

ACLA COURSE STUDY GUIDE

Occupational Health in Developing
Countries

Workplace hazards, high-risk sectors and building occupational health systems where they matter most.

Dr. Joseph Otieno · Intermediate
3 modules · 17 lessons · 4 weeks

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About This Course

Occupational Health in Developing Countries addresses the world of work at its most challenging: where informal employment, weak enforcement and hazardous industries concentrate. Three focused modules cover the foundations and global burden of occupational injury and disease, the physical, chemical, biological and psychosocial hazards that dominate developing-economy workplaces (with special attention to vulnerable workers), and what it takes to build occupational health systems and deliver a capstone workplace intervention.

Course information

Course	Occupational Health in Developing Countries
Instructor	Dr. Joseph Otieno
Level	Intermediate
Structure	3 modules · 17 lessons · 4 weeks
Assessment	Module quizzes (pass mark 60%) and a final test (pass mark 80%). Certificate issued on final success, verifiable at acla.io/verify .

What you will be able to do

1. Explain and apply the core concepts of foundations of occupational health.
2. Explain and apply the core concepts of physical, chemical and biological hazards.
3. Explain and apply the core concepts of building occupational health systems and the capstone.

How to use this study guide

This guide is the complete companion to the Tapi Learn mobile course. Each chapter corresponds to one course module and reproduces every lesson in full, including the key takeaways. Read a lesson in the app, then revisit the same text here to revise; the structure and headings match the in-app lesson reader. After finishing a module, take the module quiz in the app (60% to pass), and after all modules, the final test (80% to pass) to earn your verified ACLA certificate of completion.

Module 1: Foundations of Occupational Health

Occupational health is the discipline concerned with the promotion and maintenance of the physical, mental, and social well-being of workers, and the prevention of harm caused by working conditions.

4 lessons · 9m

1.1 What Is Occupational Health?

Occupational health is the discipline concerned with the promotion and maintenance of the physical, mental, and social well-being of workers, and the prevention of harm caused by working conditions. It encompasses three closely related aims: preventing work-related injury and illness before it occurs, protecting workers from hazards that cannot be fully eliminated, and promoting working conditions and practices that support long-term worker well-being, not merely the absence of acute harm. Occupational health is distinct from, but closely related to, occupational safety, which focuses more specifically on preventing accidents and acute injuries, and the two are typically addressed together under the umbrella of occupational safety and health (OSH). A comprehensive OSH approach addresses hazards at their source (through elimination or engineering controls), through safer work organization and administrative controls, and, as a last line of defense, through personal protective equipment (PPE) worn by the individual worker — a sequence known as the hierarchy of controls, which prioritizes interventions that do not depend on individual worker behavior over those that do.

1.2 The Global Burden of Occupational Injury and Disease

Work-related injury and illness represent a substantial and often underrecognized share of the global burden of disease. Workers can be exposed to hazards that cause immediate traumatic injury (falls, machinery accidents, transport incidents), as well as hazards that cause disease over months or years of cumulative exposure (respiratory disease from dust or fumes, musculoskeletal disorders from repetitive strain, cancers from chemical exposure, and hearing loss from prolonged noise exposure). This burden is measured using several standard tools of public health epidemiology, adapted to the occupational setting: Incidence and fatality rates — the number of injuries, illnesses, or deaths per defined number of workers (commonly per 100,000 workers) over a given period, allowing comparison across sectors, countries, and time. Disability-Adjusted Life Years (DALYs) — a composite measure combining years of life lost to premature death and years lived with disability, used to compare the overall health burden of different occupational hazards and to prioritize interventions. Underreporting — a persistent and well-documented challenge in measuring the true occupational health burden, particularly acute in countries with large informal economies, weak reporting systems, and limited occupational health surveillance infrastructure, meaning that official statistics in many developing-country contexts substantially understate the true burden.

1.3 Why Developing-Country Contexts Present Distinct Challenges

While the underlying biology of occupational hazards is universal, the context in which workers are exposed to them differs markedly between high-income and developing-country settings, in ways that shape both risk and the feasibility of intervention. The scale of informal employment. In many developing countries, the majority of the workforce is employed informally — outside registered enterprises, without written contracts, and largely outside the reach of labor inspection and occupational health regulation. Informal workers are frequently excluded from occupational health and safety protections that formally apply only to registered employers. Limited enforcement and inspection capacity. Many national labor inspectorates in developing countries are severely under-resourced relative to the size of the workforce they are responsible for, meaning that on-paper regulations frequently exist without the capacity to monitor or enforce compliance at scale. Concentration in hazardous, low-technology sectors. Developing-country economies often have a larger share of employment in sectors with inherently high occupational hazard profiles — subsistence and smallholder agriculture, artisanal and small-scale mining, informal construction, and low-technology manufacturing — frequently using older equipment, fewer engineering controls, and less protective equipment than comparable formal-sector operations in higher-income countries. Weaker health system linkages. Occupational health services, when they exist, are less likely to be integrated with primary health care, meaning work-related illness may be diagnosed late, misattributed to non-occupational causes, or never formally diagnosed at all. Competing development priorities. Occupational health investments must often compete for limited public resources against other pressing health and development priorities, requiring occupational health advocates to make a clear economic and human case for investment.

