

Title of the Project

Cooperative Agreement on Occupational Health with the World
Health Organization CDC- RFA-OH-17-1701

FINAL PROGRESS REPORT

12/15/2020

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E11-OH-010461
09/01/2017-08/31/2020

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LIST OF TERMS AND ABBREVIATIONS

CDC/NIOSH	Centres for disease control and prevention/ National institute for occupational safety and health
COVID-19	Coronavirus infectious disease-19
EU-OSHA	European Agency for Safety and Health at Work
HealthWISE	Work improvement in health services
ICOH	International Commission on Occupational Health
IFRC	International Federation of Red Cross and Red Crescent
ILO	International Labour Organization
INAIL	National institute for insurance against work accidents
IOE	International Organization of Employers
IOMSC	International Occupational Medicine Society Collaborative
IOSH	Institution of Occupational Safety and Health
NEPAD	Planning and Coordination Agency into the African Union Development Agency
NIOH	National institute of Occupational Health
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OSH	occupational safety and health
PSI	Public Services International
RTT	Rapid Response Teams
SDG	Sustainable development goals
UNICEF	United Nations Children' Fund
WCCs)	WHO collaborating centres
WHO	World Health Organization
WIEGO	Women in Informal Economy Globalizing and Organizing
Wonca	World Federation of Family Doctors

ABSTRACT

This cooperative agreement (2017-2020) contributed to leveraging global action by the World Health Organization (WHO) on occupational health through strengthening countries' capacities to formulate policies and action plans for healthier and safer workplaces, enhancing the protection of health and safety of health workers and emergency responders, developing strategies for addressing occupational health of migrant workers and workers in the informal economy and measuring the health impacts of occupational risk factors.

With support under this agreement WHO was able to:

- provide support to countries for developing their national policies and action plans for promoting health and safety at work for all workers and national programmes for occupational health of health workers;
- elaborate training materials for integrating working life in the delivery of primary health care services and for the protection of health and safety of health workers and emergency responders;
- establish global strategies and develop plans of action for scaling up the efforts for healthier and safer workplaces for disadvantaged groups of workers, such as migrant workers and informal economy workers;
- develop methodologies for measuring and monitoring the health impacts of prioritized occupational risk factors based on robust scientific evidence and producing estimates of work-related burden of disease for 195 countries, disaggregated by sex and age group.

In addition, the agreement enabled WHO to integrate occupational health and safety into the broader global agenda for public health and to build partnerships with the various actors in the world of work, such as labour agencies and organizations of workers and employers.

WHO's capacities for protecting health and safety of health workers, and emergency responders and other workers have been significantly strengthened. These capacities were essential for issuing recommendations and supporting countries in the response to the COVID-19 pandemic.

WHO studies, data and estimates on health impacts of occupational risk factors, including among to the most disadvantaged workers, have given new impetus for global action on protecting and promoting health and safety in the world of work. They enabled countries to develop national policies and strategies for improving the protection of health and safety at work.

As a result of this work, the heads of states and governments committed at the United National General Assembly to scale up efforts for healthier and safer workplaces for all workers, to expand the provision of occupational health services as part of universal health coverage (including disadvantaged workers), to protect health and safety of health workers and to work with the private sector for the prevention and control of non-communicable diseases.

SECTION 1 SUMMARY OF ACHIEVEMENTS

Significant key findings

WHO recommendations, guidance, tools, evidence, data and estimates on occupational health were useful for countries in developing their national policies and action plans on health and safety at work.

The WHO/ILO global framework for the development of national programmes for occupational health was feasible for implementation in countries and healthcare facilities.

The development of national outlooks of workers' health resulted in development of national strategies and action plans on health and safety at work several countries, such as Qatar, Tanzania, Cuba, Israel, and Madagascar.

Occupational health and safety of health workers and responders should be an integral part preparedness and response to public health emergencies.

The protection of health and safety at work can be enhanced through an interdisciplinary approach across occupational health and safety, infection prevention and control, management of human resources for health and patient safety.

Global initiatives, such as the Global Compact on Migration, provide impetus for protection of occupational health and safety of migrant workers, however workers in the informal economy continue to be neglected in global and national policies and strategies.

WHO and ILO, collaborating with many individual experts, have produced sufficient evidence and data to measure and monitor the health impacts of several occupational risks, such as certain carcinogens, workplace air pollution, noise, long working hours and ergonomic risk factors.

Under formal Collaboration Agreement, WHO and ILO have produced the first WHO/ILO joint estimates of work-related burden of disease and injury (WHO/ILO Joint Estimates).

WHO and ILO have proposed an indicator on occupational disease burden from the WHO/ILO Joint Estimates to be added to the indicator system for the Sustainable Development Goals.

Translation of findings

Countries can use the WHO-ILO global framework, training materials and practical tools for the development and implementation of national programmes for occupational health of health workers. Critical capacities for occupational health and safety of health workers should be built at the national and healthcare facility levels.

The indicators and databases on workers' health developed by WHO can be used by countries for developing national policies and action plans on health and safety at work and monitoring progress.

Universal health coverage cannot be achieved without fully integrating working life in the delivery of primary health care and without extending coverage to the most disadvantaged workers, such as migrant and informal economy workers. This requires including occupational health in the undergraduate training of medical professionals

Capacities and mechanisms need to build at the national and local level for integrating occupational health and safety measures into the preparedness for and response to public health emergencies.

