INTERNATIONAL MINIMUM REQUIREMENTS
FOR HEALTH PROTECTION IN THE WORKPLACE
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ACKNOWLEDGEMENTS

Ute Papkalla, MPH, MA, Consultant, Advisor for Public and Occupational Health, German Institute for Medical Mission (DIFAEM)

Jane Collison, PhD, H&S Consultant & Training Provider at ATM Safety and Environment

This publication was prepared with financial support from WHO cooperative agreement with Centers for Disease Control and Prevention National Institute for Occupational Safety and Health of the United States of America RFA-OH14-002: “Implementing World Health Assembly Resolution 60.26 “Global Plan of Action for Workers’ Health 2008-2017”
A core function of the World Health Organization (WHO) is to set health-based norms and standards and to promote their implementation. WHO has adopted internationally recognized methods for guideline development to ensure a clear, transparent and unbiased process for comprehensive and objective assessment of the available evidence and international consensus on recommendations to meet global public health needs.¹

The 60th World Health Assembly in 2007 requested that WHO should develop a set of minimum requirements for health protection, applicable to all workplaces in big and small enterprises whether in formal or informal work settings. Such standards are voluntary and are there to guide governments in developing their own national regulations and norms.

WHO regularly receives requests from its Member States to provide information and to advise on setting up national health standards for workplaces. Compliance with a basic set of internationally agreed standards for health protection can support workers’ health, particularly in small enterprises and informal settings that are outside the scope of official occupational safety and health inspection and administration.

WHO has already developed several public health standards and guidelines applicable to work settings, such as indoor air quality guidelines,² radiation protection standards,³ international chemical safety cards,⁴ and a guide for water safety in public buildings.⁵ Other guidance documents are currently being developed including on occupational exposure to nanoparticles, electromagnetic fields, UV and optical radiation and occupational risks in housing.

This report provides an analysis of the current spectrum of global, regional and national norms including conventions, standards, directives, regulations, guides, and codes directly relating to protecting health in the workplace. It identifies gaps in what is currently available and makes recommendations for improvements. Consideration has been given to exposure to hazardous substances, noise and vibration, radiation, musculoskeletal and psychosocial risks, as well as general workplace and welfare issues such as lighting, thermal comfort, drinking water and sanitation, first aid and health surveillance.

The work was carried out under the supervision and guidance of the WHO Global Occupational Health Programme.

2. METHODOLOGY

This report includes standards, conventions, recommendations, directives, regulations, codes and guides (collectively known as ‘norms’). They were developed and established by consensus-building processes involving experts from various countries and issued by an international body. They include requirements for identifying health hazards and controlling risks in the workplace, or they provide guidance and instruction on related topics. Some may be binding, such as ratified conventions and European directives, while others such as recommendations, codes or guides encourage voluntary compliance. In exceptional cases, national regulations, standards or guides have been listed. These were included when considered to be internationally important because they provided an example of a standard type that might be needed globally.

Norms were found by typing relevant English keywords into general search engines and the online search engines of specific standard-setting organizations such as the International Organization for Standardization (ISO), the International Labour Organization (ILO) and WHO. Using English keywords may have limited the number of results from non-Anglophone regions, although it can be assumed that most globally-applied standardization documents will also be available in English.

A complete list of the organizations searched is given in Table 1 and the role of the leading institutions and their approach to standard setting is summarized in Table 2.

The title of each norm found was entered into a database and categorized according to:

- the hazard or risk factor that it covered;
- its type, e.g. convention, standard, directive, etc.;
- whether it applied at a global, regional or national level;
- whether it targeted health protection of workers or technical support.

For each norm, a record was made of the source (the publisher), the website where it could be downloaded or purchased and its date of publication.

The research focused on hazards impacting on workers’ health and were grouped into the following categories:

- chemical substances
- biological agents
- noise and vibration
- radiation
- musculoskeletal risk factors
- psychosocial risk factors
- work environment
- general.

---

6 Using the database FileMaker Pro.
First aid was included in the work environment category because it is grouped in this way in the ILO Convention on Hygiene when considering topics such as heating and lighting.

The general category included norms that covered health and safety overall, health surveillance, norms specific to certain industries, and norms that related to employment protection such as maternity rights, night work and minimum age.

An example of the database screen for one record is shown in Figure 1.

**FIGURE 1. DATABASE SCREEN**

<table>
<thead>
<tr>
<th>Hazardous substances</th>
<th>Noise and vibration</th>
<th>Psycho-social agents</th>
<th>Work Environment</th>
<th>Biological agents</th>
<th>Radiation</th>
<th>Musculo-skeletal</th>
<th>General</th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Type of doc.</th>
<th>Guide</th>
<th>Date</th>
<th>Short title</th>
<th>Website</th>
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</thead>
</table>