1.4 International Frameworks and Conventions

A body of international law and guidance provides the normative foundation for national occupational health policy, even where domestic enforcement capacity remains limited. The International Labour Organization (ILO) has adopted a series of conventions relevant to occupational health, most centrally Convention No. 155 (Occupational Safety and Health Convention, 1981), which establishes the principle that national policy should aim to prevent accidents and injury to health arising from work, and Convention No. 187 (Promotional Framework for Occupational Safety and Health Convention, 2006), which calls on ratifying states to develop a national OSH policy, system, and program. Together with sector- and hazard-specific conventions, these instruments form the backbone of international occupational health standards. The World Health Organization's Global Plan of Action on Workers' Health provides a framework for integrating occupational health into national health systems, emphasizing primary prevention, basic occupational health services for underserved populations including informal workers, and linkage between occupational and public health surveillance. The Sustainable Development Goals connect occupational health directly to SDG 8 (Decent Work and Economic Growth), which explicitly calls for protecting labor rights and promoting safe working environments for all workers, including migrant workers, and indirectly to SDG 3 (Good Health and Well-Being). A safety standard that exists only on paper protects no one — occupational health policy is only as strong as a country's capacity to reach the workers most exposed to risk.

Module 2: Physical, Chemical and Biological Hazards

Physical hazards arise from energy in the work environment that can cause injury or illness through direct physical mechanisms.

7 lessons · 15m

2.1 Physical Hazards

Physical hazards arise from energy in the work environment that can cause injury or illness through direct physical mechanisms. Noise — prolonged exposure to high noise levels, common in manufacturing, mining, and construction, can cause permanent hearing loss; this risk is heightened where hearing protection is unavailable or not consistently used. Heat — outdoor and indoor manual labor in hot climates, common across much of the developing world, creates significant risk of heat stress, heat exhaustion, and heatstroke, particularly for agricultural and construction workers performing physically demanding tasks with limited access to shade, rest breaks, or hydration. Vibration — prolonged use of vibrating hand tools or machinery, such as in mining or forestry, can cause hand-arm vibration syndrome, a painful and potentially disabling circulatory and neurological condition. Ergonomic hazards — repetitive motion, forceful exertion, and awkward postures, common in manual agriculture, textile work, and manual material handling, cause musculoskeletal disorders that are among the most common, if underrecognized, occupational health conditions worldwide. Radiation — ionizing radiation (in some mining and medical settings) and non-ionizing radiation, including ultraviolet exposure from prolonged outdoor work, both carry long-term health risks that are frequently underappreciated in informal outdoor occupations.

2.2 Chemical Hazards

Chemical hazards involve exposure to substances that can cause acute or chronic harm through inhalation, skin contact, or ingestion. Pesticides and agrochemicals — agricultural workers, particularly in smallholder and subsistence farming with limited access to protective equipment and training, face significant risk of acute pesticide poisoning and chronic health effects from repeated low-level exposure. Solvents and industrial chemicals — used widely in manufacturing, printing, and informal repair trades, these substances can cause a range of effects from skin and respiratory irritation to long-term neurological and organ damage. Heavy metals — exposure to mercury (notably in artisanal gold mining), lead (in informal battery recycling and some manufacturing), and other heavy metals causes serious and sometimes irreversible neurological, developmental, and organ damage, and is a particular concern where informal recycling and extraction activities operate with minimal environmental or health safeguards. Dust and particulates — occupational exposure to silica dust (mining, construction, stone-cutting), cotton dust (textile processing), and other particulates causes progressive and often irreversible lung disease, including silicosis and byssinosis, when engineering controls and respiratory protection are inadequate.

2.3 Biological Hazards

Biological hazards arise from exposure to living organisms or their byproducts, and are of particular relevance in developing-country contexts where infectious disease burden is often higher and health system protections weaker. Healthcare and laboratory workers face elevated risk of exposure to bloodborne pathogens and infectious disease, a risk that has been repeatedly highlighted during infectious disease outbreaks and that requires reliable access to personal protective equipment, safe injection practices, and post-exposure protocols. Agricultural and animal-handling workers face risk of zoonotic disease transmission from livestock and, in some regions, from wildlife encountered in forestry, hunting, or land-clearing activities. Waste management and sanitation workers, an occupation heavily reliant on informal labor in many developing-country cities, face significant exposure to pathogens, sharps injuries, and hazardous waste, frequently with minimal protective equipment or training.