WHO and ILO can use the joint evidence and databases they have produced through this cooperative agreement for producing WHO/ILO joint estimates of the work-related burden of disease and injury. It is necessary to expand the WHO/ILO joint methodology and estimates to include additional occupational risk factors. Further training is needed for experts in countries to measure, estimate and monitor work-related health impacts.

Research outcomes/impact

54 countries reported having national programmes for occupational health for health workers

54,000 trainees enrolled in the WHO online course on occupational health and safety for health workers in COVID-19

Over 200 scientists were mobilized to develop the methodology for the WHO/ILO joint estimates of the work-related burden of disease and injury

Workplace health was included in the WHO Global Strategy on Health, Environment and Climate Change and the WHO Global Plan of Action on Promoting the Health of Refugees and Migrants approved by the 72nd Session of the World Health Assembly in May 2019.

National programmes on occupational health of health workers were successfully developed with WHO assistance in Togo, Tanzania (Tanganyika and Zanzibar) and Botswana and projects for development of such programmes started in Kuwait, Sri Lanka, Sierra Leone.

WHO recommendation of occupational health and safety for health workers and responders were used for the elaboration of international guidance and standards and national standard operating procedures for COVID-19 response

First WHO systematic reviews and meta-analyses of differences in occupational and work-related health outcomes between migrant and non-migrant workers and informal and formal economy workers, providing evidence for improving equity in occupational health and safety

WHO, working with ILO, has established a large network of experts from academic, governmental and inter-governmental organizations, to synthesise evidence and contribute to global health estimates in occupational health.

WHO and ILO have exchanged and harmonized data, evidence, and methods for global health estimation of work-related burden of disease, including produced novel and joint databases, evidence synthesis methods and statistical estimation models.

WHO, working with ILO and many individual experts, have conducted 15 systematic reviews and meta-analyses of the prevalence of occupational risk factors and their health impacts and published these in 14 academic journal articles in international journals. The first WHO/ILO Joint Estimates have been produced and shared with WHO member states in global consultations. They provide countries with an official base for developing policy and action in occupational health, across health and labour sectors.

At the United National General Assembly the heads of states and governments committed to scale up efforts to promote healthier and safer workplaces for all workers, to expand the provision of occupational health services as part of universal health coverage, to protect health

and safety of health workers and to work with the private sector for the prevention and control of non-communicable diseases.

SECTION 2: SCIENTIFIC REPORT

This section describes the progress made on the planned strategies and activities during the project period 2017-2020.

The 13th General Programme of Work of WHO, endorsed by the 71st World Health Assembly in May 2018, sets strategic directions for WHO's work on work and health in the period 2019-2023. In expanding universal health coverage so that 1 billion more people could benefit, WHO was requested to pay specific attention to decent working conditions for health workers and to the contribution of private sector to universal health coverage as employers.

In working towards healthier populations (1 billion more people enjoying better health and well-being), WHO is expected to build resilience to the increasing spread of work-related diseases, and to promote improved monitoring and surveillance, early warning systems and a coordinated and robust response, including awareness raising. Furthermore, WHO was requested to scale up its work with different sectors, including labour in reducing workplace air pollution

Strategy 1. Improving the effectiveness of health systems regarding the protection and promotion of workers' health

1.1. Foster the use and evaluate effectiveness of global training materials for occupational health in primary health care

WHO Headquarters and the Regional Office for South East Europe organized a three day workshop in New Delhi, 5-7 December 2017 for countries from South East Asia to review the progress made in occupational health and the follow up actions. This included a special session on training and education on occupational health where Thailand, Sri Lanka and Indonesia presented their experience in training of primary health care providers in occupational health. The session resulted in specific recommendations for the development of WHO global training modules for primary care providers.

WHO and the International Commission on Occupational Health (ICOH) collaborated on integrating occupational health into the WHO/UNICEF Global Conference on Primary Health care, held in October 2019 in Astana, Kazakhstan.

The PI also carried out review and provided recommendations for integrating occupational health into the [WHO operational framework for primary health care](#).

1.2. Develop guidance for detection of priority occupational diseases in primary health care

WHO together with the WCCs at the University of Illinois in Chicago and the International Centre for Rural health, Italy, organized a special session during the 11th global meeting of WHO Collaborating centres (WCCs) for occupational health, 27-28 April 2018, Dublin, on the development of methods for early detection of priority occupational diseases in line with the ILO diagnostic and exposure criteria for occupational diseases. The session resulted in a set of priorities and expressions of interests by the WCCs to become members of the working group. The working group will carry out systematic reviews of evidence of the effectiveness and cost-effectiveness of methods for early detection of noise-induced hearing loss; pneumoconiosis; asthma; chronic obstructive pulmonary disease; low back pain; repetitive strain injury; contact dermatitis; cancers of the lung and bladder; and leukaemia;

1.3. Establish collaboration with associations of primary health care providers for global action on workers' health

Occupational health was included in the collaboration agreements between WHO and World federation of family doctors (Wonca) and International Council of Nurses. WHO and Wonca President discussed the collaboration and decided to establish a joint working group on occupational health in primary health care. WHO organized a capacity building workshop on occupational health in primary health care at the Wonca Regional Conference in Africa, June 2019 in Kampala, Uganda. This resulted in [commitment](#) of African family physicians to integrate working life in the working life in the delivery of people-centred care. In 2020, WHO also provided technical support to the National Institute of Occupational Health and the Public Health Foundation of India for developing a [technical package for training of primary healthcare providers in occupational health](#).