**TABLE 1. LIST OF ORGANIZATIONS SEARCHED**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.acgih.org/">http://www.acgih.org/</a></td>
</tr>
<tr>
<td>AFNOR</td>
<td>French Standards Association</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.afnor.org/en">http://www.afnor.org/en</a></td>
</tr>
<tr>
<td>AFSSSET</td>
<td>French Agency for Food, Environmental and Occupational Health &amp; Safety</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.afssa.fr/galaxieEN.html">http://www.afssa.fr/galaxieEN.html</a></td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.ansi.org/">http://www.ansi.org/</a></td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.asean.org/">http://www.asean.org/</a></td>
</tr>
<tr>
<td>ASSE</td>
<td>American Society of Safety Engineers</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.asse.org/">http://www.asse.org/</a></td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials (now ASTM International)</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.astm.org/">http://www.astm.org/</a></td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Organization</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>ATSDR</td>
<td>Agency for Toxic Substances and Diseases Registry (United States of America, USA) <a href="http://www.atsdr.cdc.gov/">http://www.atsdr.cdc.gov/</a></td>
</tr>
<tr>
<td>BC-GSEU</td>
<td>British Columbia Government and Service Employees Union <a href="http://www.bcgeu.ca/">http://www.bcgeu.ca/</a></td>
</tr>
<tr>
<td>BC-PSA</td>
<td>British Columbia Public Service Agency <a href="http://www2.gov.bc.ca/">http://www2.gov.bc.ca/</a></td>
</tr>
<tr>
<td>BNQ</td>
<td>Bureau de Normalisation du Québec, Canada <a href="http://www.bnq.qc.ca/en/">http://www.bnq.qc.ca/en/</a></td>
</tr>
<tr>
<td>BSI</td>
<td>British Standards Institution <a href="http://www.bsigroup.com/">http://www.bsigroup.com/</a></td>
</tr>
<tr>
<td>CAMA</td>
<td>Corporate Alliance on Malaria in Africa <a href="http://www.gbchealth.org/our-work/collective-actions/cama/">http://www.gbchealth.org/our-work/collective-actions/cama/</a></td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstracts Service (USA) <a href="https://www.cas.org/">https://www.cas.org/</a></td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention (USA) <a href="http://www.cdc.gov/">http://www.cdc.gov/</a></td>
</tr>
<tr>
<td>CEEP</td>
<td>European Centre of Employers and Enterprises providing Public services <a href="http://www.ceep.eu/">http://www.ceep.eu/</a></td>
</tr>
<tr>
<td>CENELEC</td>
<td>European Committee for Electrotechnical Standardization <a href="https://www.cenelec.eu/">https://www.cenelec.eu/</a></td>
</tr>
<tr>
<td>CIS</td>
<td>International Occupational Safety and Health Information Centre (ILO) <a href="http://www.ilo.org/safework/cis/lang%E2%80%94en/index.htm">http://www.ilo.org/safework/cis/lang—en/index.htm</a></td>
</tr>
<tr>
<td>CMA</td>
<td>Croatian Medical Association <a href="http://hlz.mef.hr/">http://hlz.mef.hr/</a></td>
</tr>
<tr>
<td>CSOH</td>
<td>Croatian Society of Occupational Health</td>
</tr>
<tr>
<td>EBRC</td>
<td>European Bank for Rehabilitation and Cooperation</td>
</tr>
<tr>
<td>ETSI</td>
<td>European Telecommunications Standards Institute <a href="http://www.etsi.org/">http://www.etsi.org/</a></td>
</tr>
<tr>
<td>ETUC</td>
<td>European Trade Union Confederation <a href="http://www.etuc.org/">http://www.etuc.org/</a></td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Organization</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>GRI</td>
<td>Global Reporting Initiative <a href="https://www.globalreporting.org/Pages/default.aspx">https://www.globalreporting.org/Pages/default.aspx</a></td>
</tr>
<tr>
<td>HSE</td>
<td>Health and Safety Executive (United Kingdom of Great Britain and Northern Ireland) [<a href="http://www.hse.gov.uk(index.htm">http://www.hse.gov.uk(index.htm</a>](<a href="http://www.hse.gov.uk(index.htm)">http://www.hse.gov.uk(index.htm)</a></td>
</tr>
<tr>
<td>IAC</td>
<td>Immunization Action Coalition <a href="http://www.immunize.org/">http://www.immunize.org</a></td>
</tr>
<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency <a href="http://www.iaea.org/">http://www.iaea.org</a></td>
</tr>
<tr>
<td>ICNIRP</td>
<td>International Commission on Non-Ionizing Radiation Protection <a href="http://www.icnirp.org/">http://www.icnirp.org</a></td>
</tr>
<tr>
<td>ICRP</td>
<td>International Commission on Radiological Protection <a href="http://www.icrp.org/">http://www.icrp.org</a></td>
</tr>
<tr>
<td>ICRU</td>
<td>International Commission on Radiation Units and Measurement <a href="http://www.icru.org/reports">http://www.icru.org/reports</a></td>
</tr>
<tr>
<td>IEA</td>
<td>International Ergonomics Association <a href="http://www.iea.cc/">http://www.iea.cc</a></td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission <a href="http://www.iec.ch/">http://www.iec.ch</a></td>
</tr>
<tr>
<td>IFRC</td>
<td>International Federation of Red Cross and Red Crescent Societies <a href="http://www.ifrc.org/">http://www.ifrc.org</a></td>
</tr>
<tr>
<td>INC</td>
<td>International Council of Nurses <a href="http://www.icn.ch/">http://www.icn.ch</a></td>
</tr>
<tr>
<td>IOHA</td>
<td>International Occupational Hygiene Association <a href="http://www.ioha.net/activities.html">http://www.ioha.net/activities.html</a></td>
</tr>
<tr>
<td>JSOH</td>
<td>Japan Society for Occupational Health <a href="http://www.paho.org/hq/">http://www.paho.org/hq</a></td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Organization</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
</tbody>
</table>
| MHCC         | Mental Health Commission of Canada  
               http://www.mentalhealthcommission.ca/ |
| NEA          | Nuclear Energy Agency  
               https://www.oecd-nea.org/ |
| NIOSH        | National Institute for Occupational Safety and Health (USA)  
               http://www.cdc.gov/niosh/ |
| OECD         | Organisation for Economic Co-operation and Development  
               http://www.oecd.org/ |
| OSHA         | Occupational Safety and Health Administration of the USA  
               https://www.osha.gov/index.html |
| PAHO         | Pan American Health Organization  
               http://www.paho.org/hq/ |
| PSI          | Public Services International  
               http://www.world-psi.org/ |
| QF           | Qatar Foundation  
               http://www.qf.org.qa/ |
| SAN          | Sustainable Agriculture Network  
               http://sanstandards.org/sitio/ |
| SCOEL        | Scientific Committee on Occupational Exposure Limits  
| SWA          | Safe Work Australia  
| UEAPME       | Union Européenne de l’Artisanat et des Petites et Moyennes Entreprises  
               http://www.ueapme.com/ |
| UN           | United Nations  
| UNEP         | United Nations Environment Programme  
               http://www.unep.org/ |
| VDI          | Verein Deutscher Ingenieure  
               http://www.vdi.eu/ |
| WB           | The World Bank  
               http://www.worldbank.org/ |
| WEF          | World Economic Forum  
               http://www.weforum.org/ |
| WENRA        | Western European Nuclear Regulators Association  
| WHO          | World Health Organization  
               http://www.who.int/en/ |
### TABLE 2. MAIN INSTITUTIONS’ APPROACH TO DEVELOPING NORMS FOR WORKPLACE HEALTH PROTECTION

