organized as a separate OHS		
BOHS is integrated into PHC services		

Break

14c. Please clarify in more detail

Break

Actors in the organization and development of OHS

Break

15a. Who are the key actors of OHS in your contry at the national level?
*

- Government
- Employers' Federations
- Trade Unions
- National Advisory Committee/Council for Occupational Safety and Health
- National Advisory Committee/Council for Occupational Health Services
- Social Security Institutions
- Others, what?

Break

15b. Who are the key actors of OHS in your country at the provincial or regional level?
*

Break

15c. Who are the key actors of OHS in your country at the local level?
*

Break

16. What is the coverage of OHS in your country as percentage of the total workforce? If no statistics are available, can you estimate? *

(Obs! Please provide information on the real access to OHS, not only e.g. the legal coverage of workers as often the practical implementation may be different from the legally stipulated coverage.)

Break

Financing of OHS

Break

17a. How are OHS in your country financed? *

- Employers only
- Public sector only
- OSH Insurance
- Special Insurance
- General Social Insurance
- Combination of some of the above
- Other, what?

Break

17b. Please explain

Break

Human resources for OHS

Break

18. What are the human resources for occupational health services in your country? If statistics on numbers are not available, please estimate. *

Please mark on the line both Number / Rough training background. (e.g. 500 / medical doctor)

- Occupational health physicians
- Occupational health nurses
- Occupational hygienists
- Safety engineers
- Ergonomists/physiotherapists
- Occupational health psychologists
- Other personnel, what? (indicate also numer/training)

Break

19. Training of OHS personnel (This question concerns the potential availability of occupational health specialists in your country including the specialists employed in occupational health services or elsewhere)

In this survey, the specialty means formally accredited post-graduate curriculum of 3-6-year duration, and certified by formal specialist exam and diploma or certificate granted by authorities or professional bodies. (The postgraduate training for ergonomists/physiotherapists and psychologists may be shorter).

Break

19a. Do you have specialty in occupational medicine / occupational health (physicians)? *

If yes, please specify to the line How many specialists, and / How many years of postgraduate (specialist) training?

- Yes
- No

Break

19b. Do you have specialty for occupational health nurses? *

If yes, please specify to the line How many specialists, and / How many years of postgraduate (specialist) training?

- Yes
- No

Break

19c. Do you have specialty for occupational hygienists? *

If yes, please specify to the line How many specialists, and / How many years of postgraduate (specialist) training?

- Yes
- No

Break

19d. Do you have specialty for occupational psychologists? *

If yes, please specify to the line How many specialists, and / How many years of postgraduate (specialist) training.

- Yes
- No

Break

19f. Please describe in more detail the training institutions providing training courses

Break

19e. Do you have specialty for ergonomists/physiotherapists? *

If yes, please specify to the line How many specialists, and / How many years of postgraduate (specialist) training?

- Yes
- No

Break

Main perspectives

Break

20. What are your main national priorities for the development of Occupational Health Services for the next 5 years? *

(List 3-5 most important)

Break

21. The previous ICOH OHS survey was sent on 17 September 2010. Can you name some major regulatory, programmatic or service system changes which have happened in OHS in your country since the previous survey reply? *

Break

22. Additional comments

Break

Part III. Contact information of the respondent

Break

Please fill your contact information *

First name

Lastname

Email

Affiliation

Address

ZIP code

City

Country

Phone

Break

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