A guide on using the International [One Health Costing Tool](#) for workers' health interventions was developed and disseminated among interested countries, prior to its incorporation on the manuals of the OneHealth Costing Tool. Special sessions on expanding coverage of workers with occupational health services were organized as part of the WHO global expert consultation with ministries of health and partners "Work and Health in the Context of SDGs" held in Geneva 9-11 April 2018 and as part of the 11th meeting of WCCs for OH, held in Dublin 27-28 April 2018.

The PI co-authored a chapter on global occupational health in a forthcoming Handbook on Global Health to be published by Springer Nature. The handbook will be used for training of public health students and practitioners around the world.

1.4. Provide technical assistance to national governments for strengthening the development and implementation of policy tools for workers' health

WHO developed a [global strategy on health, environment and climate change](#), and actions on health at the workplace are integrated in this strategy to ensure synergies with environmental health actions by WHO. One of the objectives of the global strategy is "To ensure coverage of occupational health services that deal with the full range of physical, chemical, biological, psychosocial and ergonomic risks at the workplace; that contribute to prevention and control of modifiable risk factors, in particular for noncommunicable diseases; and that are adapted to the new forms of work, migration and organization of workplaces, including the informal economy and precarious employment."

Technical assistance has been provided to the ministries of health of Sri Lanka, Kuwait, Jamaica, Dominican Republic, Madagascar, Israel and Cuba to develop a plan of action on workers' health based on the national outlook of workers health developed under the 2014-2017 WHO/NIOSH cooperative agreement. WHO supported the organization of workshops of stakeholders from the health sector, held in Antananarivo, Madagascar in 2017 and Havana, [Cuba](#) in 2018.

1.5. Assist countries in developing national outlooks of workers' health

WHO provided assistance to the ministries of health of Israel and Madagascar to use the data of the national outlook on workers' health for the development of national plan of action on occupational health.

1.6. Assist countries in establishing roadmaps for scaling up workers' coverage with essential interventions for prevention and control of occupational and work-related diseases and injuries

Technical assistance was provided to the ministry of health of Botswana for developing [standard for occupational health services](#).

Strategy 2. Occupational health and safety of health and emergency response workers

The work towards this objective has been significantly expanded in the context of WHO response to the COVID-19 pandemic. As of 15 March 2020, at the request of WHO Director-General, the PI was deployed as occupational health officer 100% to the WHO Health Emergencies Programme. This allowed for full participation in the WHO COVID19 response and establishing collaboration with the other pillars of the emergency response, in particular management of infodemics, infection prevention and control, essential health services and health operations.

WHO and ILO established an Ad Hoc Study Group on Occupational Health for Health Workers in COVID19 with involvement of WHO collaborating centres with relevant expertise, including CDC/NIOSH. The Ad Hoc Study Group help weekly meetings, carried out rapid reviews of evidence and a global survey on health and safety of health workers in COVID19.

The WHO [World Patient Safety Day in 2020](#) was devoted to health worker safety and this provided significant leverage to WHO action on protecting health, safety and wellbeing of health workers. On the occasion of this day WHO issued a charter on health worker safety and organized a global campaign to promote health worker safety

2.1. Review the development and implementation of existing national occupational health programs in the health sector

WHO collected the available national policies and programmes for occupational health and safety of health workers available in English, French, Spanish and Russian. WHO collaborating centres for occupational health carried out a comparative review of the existing policies vis a vis the [WHO/ILO global framework for the development of national programmes on occupational health of health workers](#) .

The [WHO Director-General called upon all countries](#) to develop national programmes for occupational health for health workers. The percentage of countries having such programmes was included as indicator for the WHO monitoring and evaluation of COVID19 response and the situation is monitored on monthly basis. As of 1 December 2020, 54 of the 195 WHO Member States reported having such programmes.

In 2020 WHO convened an expert meeting to review the implementation of existing national programmes for occupational health and safety for health workers and the lessons learned from their development and implementation. Country case studies were reviewed from Sri Lanka, Philippines, Thailand, Togo, Tanzania, Ghana, South Africa, Croatia and the United Kingdom.

2.2. Develop global guidance for national occupational health programs for health workers

Based on the WHO/ILO framework for national occupational health programs for health workers, and grounded in our review of existing programs, WHO developed first draft for a WHO/ILO guidance on developing and implementing national programs for occupational safety

of health workers, including: country case studies of different programs. The draft was piloted in the United Republic of Tanzania (Mainland and Zanzibar), Sri Lanka, Togo, North Macedonia, Cuba, Botswana, Kuwait and Sierra Leone.

In 2020, WHO and ILO issued a policy brief on the development and implementation of national programmes for occupational health of health workers. WHO also issued a checklist for assessment of health facilities vis a vis the key elements of the WHO/ILO global framework. WHO Headquarters and its Regional Office for the Eastern Mediterranean organized a training workshop for countries in the development and implementation of national programme for occupational health for health workers. WHO also contributed to national workshops in North Macedonia and Kazakhstan on the development of national programmes.