<table>
<thead>
<tr>
<th>Organization</th>
<th>Type of document</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>European Union and its Committee for Standardization (CEN)</strong></td>
<td>Regulations</td>
<td>The EU publishes regulations, directives and recommendations. Regulations and directives are legally binding on Member States. They define the essential requirements that ensure a high level of protection for health, safety, the consumer or the environment. The task of drawing up harmonized standards to meet the essential requirements established by the directives, is entrusted to the European standardization organizations (CEN, CENELEC and ETSI). CEN has signed the Vienna Agreement with the International Organization for Standardization (ISO), enabling European and international standards to be developed in parallel. About 30% of the European Standards in the CEN collection are identical to ISO standards. These EN ISO standards have the dual benefit of automatic and identical implementation in all CEN member countries, and have global applicability.</td>
</tr>
<tr>
<td><strong>International Labour Organization (ILO)</strong></td>
<td>Conventions, Recommendations, Codes</td>
<td>International labour standards are legal instruments drawn up by the ILO’s constituents (governments, employers and workers). They are either conventions, which are legally-binding international treaties that may be ratified by Member States, or recommendations, which serve as non-binding guidelines. Codes are another form of ILO guidance document.</td>
</tr>
<tr>
<td><strong>International Standards Organization (ISO)</strong></td>
<td>International standards</td>
<td>ISO standards respond to market needs. They are developed by international experts organized into technical committees. These include experts from the relevant industry, consumer associations, academia, nongovernmental organizations (NGOs) and government. Each standard is developed using a consensus-based approach.</td>
</tr>
<tr>
<td><strong>World Health Organization (WHO)</strong></td>
<td>Different types of guidelines</td>
<td>WHO has adopted an internationally recognized approach to standards and guideline development that includes review of evidence, external consultations and peer reviews.</td>
</tr>
<tr>
<td><strong>WHO and ILO with the cooperation of the European Commission.</strong></td>
<td>International Chemical Safety Cards (ICSC)</td>
<td>The ICSC are data sheets intended to provide essential safety and health information on chemicals in a clear and concise way. The primary aim of the cards is to promote the safe use of chemicals in the workplace. The main target users are workers and those responsible for occupational safety and health.</td>
</tr>
</tbody>
</table>

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3. CHEMICAL SUBSTANCES

This chapter covers norms relating to chemical substance exposure, inhalable dusts, asbestos, lead and welding fume (summarized in Table 3). Some of these norms are industry specific but the majority are relevant to all workplaces. The main points from the review are summarized as follows.

3.1 PROTECTING WORKERS FROM CHEMICAL SUBSTANCES

ILO Convention 170 issued in 1990 on the use of chemicals, requires the adoption of a coherent policy on safety in the use of chemicals at work. This policy should cover the production, handling, storage, transport and disposal of chemicals. It highlights the responsibilities of suppliers and exporting states, as well as the responsibilities of the users. It draws attention to the need for employers to comply with occupational standards, and calls for such standards to be adopted at national level.

Similar requirements for the protection of workers are given in European Directive 98/24/EC. This directive also provides for the drawing up of indicative and binding occupational exposure limit values as well as for biological limit values at community level.

The ILO and the EU have also issued conventions and directives on asbestos (ILO C162 and Directive 2009/148/EC). However, the ILO does not have a specific convention to protect workers from exposure to lead, whereas at the regional level, lead is covered in EU Directive 98/24/EC.

3.1.1 Occupational exposure limits

In 1980 the ILO published a code on exposure to airborne substances harmful to health. This covers what factors should be considered when adopting exposure limits, how they should be used and the importance of keeping them up to date. For example the code states that:

When a country adopts exposure limits established in another country, account should be taken of possible differences with regard to climate, altitude, pollution of the living and general environment, conditions of work and physical effort, eating habits and health of the population, anthropometric data, distribution of workers by age and sex, and the general level of protection against occupational hazards; these differences may affect the absorption, metabolism, elimination and biological effects of hazardous substances in the body’s system.

The American Conference of Governmental Industrial Hygienists’ (ACGIH) Guide is an important document listing exposure limits. ACGIH is a member-based organization that advances occupational and environmental health. Its annual publication on threshold limit values (TLVs) and biological exposure indices (BEIs) is available for sale in Canada, the United States and many other countries.

In Directive 2000/39/EC, the EU has published a list of 63 Indicative Occupational Exposure Limits (IOELs). These limits are not binding but must be used by Member States when deciding which
limit to adopt. The scientific basis for IOELs established by the European Commission is published by the Scientific Committee on Occupational Exposure Limits (SCOEL).12

The substance-specific information required by European Regulation 1907 of 2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) also includes occupational exposure limits in the form of derived no-effect levels (DNELs). Under REACH there is a requirement for health-based DNELs to be established for occupational (and non-occupational) exposure to chemicals produced or imported into Europe in annual quantities above 10 tonnes.13

The Japanese Society for Occupational Health (JSOH) published a recommendation for occupational exposure limits in 2013. This list has been included for comparison with ACGIH and EU recommendations.

For asbestos, in its 1986 Convention the ILO prohibits the use of certain types but calls for exposure limits for other types, to be determined by the competent authority of national governments. The EU Directive 2009/148/EC specifies both a binding exposure limit and the method of assessment that should be used. Occupational exposure should not exceed 0.1 fibres per cm2 as an 8 hour time weighted average (TWA).

For lead, binding exposure and biological limits are given in Annex I and Annex II of EU Directive 98/24/EC. These are 0.15 mg/m3 per 8 hour TWA and 70 µg lead/100 ml blood. The blood-lead standards quoted are for all workers and indicate when suspension from lead work is required. Lower limits may be recommended and used at a national level, with still lower limits for young persons and women. For example, it is understood that the ACGIH recommend a limit of 30 µg/100 ml,14 which is the same limit used for women of reproductive capacity in the United Kingdom.15

3.2 GAPS IDENTIFIED IN CHEMICAL SUBSTANCES’ NORMS

Further guidance is required on practical measures to assess and manage exposure to hazardous substances, including a generic assessment form.

The ACGIH produces a comprehensive list of occupational exposure limits (OELs), which is reviewed annually. The list is a priced publication and the current version is only available in English. It is understood that earlier editions are available in Greek, Italian, Spanish and Portuguese. The ILO and WHO publish a series of international chemical safety cards that can be accessed free of charge in 10 languages. These contain TLV exposure limits referenced to an ACGIH publication, the German maximum workplace concentration (MAK) limit and the EU limit. These cards are a useful source of reference provided they are regularly updated. In general, more access to OEL information is required together with guidance on interpreting the limits and monitoring exposure. Priced ISO measurement standards are available for some air contaminants, but more guidance is required on simple methods to estimate exposure using inexpensive equipment.