WHO, with support from ILO, developed a draft for a technical package on the development of national and facility programmes for occupational health for health workers. The package includes: (1) overview of main occupational risks and the existing international recommendations for their control; (2) guidance for the development of national programmes for occupational health of health workers based on countries' experience; (3) recommendations for implementation of national programmes based again on countries experience. WHO decided to make this package a global public health good (a corporate priority) and its development will continue in 2021 to meet WHO quality standards for development of global public health goods.

2.3. Develop global guidance and standard operating procedures for protecting OHS in emergency preparedness and response

Based on the experience gained from the Ebola response in West Africa, and the review international recommendations and evidence, WHO and ILO developed and issued in 2018 a manual on occupational health and safety in public health emergencies, published in English, French, Spanish and Chinese.

WHO also developed a [manual for vaccination of health workers against seasonal flu](#).

Occupational health was integrated into the Joint External Evaluation Tool for measuring the level of preparedness of countries for public health emergencies under the International Health Regulations.

In the context of the COVID-19 response, WHO issued interim guidance for occupational safety and health of health workers, prevention and management of COVID19 infections among health workers, and management of health workforce.

WHO also contributed to the development of [standard on duty of care](#) for humanitarian personnel, issued by the Interagency Standing Committee on humanitarian emergencies.

2.4. Develop training materials for protecting emergency response workers' OHS for use by countries

WHO also prepared a training module on occupational health and safety for rapid response team (RTT). The module was successfully piloted in Tanzania and was included in being All-Hazard RRT Training Package (version 2.0). WHO also developed special training package for protection of health and safety of rapid response teams in the context of COVID19 and carried out two training sessions in English and French.

An OpenWHO course on occupational health and safety for health workers in COVID19 was released for free online training. The course is available in English, French, Spanish, Portuguese, Macedonian and Swahili and as of 3 December 2020 there have been 55,000 enrolments.

2.5. Build capacities in countries for the implementation of actions on health workers' safety

Training courses on work improvement in health care facilities were carried out by WHO in Botswana and Tanzania (3 locations in the mainland and Zanzibar) using the [ILO/WHO HealthWISE toolkit](#). WHO collaborating centres for occupational health at the University of Abomey Calavi, Benin, University of British Columbia, Canada, University of Maryland, USA and National Institute of Occupational Health, South Africa carried out training courses on work improvement in health care facilities in Togo, Benin, Gambia, Swaziland, and Mozambique. WHO and ILO organized a demonstration of the HealthWISE tool at the Global Forum on Human Resources for Health, held in Dublin in 2018 with participation of national experts from Togo, China and Tanzania. A Review of the experience gained in carrying out training in HealthWISE was carried out at a special session during the 11th global meeting of WCCs for OH, 27-28 April 2018, Dublin.

WHO and the Faculty of Public Health of the University of Kuwait organized a workshop on occupational health and safety of health workers as part of the Kuwait International Forum on Health, Safety, Security and Environment, co-sponsored by Kuwait petroleum under the patronage of the Minister of Oil and Energy of Kuwait. Forty-five occupational health experts from governments and oil companies in the countries from the Gulf Corporation Council were trained in the basics of occupational health and safety protections in healthcare facilities. WHO also organized a multi-stakeholder workshop on occupational health and safety for health workers in Sri Lanka in 2019.

Furthermore, WHO and ILO worked with IOSH to develop a project to scale up HealthWISE training using IOSH network of trainers in occupational safety and health in 120 countries.

The PI carried out country missions to Togo, Benin, Tanzania, Botswana, Sri Lanka and Kuwait to scope the situation regarding the protection of occupational health and safety of health workers and to work with the ministries of health to elaborate projects for developing national programmes on occupational health and safety of health workers. During the missions, the PI met with the senior officials from ministries of health and visited different types of health facilities and elaborated plans for support by WHO collaborating centres for the national programmes.

The projects include three components: (1) analysis of the current situation in the country vis a vis the WHO/ILO global framework for developing national programmes for occupational health of health workers; (2) national workshop for stakeholders to appreciate the current situation and to develop strategic recommendations for elaboration of the national programmes in line with the WHO/ILO framework; (3) in-country train the trainers course in HealthWISE (five days for 30 participants). The two countries, were selected in addition to Togo, Tanzania and Botswana to serve as pilots in the development of the national occupational health programmes for health workers based on the strong commitments of the ministries of health and because they represent different geo-political areas and types of national health systems.

2.6. Collect, analyse, and disseminate scientifically valid data on occupational health and safety in outbreaks and other public health emergencies

The WHO/ILO Ad Hoc Study Group on Occupational Health for Health Workers in COVID19 carried out rapid reviews of evidence for certain non-infectious occupational risks that were amplified by the COVID19 pandemic – psycho-social risks, violence and stigma, fatigues and prolonged use of personal protective equipment. The results of these reviews were used to develop WHO/ILO guidance on occupational health and safety of health workers in the context of COVID19.

Strategy 3. Health of workers in informal and small worksites with constrained resources

The activities under this strategy were focused primarily on workers in the informal economy. Responding to the request of the World Health Assembly to WHO to develop a [global plan of action on health of refugees and migrants](#), an emphasis was placed on international migrant workers, as these commonly work in informal and small worksites. The plan of action was approved by the 72nd Session of the World Health Assembly in May 2019 and includes a priority on occupational health for migrant workers. Several of the activities were carried out in collaboration with the National Institute for Occupational Health (NIOH) of South Africa.

3.1 Assess the determinants of health and health status of workers in informal and small worksites

Collaboratively with NIOH South Africa and Women in Informal Economy Globalizing and Organizing (WIEGO), WHO produced a first systematic review and meta-analysis of health services use and health outcomes among informal economy workers, compared with formal economy workers. On NIOH South Africa's request, WHO provided training and technical assistance to the institute on systematic review and meta-analytic methods in occupational health, building dedicated capacity for conducting high-quality evidence syntheses in the African region. The systematic review identified twelve studies on the topic and concluded that informal economy workers may be less likely than formal economy workers to use any health services and more likely to experience depression. The evidence is uncertain for the other eligible outcomes and warrants further research to strengthen the currently small existing body of evidence. The journal article reporting the systematic review is currently undergoing peer-review at an international, peer-reviewed academic journal.

In addition, WHO finalized its systematic review and meta-analysis of health services use and health outcomes among international migrant workers, compared with non-migrant workers. The search and evidence synthesis were updated to cover the recent body of evidence published over the last decade (2010-2020). Twenty-one studies fulfilled the inclusion criteria. From this evidence synthesis, we concluded that migrant workers may be less likely than non-migrant workers to use health services and more likely to have occupational injuries. More research is required on migrant workers from and in low- and middle-income countries, in migration stages other than destination, from irregular migration and in the informal economy. This systematic review has also been submitted for publication in a peer-reviewed academic journal and is currently undergoing peer-review.

3.2. Identify priorities for global action to improve health protection and health coverage of workers in informal and small worksites

The systematic reviews on informal economy and migrant workers provided an evidence base for prioritization areas of global action to protect and promote the health of workers in informal

and small worksites, including those who are migrants. They identified the need for expanding universal health coverage, including occupational health services, to workers in informal and small worksites, with a focus on protection from occupational injuries and mental health promotion.

Strategies for reaching out to informal workers were included in the [WHO, IFRC, OCHA recommendations](#) on how to involve disadvantaged people in risk communication and community engagement.

WHO also issued specific recommendations for protecting occupational health and safety of migrant workers in the context of COVID19 as part of its interim guidance on preparedness, prevention and control of coronavirus disease for refugees and migrants in non-camp settings and a special interim guidance for promoting the health of migrant workers in the WHO European Region during COVID-19.

WHO also issued a [Manifesto for healthy and green recovery from COVID-19](#) including measures for building resilient workplaces and addressing health and safety of workers in the informal economy.

3.3 Identify and assess effectiveness of existing national and local policies and programs for addressing the health of workers in informal and small worksites

We have produced the first three qualitative country case studies of prioritized national OSH laws, policies and programmes for workers in informal and small worksites in three countries from three WHO regions: Brazil, South Africa, and Thailand. This work was coordinated jointly by WHO and NIOH South Africa, with contributions elicited from HomeNet Thailand; NIOH South Africa; University of KwaZulu Natal; and WIEGO.

3.4. Identify and assess cost-effectiveness of existing tools for workplace improving in informal and small worksites

At the inaugural OSHAfrica Congress in 2019, WHO collaborating with partners, including the ILO, organized global panels of national government representatives, associations of informal economy workers and individual experts that reported and exchanged on existing tools for improving informal and small worksites to protect and promote workers' health.

WHO also carried out a review on the existing good practices for national and corporate policies on addressing occupational health and safety for migrant workers. The report was submitted for publication by WHO.

3.5. Build countries' capacities to develop and implement national policies and programs for informal workers

Capacity was built in the Ministry of Health, Tanzania, to integrate in the country's occupational health surveillance system the collection of data on the health of workers in informal and small worksites, as the basis for developing policies for improving the health of this worker population. WHO technical assistance resulted in the ministry of health developing a list of prioritized indicators for future collections of data on workers in worksites that are informal or small.

WHO in collaboration with ILO organized a round table [“Breathe clean air: everywhere, for everyone”](#) on protecting workers from air pollution outdoors and indoors, as part of the First Global Conference on Air Pollution. International experts from WHO, ILO, academic organizations, ministries of health and trade unions elaborated a set of measures for protecting

workers, particularly in the informal sector, from exposure to air pollution. As a result, the development and implementation of occupational safety and health regulations and measures to protect workers from occupational exposure to air pollution outdoors and indoors and research on occupational exposure to ambient air pollution were included among the priority actions “[Clean air for health: Geneva Action Agenda](#)” recommended by the WHO Global Conference on Air Pollution.

WHO contributed to including occupational health in the development of international interagency guidance on bilateral labour agreements.

3.6. Develop tool kits for improving prioritized informal worksites

WHO developed and presented at OSHAfrica a global framework for actions to protect and promote workers’ health in small, informal worksites. This framework was the basis of exchange on effectiveness and cost-effectiveness of tools in a global panel organized by WHO, which brought together experts and stakeholders from national governments, WHO, ILO, the African Union (through NEPAD) and organizations of informal economy workers, including WIEGO. More work is needed to systematically review and synthesise evidence on effectiveness of cost-effectiveness of tools to ensure the occupational health and safety of workers in the informal economy and small worksites.