14 Dr LJ Bhagia communication with the authors (2014).
Standards have been published for ventilation in buildings, for dust control in specific industries, and for dust control from specific substances i.e. silica. However, there is no global standard or code on the design, use and testing of local exhaust ventilation.

**TABLE 3. NORMS FOR CHEMICAL SUBSTANCES**

<table>
<thead>
<tr>
<th>Area</th>
<th>Type</th>
<th>Source</th>
<th>Date</th>
<th>Sort title</th>
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<td><strong>FOCUS: WORKER HEALTH PROTECTION</strong></td>
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</tr>
<tr>
<td>Global</td>
<td>Convention</td>
<td>ILO</td>
<td>1971</td>
<td>C136 – Benzene Convention, 1971 (No. 136)</td>
</tr>
<tr>
<td>Global</td>
<td>Convention</td>
<td>ILO</td>
<td>1976</td>
<td>Occupational Cancer Convention, 1974 (No. 139)</td>
</tr>
<tr>
<td>Global</td>
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<td>2010</td>
<td>WHO guidelines for indoor air quality: selected pollutants</td>
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<td>ACGIH</td>
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<td>Control of inorganic lead at work &amp; safe use of lead</td>
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<td>International Chemical Safety Cards</td>
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<td>Directive</td>
<td>EU</td>
<td>1998</td>
<td>CEN/TC 264 – air sampling methods</td>
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4. BIOLOGICAL AGENTS

Biological agents can be defined as:

Bacteria, virus, fungi and other micro-organisms or parts of them and their associated toxins, including those which have been genetically modified, cell cultures or endoparasites which are potentially hazardous to human health.

Note: dusts of organic origin such as pollen, flour dust and wood dust are not considered to be biological agents and are therefore not covered by this definition.¹⁶

Workers can be exposed to biological agents through contact with infected individuals, infected animals, body fluids, exposure to contaminated water or air, and through a work activity that involves the use of human pathogens, for instance laboratory work involving infectious diseases. Table 4 shows norms relating to biological agents and the key points are summarized as follows.

4.1 PROTECTING WORKERS FROM BIOLOGICAL AGENTS

The range of documents outlining the requirements for assessment and control of biological agents is diverse and fragmented. Several guidance documents exist on specific diseases, such as a joint guideline from WHO and the International Leptospirosis Society (ILS) on leptospirosis. Other pathogens that are covered include the human immunodeficiency virus (HIV), malaria parasites, tuberculosis and anthrax bacteria.

There are also broader documents for the classification of biological agents by hazards and standardized protection measures for the different levels of risk. However, no international standard was found providing an overview for worker exposure to biological agents. The regional European Directive 2000/54/EC on biological agents at work may serve as a blueprint for such a minimum standard. It classifies biological agents into risk groups and defines the minimum requirements for eliminating and controlling these risks. Its annexes cover medical surveillance, biohazard signs and vaccinations among others. Another example, which may be especially relevant to developing countries, is a Canadian guidance document developed in British Columbia in 2007. This provides instructions on how to deal with the risk of infectious disease transmission in the workplace.

In the last decade the international community has developed a comprehensive approach to the prevention and management of HIV transmission in the workplace. ILO’s HIV and AIDS Recommendation No. 200 in 2010 states that:

- HIV and AIDS should be recognized and treated as a workplace issue;
- prevention of all means of HIV transmission should be a fundamental priority;
- the workplace should play a role in facilitating access to treatment;

there should be no discrimination against or stigmatization of workers, in particular jobseekers and job applicants, and no workers should be required to undertake an HIV test or disclose their HIV status.

Other guidelines consider post-exposure prophylaxis (PEP) to HIV at work (WHO/ILO, 2007) and provide guidance on how to improve access to HIV and tuberculosis (TB) prevention, treatment, care and support services (WHO/ILO/UNAIDS Guidelines, 2010). The latter document focuses on health workers and is a model of how to effectively manage HIV and TB in the workplace.

Several guidelines provide directions on TB control. The most recent from 2013 was jointly developed by WHO, ILO and UNAIDS updating the 2003 guidelines on workplace HIV control. The United States Occupational Safety and Health Administration (OSHA) standard from 2001 gives examples of how to manage various aspects of TB control in the workplace, including case-finding, case management and case notification. A 2009 WHO guideline advises on TB control in health-care settings.

No international norms were found on control of exposure to malaria during working hours in endemic countries. International 2009 guidelines are available from the Corporate Alliance on Malaria in Africa (CAMA) and the World Economic Forum (WEF), 2006, which sets out the most important features of malaria control in workplaces.

Several WHO documents provide guidance on control of pathogens in health-care settings. A 2008 guideline gives recommendations regarding care for patients with suspected or confirmed Filovirus haemorrhagic fever; a 2009 document deals with H1N1 and other influenza-like illnesses and a guideline from 2014 covers epidemic- and pandemic-prone acute respiratory infections.

4.2 Gaps identified in biological agents’ norms

Guidance is available to protect workers from exposure to HIV, TB, malaria, anthrax and leptospirosis as well as other pathogens occurring in health-care settings. However, there is no ILO Convention for biological agents, or global guidance that covers all biological agents. Therefore we recommend that a comprehensive international guidance is required. This standard should also consider aspects of pandemic preparedness outside health-care institutions, with particular consideration given to (re)emerging diseases – like SARS (severe acute respiratory syndrome) and viral haemorrhagic fevers – and their impact on the workplace at local and international level.