3.7. Identify and assess global stakeholders for action on informal workers’ health

WHO conducted a stakeholder analysis for informal workers’ health. Through it the Organization identified several global stakeholders. This stakeholder analysis enabled WHO to bring key actors together for exchange and joint strategizing for action, including at the abovementioned OSHAfrica panels.

3.8. Develop a strategy for mobilizing actors (people with notable influence) across the globe to improve informal workers’ health

WHO organized several webinars for international stakeholders on addressing COVID19 among informal workers, with participation of WIEGO, ministries for health and labour, ILO and the international organizations of employers and trade unions.

In collaboration with WHO multilateral partnerships department we organized a World of Work Dialogue to explore the challenges and the strategies for addressing health and safety at work in small and medium enterprises and in the informal sector.

Strategy 4. Global platform for monitoring workers’ health

The activities under this strategy were carried out in close collaboration with INAIL (National Institute for Insurance against Accidents at Work), Italy.

4.1. Create an open-access facility for international data and indicators on workers’ health

The global database for workers’ health, which was established through the previous WHO/NIOSH cooperative agreement (2014-2017), was again fully updated with the latest available datasets for each of the 39 prioritized indicators. With support from INAIL, Italy, the indicators in the database were further harmonized, so that they are ready for upload and presentation in a suitable online platform. WHO has further considered the opportunity to use existing online platforms for making the updated database open access. A working group on OSH data was introduced to the recently launched Global OSH Coalition, which may also

provide a mechanism for international collaboration that will make these global workers' health indicators available in an open-access facility. To that end, the European Agency for Safety and Health at Work (EU-OSHA), which has recently developed open-access visualization facilities for European OSH indicators, has already indicated that they may be able to work with WHO towards an open-access facility for the WHO global database.

WHO has also started to work towards establishing a more comprehensive global monitoring system for workers' health, including regular global reporting. The development of the first global outlook of workers' health that was advanced. With support from INAIL, Italy, standard graphs and reporting formats have been developed and tested on selected indicators.

4.2. Provide technical assistance to users of the global data and indicator facility

With its collaborating centre at INAIL, Italy, WHO further updated, harmonized and maintained the database. WHO also provided access to and extractions of data on their indicators to several countries across regions and provided technical assistance to use these indicators to develop national plans of action for workers' health.

4.3. Assess strengths and gaps of existing global methodologies for estimating work-related deaths

The WHO report "Preventing disease through healthier and safety workplaces" was published in 2018. It provides WHO estimates of the burden of disease that can be prevented through action on the working environment and the corresponding interventions. It builds on the WHO report published in March 2016 titled "Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks". The spotlight report on working environment was written based on: (a) systematic reviews of the links between occupational risk factors and conditions and major disease groups, with a special focus on non-communicable diseases; (b) synthesis of available information on fractions of disease burdens attributable to the occupational risk factors, using comparative risk assessment methods and expert opinions; and (c) synthesis of the literature on interventions.

4.4. Develop proposal for a global methodology for estimating work-related health outcomes across risk factors

WHO and ILO have collaborated to develop their [first joint methodology for estimating the work-related burden of disease and injury](#) (WHO/ILO Joint Methodology). To that end, WHO and ILO reviewed their respective methodologies used in the past, identified synergies and developed a joint, agreed methodology. This methodology is based on the Global Comparative Risk Assessment. In 2019, WHO and ILO committed by formal [Collaboration Agreement](#) to produce joint estimates of the work-related burden of disease and injury (WHO/ILO Joint Estimates). This in effect established an interagency global monitoring programme that has never existed before.

4.5. Identify additional occupational risk factors not covered by the Global Burden of Disease Study 2015

WHO conducted a gap analysis in which it identified a long list of 80 potentially relevant additional pairs of occupational risk factors and their health outcomes that could be used to expand the scope of work-related burden of disease estimates. These pairs were incorporated neither in the WHO and ILO methodologies for estimating work-related disease burden, nor in the Institute for Health Metrics and Evaluation's Global Burden of Disease 2015 Study. WHO

then conducted rapid reviews of evidence for potentially estimating the burden of disease from each of these potentially relevant pairs of risk factors and health outcomes. Criteria were developed to systematically select the most prioritized pairs. WHO and ILO, collaboratively with international and national partners (e.g., ICOH and INAIL) and leading technical experts, selected the ten most prioritized pairs for inclusion in the WHO/ILO Joint Methodology, if a systematic review of parameters would generate the evidence required for producing scientifically robust estimates.

4.6. Assess epidemiological evidence and data on these occupational risk factors and their health impacts

WHO and ILO invited expressions of interest from individual experts to contribute to the conduct of 15 systematic reviews and meta-analyses of parameters for estimating the burden of disease for the ten prioritized, additional pairs of occupational risk factors and health outcomes. The invitation of expressions of interest was circulated to WHO collaborating centres for occupational health, ILO networks, and relevant ICOH scientific committees.

In Year 1, WHO and ILO selected 130 scientists from 25 countries to contribute to the systematic reviews. In Year 2, the organizations further grew this expert group to 150 experts from 30 countries. By Year 3, WHO and ILO had grown the global network of individual experts to comprise over 200 experts in 35 countries across five WHO regions. This included experts from national governments, including ministries of health and labour, in ten countries (Brazil, Bulgaria, China, Denmark, Finland, Italy, Japan, Netherlands, South Africa, and Thailand). It also included experts from two intergovernmental organizations in the regions of Africa and Europe.

WHO and ILO, supported by their large expert network, and drawing on leading systematic review methodologists from the Cochrane Collaboration and the GRADE Working Group, developed a standard methodology for conducting the required systematic reviews and meta-analyses. This included WHO, with ILO inputs, developing a novel tools for assessing risk of bias and quality of evidence in prevalence studies in occupational health. This work advanced systematic review methods for occupational health with a focus on strengthening the evidence base for burden of disease estimation.

WHO provided extensive training in systematic reviews and global health estimation to the over 200 occupational health experts and occupational epidemiologists. WHO subsequently involved the experts in the systematic reviews and/or sought their technical advice on the WHO/ILO Joint Methodology and/or Estimates. WHO and ILO convened coordination meetings of lead reviewers in October 2016 at ILO Headquarters in Geneva, Switzerland, and in April 2019 at the European Agency for Safety and Health at Work (EU-OSHA) in Bilbao, Spain.

A [special issue in *Environment International*](#), a high-impact academic journal specialised in systematic reviews in environmental and occupational health, was secured for the Gold Open Access publication of the new methods, nine protocols and 15 systematic reviews. The pre-published protocols guided the implementation of each systematic review. Fifteen systematic reviews have been conducted. Of these, four are published, six are submitted for publication in the journal, and the remaining five are being finalized. These encompass five systematic reviews of studies on occupational risk exposures, and ten systematic reviews of the effect of these occupational risk factors on health outcomes. These provide the evidence base for producing the WHO/ILO Joint Estimates.

4.7. Develop methodologies for estimating the burden of disease for these occupational risk factors.

WHO and ILO established three joint databases of (proxies for) exposure to occupational risk factors, populating these primarily with national official Labour Force Surveys:

1. Industrial sector (proxy for occupational risk factor exposure): 1,061 surveys, 120 countries.
2. Occupation (proxy for occupational risk factor exposure): 592 surveys, 94 countries.
3. Working hours: 2,324 surveys, 154 countries.

These WHO/ILO databases are an innovative and new global data resource for occupational health.

Drawing on WHO's standard models for estimating environmental exposures, WHO and ILO built their standard multi-level, predictive models for estimating exposures to occupational risk factors. One standard binary exposure model was built (exposed vs unexposed), as was one categorical model (exposed to category A vs category B vs category C). These models were fed with the exposure data from the WHO/ILO exposure databases. Applying their novel and joint data bases and statistical models, WHO and ILO developed the first sets of WHO/ILO Joint Estimates. This included estimates of exposure to occupational risk factors (eg long working hours, solar ultraviolet radiation, silica dusts and welding fumes) and estimates of burden of five new pairs of these occupational risk factors and selected health outcomes. A journal article was written and submitted to a journal that describes the new methods used for modelling exposure to occupational risk factors over a time window. Estimates of occupational disease burden were also produced for 39 pairs of occupational risk factors and health outcomes established already through the Global Burden of Disease Study 2017. An academic journal article reporting the WHO/ILO Joint Estimates of the burden of cardiovascular disease attributable to exposure to long working hours has been submitted to an academic journal for publication.

WHO conducted formal country consultation on two sets of these global health estimates, giving all Member States the opportunity to review their estimates and provide feedback on these, engaging all WHO country and regional offices and approximately 40 countries through this process. WHO also led the writing of WHO and ILO corporate reports on the WHO/ILO Joint Estimates, presenting the methods and data sources (technical report) and presenting the global burden of disease estimates (monitoring report), which are forthcoming for publication.

From the WHO/ILO Joint Estimates, WHO and ILO developed a proposal for an indicator on the burden of occupational diseases to be added to the Sustainable Development Goals indicator system. This WHO/ILO indicator proposal was submitted to the United Nations Inter-agency and Expert Group on SDG Indicators. This indicator from the WHO/ILO Joint estimates presents an opportunity for countries to further improve global visibility of occupational health and safety.

Collaborations

There were several meetings with collaborators organized during the implementation of this cooperative agreement.

The global workshop "Health and Work: WHO's action on the sustainable development goals" was held in Geneva 9-11 April 2018. The overall objective of this meeting was to develop

strategic directions for WHO's future action on health and work for the next five years in line with the 13thGPW and SDGs. In particular, the meeting reviewed the progress made and unfinished agenda under the existing WHO resolutions and international commitments on health and work; identified cost-effective upstream policy options action by the health sector at national and international levels to achieve the SDG targets relevant to health and work, and proposed a set of high priority strategic actions for improving workers' health and the working environment in the context of global action on health, environment and climate change. The recommendations of the meeting provided a basis for the development of WHO operational framework for workplace health under the WHO Global Strategy of Health, Environment and Climate Change. The meeting was attended by experts in public health, occupational and environmental health from governments and non-state actors, WHO collaborating centres for occupational health and WHO experts from the relevant technical programmes in the HQ and Regional Offices.