Products used to disinfect and control biological hazards are regulated in the EU under the Biocidal Products Regulation and it is recommended that the requirements of this legislation be adopted internationally. Similarly, the EU regional standard for sharps’ safety should be made an international standard.
## TABLE 4. NORMS FOR BIOLOGICAL AGENTS

<table>
<thead>
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<td>Guidelines for workplace TB control activities</td>
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<td>WHO ILS</td>
<td>1976</td>
<td>Human leptospirosis: guidance for diagnosis, surveillance and control</td>
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<td>WEF</td>
<td>1993</td>
<td>Guidelines for employer-based malaria control programmes</td>
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<td>WHO</td>
<td>1974</td>
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<td>WHO</td>
<td>1980</td>
<td>Guidelines for the surveillance and control of anthrax in humans and animals</td>
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<td>Global</td>
<td>Guide</td>
<td>WHO</td>
<td>1984</td>
<td>Policy on TB infection control in health-care facilities, congregate settings and households</td>
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<td>Global</td>
<td>Guide</td>
<td>WHO</td>
<td>2001</td>
<td>Infection prevention and control in health care for confirmed or suspected cases of pandemic (H1N1) 2009 and influenza-like illnesses</td>
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<td>Global</td>
<td>Guide</td>
<td>CAMA</td>
<td>2001</td>
<td>Implementing an integrated malaria control program</td>
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<tr>
<td>Global</td>
<td>Guide</td>
<td>WHO ILO UNAIDS</td>
<td>2008</td>
<td>Joint WHO-ILO-UNAIDS guidelines for improving health workers’ access to HIV and TB prevention, treatment, care and support</td>
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<td>WHO ILO</td>
<td>2010</td>
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<td>2000</td>
<td>EN 13098 Workplace measurement of airborne micro-organisms and endotoxins</td>
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<td>2003</td>
<td>EN 14031 Workplace atmospheres – Determination of airborne endotoxins</td>
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<td>EN 14042:2003 Procedures for the assessment of exposure to chemical &amp; biological agents</td>
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<td>Standard</td>
<td>OSHA</td>
<td>2001</td>
<td>1904.11 Recording criteria for work-related tuberculosis cases</td>
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</table>
5. NOISE AND VIBRATION

A summary of norms on noise and vibration is given in Table 5.

5.1 PROTECTING WORKERS FROM NOISE AND VIBRATION

Noise and vibration is included in the 1977 ILO Convention No. 148 on the working environment. In addition, the ILO has published Recommendation 156 and two relevant codes. The code on noise and vibration, first published in 1971 and revised in 1984, recommends a noise warning limit at 85 decibels (dB) (A) and a danger limit at 90 dB (A) as equivalent continuous sound levels for 8 hours. Limits for impulse noise are also given. No exposure limits are given for vibration but reference is made to the relevant ISO standard.

There are two important EU directives, one relating to noise exposure (2003/10/EC) and the other to whole-body and hand-arm vibration (2002/44/EC). Both these directives specify exposure limits. For noise this is 87 dB (A) averaged over 8 hours, and for vibration 5 m/s² for hand-arm vibration and 1.15 m/s² for whole-body.

5.2 TECHNICAL SUPPORT FOR NOISE AND VIBRATION

For technical support on measurement and evaluation techniques for noise and vibration, see the ISO standards series 4869, 2631, 4869, 5349, 9612 and 1999.

5.3 GAPS IDENTIFIED IN NOISE AND VIBRATION NORMS

Workplace protection on noise and vibration is well covered by international standards. However, more guidance is needed on how to assess noise and simple methods of noise control. Noise is measured in decibels (dB), which is a log scale and employers need to understand the practical implications of this. For example, a difference of 3 dB equates to a doubling or halving of noise exposure, for instance: 90 db + 90 dB = 93dB.
### TABLE 5. NORMS FOR NOISE AND VIBRATION

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<td>ISO</td>
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<td>ISO 9612 Determination of noise exposure, engineering method</td>
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6. RADIATION

6.1 PROTECTING WORKERS FROM RADIATION

ILO Convention No. 115 on the protection of workers from ionizing radiation has been available since 1960 and is still applicable. However, there is no specific convention for non-ionizing radiation. Some aspects are covered in ILO codes and guides, for example: on the use of lasers (1993); the protection of workers from power frequency, electric and magnetic fields (1994); visual display units (1994); and safety when using radio-frequency dielectric heaters and sealers (1998). The ILO List of Occupational Diseases (revised in 2010) includes diseases caused by ionizing radiations and by optical (ultraviolet, visible light, infrared) radiations including laser.


WHO provided guidance on exposure to radon in buildings in 2009. WHO has also been actively involved in the revision of the international radiation basic safety standards (so-called “International BSS”), co-sponsored by WHO and seven other international organizations. This covers all sources of radiation exposure that workers, the public and patients might experience.

The International Commission on Radiological Protection has been publishing recommendations on protection from ionizing radiation since 1928. Virtually all international standards and national regulations addressing radiological protection are based on the Commission’s recommendations. The latest edition was published in 2007.

There are three important European directives on: the protection of patients, workers and the public from ionizing radiation (Council Directive 2013/59/ Euratom, so-called “Euratom BSS”); the protection of workers exposed to electromagnetic fields (2013/35/EU); and the protection of workers exposed to artificial optical radiation (2006/25/EC).

Both the International BSS and the Euratom BSS establish dose limits for workers occupationally exposed to ionizing radiation. The effective dose is limited to 20 mSv per year averaged over a period of five consecutive years (i.e. 100 mSv in 5 years) and must not exceed 50 mSv in any single year. The OELs for apprentices aged 16–18 years are 6 mSv per year. People below 16 years of age are not allowed to be exposed to ionizing radiation at work. The directive on artificial optical radiation also defines exposure limits and formulae for calculating them. However, these would be difficult for most organizations to apply unless they had access to an expert in this field.

Table 6 covers norms to protect workers from harmful exposure to ionizing and non-ionizing radiation. The main points are summarized as follows.

6.2 TECHNICAL SUPPORT FOR RADIATION

Technical support standards have been published by ISO covering different methods of dose assessment and vocabulary used in radiological protection (Series 20553, 27048, 20785, 12749,
Safety guides and technical documents related to occupational radiation protection have been published by the International Atomic Energy Agency (IAEA Safety Standards Series).

6.3 GAPS IDENTIFIED IN RADIATION NORMS

There are sufficient norms in place for ionizing radiation protection but there are no international standards for non-ionizing radiation. Guidance is therefore required to protect workers from all types of non-ionizing radiation, including exposure to the sun.

**TABLE 6. NORMS FOR RADIOLOGICAL HAZARDS**

<table>
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<td>Protection of workers from power frequency electric and magnetic fields: a practical guide</td>
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<td>Standard</td>
<td>IAEA</td>
<td>2014</td>
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<td>Guide</td>
<td>ILO</td>
<td>1993</td>
<td>No. 68 The use of lasers in the workplace</td>
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<td>Guide</td>
<td>ILO</td>
<td>1994</td>
<td>No. 70 VDU radiation protection guidance</td>
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<td>Global</td>
<td>Guide</td>
<td>ILO</td>
<td>1998</td>
<td>No. 71 Safety in the use of radio-frequency dielectric heaters and sealers</td>
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<td>2007</td>
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<td>Guide</td>
<td>ICRP</td>
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<td>ISO 16637: Monitoring and internal dosimetry for staff exposed to medical radionuclides as unsealed sources (under development)</td>
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7. ERGONOMIC RISK FACTORS

The discipline of workplace ergonomics emphasizes the interaction between workers and other elements of the working system including tasks, mental workload, equipment, workspace and environment, and aims to prevent work-related musculoskeletal disorders (WMSD) and other problems. Table 7 lists norms relating to workplace ergonomics and musculoskeletal risk factors such as manual handling and the use of visual display terminals (VDTs). The main points are summarized as follows.

7.1 PROTECTING WORKERS FROM MUSCULOSKELETAL RISK FACTORS

The 1967 ILO Maximum Weight Convention No. 127 aims to protect workers from lifting heavy loads that are likely to cause injury. Other norms cover ergonomics associated with task design and the man–machine interface. ISO standard 26800 (2011) provides an overview of ergonomics to enhance the health, well-being and satisfaction of those using equipment or carrying out tasks.

ISO standard 6385 provides a framework for analysing a work system. The ISO series 11228 specifies weight limits and other parameters for manual handling, lifting and carrying. An ISO technical report published in 2013 defines requirements regarding patient handling in the healthcare sector and is considered a preliminary norm. The ISO standard series 9241 covers office work on VDTs extensively. A similar standard on work station design involving machinery other than VDTs is available as an EU CEN standard. Two European directives from 1990 define minimum requirements regarding exposure to physical hazards and also cover WMSD, manual loads and work on VDTs.

In 2010 two professional bodies, the International Commission on Occupational Health (ICOH) and the International Ergonomics Association (IEA) published a guide on ergonomics for occupational health practice in industrially-developing countries. In the same year, ILO in collaboration with IEA published a document on general ergonomics giving advice on practical and easy-to-implement solutions for resource-limited settings. WHO has published a booklet on preventing musculoskeletal disorders in the workplace as part of its protecting workers’ health series (2010). Safe Work Australia developed a guide in 2011 on how to manage the risk of musculoskeletal disorders arising from hazardous manual tasks in the workplace.

7.2 TECHNICAL SUPPORT FOR MUSCULOSKELETAL RISK FACTORS

ISO has published a technical specification for the improvement of local muscular workloads and is working on a technical application document to inform and guide the implementation of the standard series 11228 on manual handling. ISO standard 11226 gives directions on the evaluation of static working postures.
7.3 GAPS IDENTIFIED IN MUSCULOSKELETAL RISK FACTOR NORMS

Work-related musculoskeletal diseases are a major burden to health systems in developed countries.\textsuperscript{17} WMSDs are also very common in low-income countries but prevention, diagnosis and treatment are still insufficient – these countries are characterized by low levels of automation and suboptimal working conditions. Ergonomic principles are not sufficiently recognized and applied.\textsuperscript{18} On a global level, standards on ergonomic principles as well as guidelines for developing countries relating to prevention of musculoskeletal diseases are available but their implementation lags behind.

The ILO Convention only covers lifting heavy loads and there is a need to broaden its scope to include other forms of manual handling, such as pushing and pulling or work on VDTs, as well as general ergonomics and the well-researched interaction between psychosocial risk factors and development of WMSD.\textsuperscript{19} Simple readily-available guidance is then required to put the requirements into practice.

### TABLE 7. NORMS ON WORKPLACE ERGONOMICS AND MUSCULOSKELETAL RISK FACTORS

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<td>ISO</td>
<td>1996</td>
<td>ISO 11228-1 Manual handling (MH) lifting and carrying</td>
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<td>Standard</td>
<td>ISO</td>
<td>2001</td>
<td>ISO 6385 Ergonomic principles in the design of work systems</td>
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<td>Standard</td>
<td>ISO</td>
<td>2002</td>
<td>ISO 11228-2 MH pushing and pulling</td>
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<td>Standard</td>
<td>ISO</td>
<td>2014</td>
<td>ISO 11228-3 MH of low loads at high frequency</td>
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<td>Standard</td>
<td>ISO</td>
<td>1994</td>
<td>ISO 26800 Ergonomics general principles and concepts</td>
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<td>Guide</td>
<td>ILO IEA</td>
<td>2006</td>
<td>Ergonomic checkpoints</td>
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\textsuperscript{19} The role of work stress and psychological factors in the development of musculoskeletal disorders. The Stress and MSD study. Surrey: Robens Center for Health Ergonomics for the Health and Safety Executive; 2004.
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8. PSYCHOSOCIAL RISK FACTORS

Psychosocial risk factors are defined by Cox and Griffiths\textsuperscript{20} as

\begin{quote}
\ldots those aspects of work design and the organization and management of work, and their social and environment contexts, which have the potential for causing psychological, social and physical harm.
\end{quote}

Occupational stress is one outcome of psychosocial risk factors. Table 8 lists norms relating to this category and the main points are summarized as follows.

8.1 PROTECTING WORKERS FROM PSYCHOSOCIAL RISK FACTORS

The ISO 10075 series of standards covers psychosocial risks under the heading of ergonomic principles related to mental workload. Terms and definitions are defined in Part 1, for instance mental stress and mental strain which are an integral part of the so-called stress-strain concept.\textsuperscript{21} Design principles are given in Part 2, and methods of measuring and assessing mental workload in Part 3. The series refers to the mental workload associated with both thinking and manual tasks.

The 2013 Canadian Standard provides a comprehensive example. It uses the term ‘psychological health’ and refers to British guidance documents BSI PAS 1010, on management of psychosocial risk factors, and HSG 218 on managing the causes of work-related stress.


ILO published a guide in 2012 on preventing stress at work including a number of checklists for making assessments. WHO has developed guidance on work organization and stress (2004), psychological harassment (2003) and stress at work in developing countries (2007). The European Social Partners (ESP), which combine employer and worker representations, have published framework agreements on work-related stress (2004) and harassment and violence at work (2007) and guidelines were developed that facilitate the implementation of these framework agreements (PRIMA-EF 2008). In collaboration with ILO, Public Services International (PSI) and the International Council of Nurses (ICN) also developed guidelines for workplace violence in 2003 applying specifically to health sector workplaces.