WHO also convened the 11th Global meeting of the WHO Collaborating Centres for Occupational Health, 27-28 April 2018 in Dublin, Ireland. The purpose of this meeting was to review the progress made on the implementation of GMP at regional and global levels and to discuss the contribution of the CCs to the corresponding regional and global activities tasks in the operational plans for the 2018-2019 biennium. The meeting was attended by the directors of the majority of WCCs and their representatives, senior officials from the NGOs in official relations with WHO, experts from ILO and WHO and observers.

Upon the recommendation of the ministry of social affairs and health of Finland, ILO and WHO established a global Coalition on Occupational Safety and Health to promote synergies and partnerships for action on health and work in line with SDG3 and SDG8 goals. WHO and ILO serve as co-chairs of the Coalition, and the founding member are: The European Commission (DG Employment), the European Agency for Safety and Health at Work, the International Commission on Occupational Health, the Ministry of Social Affairs of Health of Finland and the Finnish Institute of Occupational Health, the Ministry of Manpower of Singapore and the Workplace Safety and Health Institute. The Coalition held two meetings to develop the priority workstreams, which include prevention and control of non-communicable diseases and mental health at the workplace, occupational health and safety of labour migrants, data for occupational safety and health, Vision Zero, and occupational health and safety in the future of work.

WHO also contributed to the work of ILO on the future of work and issued a [web note](#) on the recommendations of the Global Commission on the Future of Work.

WHO has also contributed to the ICOH Congress on Occupational Health, held in Dublin 30 April-4 May 2018. The WHO Director General addressed the congress by video-link, for the first time in WHO history) and WHO participated in the global policy forum on prevention and control of occupational cancer. WHO and ILO also organized a special session on the WHO/ILO joint methodology for measuring work-related burden of disease and contributed to the technical sessions on occupational diseases and social determinants of health.

In 2019, WHO organized a round table "Towards healthier and safer workplaces for all: Delivering as one" with participation of ILO and representatives of national health authorities, trade unions, employers and the relevant WHO technical programmes. The round table was devoted to mapping ongoing global initiatives and developing a strategy for further synergies in scaling up global efforts towards healthier and safer workplaces and increasing the access to

occupational health services in line with the commitments made by the health of state at the UN High Level Meeting on Universal Health Coverage.

Through the WHO/ILO Joint Estimates, WHO and ILO strengthened their technical collaboration and harmonized their estimation methods to improve policy coherence across health and labour sectors. WHO and ILO established and facilitated collaborations with 200 individual experts from 35 countries, which contributed to the production of 15 systematic reviews and meta-analyses of the effect of occupational risk factors on selected health outcomes. This network included experts from 10 national governments, which received extensive capacity building in systematic reviews and burden of disease estimation in occupational health. WHO also engaged two inter-governmental organizations extensively in the development of the estimates (African Union and European Commission). This has strengthened WHO's and ILO's networks and collaborations for global workers' health monitoring.

In the context of the response to the COVID19 pandemic WHO organized more than 25 webinars on COVID19 at the workplace with international organizations of employers and trade unions, ministries of health and labour and scientists. A collaborative agreement was concluded between WHO and the Institution for Occupational safety and Health for joint activities on COVID19 response.

The work under this cooperative agreement provided evidence bases and advocacy for the integration of occupational health into the global health agenda.

At the 2019 United Nations General Assembly [High Level Meeting on Universal Health Coverage](#) the heads of states and governments committed to scale up efforts to promote healthier and safer workplaces and access to occupational health services for all workers and to take special actions at the country level to protect health, safety and wellbeing of health workers, and the [141st Session of the InterParliamentarian Union](#) encouraged States to implement prevention and education programmes to address occupational health and safety and part of Universal Health Coverage.

In addition, at the 2018 United National General Assembly [High Level Meeting on Non-Communicable Diseases](#), the heads of states and governments committed to work with the private sector to address non-communicable diseases and mental health at the workplace by promoting and creating safe and healthy working environments, by implementing occupational health measures, including by establishing tobacco -free workplaces, and through good corporate practices, workplace wellness programmes and health insurance plan.

Institutions involved

The project was implemented in the Headquarters of the World Health Organization, Geneva, Switzerland in collaboration with WHO Regional Offices for the Africa, Americas, Eastern Mediterranean, Europe, South East Asia and the Western Pacific.

Project activities were carried out with support from the global network of WHO collaborating centres for occupational health, ministries of health, and other international partners, in particular:

1. Ministries of health of Tanzania, Togo, Botswana, Benin, Cuba, Israel, Sri Lanka, Kuwait, Qatar, Madagascar;

2. WHO collaborating centres (WCCs) for occupational health and academic institutions: CDC/NIOSH (USA), University of Maryland (USA), National Institute of Occupational Health (South Africa), University of Abomey Calavi (Benin), Faculty of Public Health at the University of Kuwait, INAIL (Italy), International Centre for Rural Health (Italy), Muhimbili University of Health and Allied Sciences (Tanzania), University of Colombo (Sri Lanka), Finnish Institute of Occupational Health, Workplace Safety and Health Institute (Singapore), Coronel Institute (The Netherlands), National Institute of Workers' Health (Cuba)
3. International organizations: International Labour Organization (ILO), International Commission on Occupational Health (ICOH), Institution of Occupational Safety and Health (IOSH), International Occupational Medicine Society Collaborative (IOMSC) Public Services International (PSI), International Organization of Employers (IOE).

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