9.1 Gaps identified in psychosocial risk factor norms

The various norms use different terms such as mental workload, work-related stress, psychological health and psychosocial risk factors. A comparison needs to be made between each of these norms to assess to what extent they are similar and if common terms, such as those given in ISO 10075.1, can be used.

To date, research on work-related stress and mental illness in developing countries is still scarce. Existing studies indicate that there is a lack of awareness of work-related stress and a shortage of resources to deal with it.\(^{22}\) Nonetheless, psychosocial risk factors at work are seen as an important factor that should be addressed.\(^{23}\) International standards, such as the ISO 10075 series, may require review and adaptation to future research findings on the psychosocial risk situation in developing countries. Existing norms should be broadened to include violence, bullying and harassment, and occupational stress. One example in this respect is the European framework for psychosocial risk management. New approaches such as the psychosocial safety climate model as an indicator for psychosocial risk factors, should be considered for inclusion.\(^{24}\)

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24 Personal communication from Prof. Maureen Dollard, 31 March 2014.
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10. WORK ENVIRONMENT

Work environment factors include air quality, temperature, provision of drinking water, lighting, general ventilation, tobacco smoke control, welfare facilities such as toilets and changing rooms, and first aid provision. Norms relating to the work environment are listed in Table 9 and the main points are summarized as follows.

10.1 PROTECTING WORKERS FROM A POOR WORK ENVIRONMENT

The ILO sets out the requirements for a healthy working environment in its Hygiene Convention C120 and in Recommendation No. 102 on welfare facilities. The convention requires good housekeeping and careful design of premises, sufficient air and light, safe drinking water, facilities to rest, wash, change and dry clothes, protection from noise and vibration and first aid provision. This convention applies to commercial establishments and offices but not to industry in general.

In 2009 the International Finance Corporation (IFC) and the European Bank for Rehabilitation and Cooperation defined international guidelines on worker accommodation in projects they were supporting financially. The 2013 mandatory standards of migrant workers’ welfare by the Qatar Foundation (QF) provide a similar example. These norms cover welfare facilities and also general employment conditions of migrant workers.

There are several ISO standards that relate to the physical working environment. ISO 6385 relates to general ergonomic aspects such as work space. A central requirement is that workers should be allowed to influence their work environment. Social, cultural and ethnic factors are recognized as influences on the acceptability of a work environment. ISO series 8995 sets requirements for proper lighting of indoor and outdoor workplaces. ISO standards 11399, 15265, 15743 and 12894 cover different aspects of the thermal environment such as working in hot and cold environments.

In its Framework Convention on Tobacco Control and associated guidelines of 2005 and 2007, WHO sets a standard for reducing exposure to tobacco smoke. The 2011 WHO guideline on safe drinking water outlines general requirements for the quality of potable water without referring explicitly to the work environment.

First aid is covered in the 1964 ILO Hygiene Convention No. 120 and in a guideline on first aid and resuscitation published by the International Federation of Red Cross and Red Crescent Societies (IFRC) of 2011.

10.2 TECHNICAL SUPPORT FOR THE WORK ENVIRONMENT

ISO 8756 gives technical advice on data handling regarding temperature, humidity and air pressure to control air quality. Monitoring the impact of working in hot and cold environments is guided

25 These regulations apply to all climatic conditions however influenced by climate change developments.
by several ISO standards. The most recent, ISO 28802, advises on assessment of environments using physical measurements and surveys of peoples’ subjective responses.

### 10.3 Gaps identified in work environment norms

The ILO Hygiene Convention is the main reference regarding basic requirements in the work environment. However, a convention that covers all workplaces, rather than just commercial premises and offices, is required that includes minimum standards for overnight accommodation if this is provided by the employer.

A further gap concerns guidelines on providing safe drinking water. The ILO Hygiene Convention requires that wholesome drinking water be provided and that WHO should publish water quality standards. There are currently no specific guidelines addressing the provision of water supplies in the workplace.

More consideration should also be given to first aid in the workplace. Responsibilities, training requirements and content of first-aid kits could be standardized. This may prevent situations in which first aid staff are overburdened with tasks and responsibilities.

### Table 9. Norms for the work environment

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11. GENERAL NORMS

Table 10 lists norms relating to general aspects of worker health protection. They cover general management of health and safety, health surveillance and health and safety in specific industries. Also included are ILO conventions on employment protection such as the minimum age, which has an indirect effect on worker’s health by excluding individuals that may be more susceptible to harm. A summary of the key points follows.

11.1 GENERAL NORMS PROTECTING WORKERS

The ILO conventions 155 and 187 on occupational safety and health and the British standard BS OHSAS 18001 have guided companies in setting up workplace health and safety management systems. In 2016 a new norm, ISO/NP 45001, was developed based on BS OHSAS 18001 and aligned with revised versions of ISO 9001 (Quality Management) and ISO 14001 (Environmental Management). Standards and guidelines targeting corporate social responsibility supportive of workers’ health protection are provided by ISO 26000 and the criteria of the Global Reporting Initiative (GRI). The World Bank Group and the IFC developed environmental, health and safety guidelines in 2007 for all projects in which they are both involved including a performance standard on labour and working conditions includes management of occupational safety and health.

With the 1985 occupational health services convention 161 and the labour inspection conventions 81 and 129, the ILO also supports governments in shaping their national workplace health and safety frameworks.

Additional ILO conventions and codes of practice regulate safety and health in specific sectors. Several guidance documents exist for professions and workplaces related to seafaring, such as fishing, dockwork, ports, shipbuilding and shipbreaking. For mining, codes of practice are available for coal and cast mines. In manufacturing and civil engineering, codes regulate health and safety in the iron and steel industries, in non-ferrous metal companies, construction and building. In the service and medical sectors, guidance is given for hospitality, nursing and domestic work.

For agriculture ILO Convention 184 covers safety and health and a comprehensive standard for farms seeking Rainforest Alliance Certification for their products was published in 2015 by the Sustainable Agriculture Network (SAN). The SAN standard incorporates the requirements of eight ILO conventions relating to fair working conditions, and requires the analysis, documentation and mitigation or elimination of occupational health risks. Specific issues relating to farming such as the use of pesticides, shade from the sun and restrictions for the employment of minors (children from 12 to 15 years of age) are included.

In 2007, the World Health Assembly adopted a global action plan on workers’ health covering the period from 2008 to 2017, which aims to achieve improvements in protection and promotion of health at work, employment conditions and health systems. The Healthy Workplaces Model was
developed consecutively as a guiding framework to support the implementation of the global action plan with a particular focus on primary and secondary prevention.

In 1998 the ILO developed technical and ethical guidelines on workers’ health surveillance. A recent national guideline from Croatia identifies surveillance procedures for workplaces where workers are at risk of developing occupational diseases and injuries. The ILO provides a list of occupational diseases based on a worldwide consensus on diseases caused by work, updated in 2010. The definition of the term ‘work-related diseases’ is still being discussed, with further guidelines targeting worker’s individual health resources. For instance, ILO and WHO have published guidance documents on food at work, management of alcohol and drug-related issues and physical fitness.

11.2 GENERAL TECHNICAL SUPPORT NORMS

No technical norms are listed in Table 10 for this category.

11.3 OTHER RELEVANT NORMS

Employment conditions strongly influence health protection in the work environment. International norms in this context are provided by several ILO conventions regulating working time, working hours per day and week, rest time, vacation, part-time work and night work. ILO conventions on social security are also associated with health as are several ILO conventions providing protection to vulnerable population groups including pregnant women, children, older people, the disabled and migrant workers.

TABLE 10. GENERAL NORMS FOR HEALTH PROTECTION

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**FOCUS: TECHNICAL SUPPORT**

**FOCUS: OTHER STANDARDS THAT MAY INFLUENCE HEALTH PROTECTION AT WORK**

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12. CONCLUSIONS AND RECOMMENDATIONS

12.1 CONCLUSIONS

This review shows that there are numerous international norms relating to protecting health at work, with some degree of duplication. However, when duplication was noted it was generally found that the approach to protection was similar. For example, ILO conventions and EU directives all advocated a degree of risk assessment, and for exposure monitoring 8 hour TWAs were used rather than ceiling limits. It was therefore concluded that there is good international cooperation on the development of norms.

Gaps were identified for all specific hazard categories investigated. In summary, the following additional norms or guidance documents would be valuable at an international level:

Chemical substances:
- Guidance on risk assessment and control of exposure. This should include examples of simple generic risk assessment forms, and information on monitoring methods using inexpensive equipment.
- A comprehensive list of occupational exposure limits (OELs) in various languages, free of charge.
- A standard or code on the design, use and testing of local exhaust ventilation.

Biological agents:
- A norm that covers workplace health protection from all biological agents.
- A norm that ensures only approved biocides are used at work.
- A norm ensuring that all health-care workplaces are equipped with safety-engineered sharps.

Noise and vibration:
- Guidance on assessing noise exposure and on practical inexpensive solutions for noise control at source.

Radiation:
- A norm on non-ionizing radiation.
- Basic guidance to protect against non-ionizing radiation at work.

Ergonomic risk factors:
- Broadening the scope of the ILO Convention on manual loads to include pushing, pulling and VDT work.
- Basic guidance on avoiding musculoskeletal injuries to put requirements outlined in the various documents in place.
Psychosocial risk factors:

- A norm that includes protection from violence, harassment and bullying.
- Review existing norms to see if they consider situations in resource-limited settings sufficiently.
- International agreement on terminology.

Work environment:

- Comprehensive norm for all workplaces, including minimum requirements for welfare, accommodation, first aid and safe drinking water.

General norms:

- A standard or code on managing health and safety specifically for small- and medium-sized enterprises and the informal sector.
- Guidance on how health protection and promotion initiatives in the workplace can achieve general health benefits for the individual and the wider community.

For some of the gaps, guidance documents at regional or national level were identified that can serve as blueprints for standard development.

The poor state of workers' health protection worldwide, especially in resource-limited settings, does not mirror the wide range of existing norms and guidance documents. There seems to be a gap between what is advocated by the norms and their implementation in practice. This gap may be lessened by better access to the guidance available through education and training, simple accessible documents, enhanced political will and improved occupational health services.

In certain aspects of health protection the relevant norms have to be purchased, as a result the cost incurred may restrict access in resource-limited settings. For example, this is the case for OELs and exposure monitoring methods.

Developing countries may require additional guidance to:

- Educate the workforce on basic requirements for workplace health protection;
- Give advisory support to small- and medium-sized enterprises (SMEs) and informal sector workers and employers;
- Promote preventive action.

In this context, it will be important to expand and strengthen prevention, diagnosis, treatment and rehabilitation services in the workplace, especially in settings where occupational health structures need to be strengthened. Close collaboration with primary health-care services may enable them to supporter workers and advocate on their behalf for preventive action by companies.

There are a number of guidance documents available for specific industries, or on specific hazards, many published by ILO in more than one language. Although these documents are a useful source of information for occupational health and safety professionals they may be too detailed for employers and workers. Simple and much shorter guidance documents are required for a number of topics. These should contain diagrams and photographs where appropriate to reach a wide range of literacy levels.
Last but not least, encouragement will be essential once a voluntary international norm has become a mandatory national law or regulation. This can be given by comprehensive information, workplace health and safety support and inspection.

**12.2 RECOMMENDATIONS**

1. International cooperation on all norms should continue and be expanded to developing countries whenever possible.

2. Access to existing norms should be improved particularly for SME and informal sector workers in resource-limited settings.

3. International norms and guidance documents should be developed according to the gaps identified in this document.

4. Simple technical guidance for employers and workers should be made available on the following topics:
   a) assessing and managing exposure to hazardous substances, and the use of OELs;
   b) controlling exposure to biological agents;
   c) noise assessment and control (including simple control methods for controlling noise at source);
   d) controlling exposure to non-ionizing radiation including exposure to the sun;
   e) preventing work-related musculoskeletal disorders;
   f) managing psychosocial risk factors including violence, bullying and harassment leading to work-related stress;
   g) provision of a safe work environment, including protection from exposure to second hand tobacco smoke, and adequate welfare facilities;
   h) the management of health and safety in small organizations.

5. International standards should be constantly reviewed and updated, so that omissions and changes in scientific opinion can be incorporated into the standards in a timely fashion. Whenever possible, standards should be amalgamated to avoid duplication and those no longer current should be taken out of circulation.
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The following experts kindly provided professional reviews and thoughtful comments on the report:

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