2.4 Psychosocial Hazards

Psychosocial hazards relate to how work is organized and the social and organizational context of work, and their health effects — while less visible than traumatic injury — are increasingly recognized as significant contributors to the overall occupational health burden. Excessive working hours and income insecurity, common among informal and gig workers without regulated schedules or minimum-wage protections, are associated with chronic stress, fatigue-related injury risk, and long-term mental and physical health effects. Workplace violence and harassment, including gender-based violence and harassment, disproportionately affect women workers in many sectors and settings and remain significantly underreported, particularly in informal work arrangements without accessible grievance mechanisms. Forced labor and debt bondage, which remain present in some agricultural, domestic work, and manufacturing supply chains in certain developing-country contexts, represent an extreme and rights-violating form of psychosocial and physical occupational harm requiring a combined labor-rights and occupational health response.

2.5 High-Risk Sectors in Developing Economies

Certain sectors recur across developing-country contexts as sites of concentrated occupational health risk, generally because they combine hazardous physical work with high rates of informality and low regulatory reach. Agriculture remains the largest employer in many developing economies and combines chemical (pesticide), physical (heat, ergonomic, machinery), and biological (zoonotic) hazards, often affecting entire family units, including children, working on smallholder farms. Artisanal and small-scale mining (ASM) employs an estimated tens of millions of workers globally, frequently informally and without engineering controls, and is associated with severe risks including mercury exposure in gold processing, structural collapse in unregulated shafts, and silica dust exposure, often compounded by remote locations far from emergency medical care. Construction, particularly informal and small-scale construction common in rapidly urbanizing developing-country cities, carries high risk of falls, structural collapse, and heavy equipment injury, frequently without fall protection, structural safety oversight, or formal training. Textile and garment manufacturing, a major source of formal-sector employment, particularly for women, in many developing economies, has historically been associated with fire and structural safety risks in some markets, alongside ergonomic hazards from repetitive manual work and, in some facilities, inadequate ventilation around dust and chemical exposure. Domestic work, overwhelmingly performed by women and, in many countries, by migrant workers, is frequently excluded from national labor law protections altogether, occurs in private households outside the reach of labor inspection, and combines physical strain, chemical exposure (cleaning agents), and elevated risk of psychological and physical abuse.

2.6 Child Labor and Occupational Health

Child labor remains a significant occupational health concern in a number of developing-country contexts, particularly in agriculture, artisanal mining, and informal manufacturing and domestic work. Children are not simply small adults from a physiological standpoint: they are more vulnerable than adults to many chemical and physical hazards due to ongoing physical and neurological development, and their participation in hazardous work also compounds long-term harm through lost education and disrupted development. International standards, particularly ILO Convention No. 182 (Worst Forms of Child Labour Convention, 1999), specifically prohibit the involvement of children in hazardous work, making the elimination of child labor from hazardous occupations a distinct and high-priority strand of occupational health policy in affected countries.

2.7 Snapshot Comparison of High-Risk Sectors

Sector	Dominant Hazard Types	Typical Informality	Key Vulnerable Group
Smallholder Agriculture	Chemical, physical, biological	Very high	Family labor, including children
Artisanal & Small-Scale Mining	Chemical (mercury), physical (collapse)	Very high	Informal miners, often migrants
Informal Construction	Physical (falls, structural)	High	Day laborers, migrant workers
Textile & Garment Manufacturing	Ergonomic, chemical, fire safety	Moderate (formal + informal)	Women workers
Domestic Work	Physical, chemical, psychosocial	Very high	Women, migrant workers
Waste & Sanitation Work	Biological, physical (sharps)	High	Informal waste pickers

Table 1. Illustrative comparison of high-risk sectors common in developing economies. Risk profiles vary significantly by country, region, and enterprise size.

Module 3: Building Occupational Health Systems and the Capstone

This module corresponds to Section 1.0 of this course and establishes the conceptual vocabulary, burden-of-disease framing, and international policy context used throughout the remainder of the curriculum.

6 lessons · 16m

3.1 Module 1 — Foundations of Occupational Health and Global Frameworks

This module corresponds to Section 1.0 of this course and establishes the conceptual vocabulary, burden-of-disease framing, and international policy context used throughout the remainder of the curriculum. Learning objectives: define occupational health and the hierarchy of controls; describe how the global occupational health burden is measured and why it is likely underestimated in developing-country contexts; identify the key international frameworks and conventions relevant to occupational health policy. Core content: definitions and the hierarchy of controls; incidence rates, DALYs, and underreporting; structural challenges specific to developing-country contexts; ILO Conventions 155, 187, and 182; the WHO Global Plan of Action on Workers' Health. Activity: using Box 1's terminology, write a short (200–300 word) explanation, suitable for a non-specialist audience, of the difference between a hazard and a risk, using one concrete workplace example of your choosing. Assessment: complete the Section 1.0 knowledge check (four short-answer questions) with at least three of four correct before proceeding.

3.2 Module 2 — Physical, Chemical, and Biological Hazards

This module provides an in-depth treatment of the major categories of occupational hazard and their characteristic health effects. Learning objectives: classify occupational hazards by category and describe their typical health effects; explain how psychosocial hazards contribute to occupational health outcomes alongside physical, chemical, and biological hazards; identify at least one prevention or control strategy appropriate to each hazard category. Core content: Sections 2.1–2.4 of this course; physical hazards (noise, heat, vibration, ergonomics, radiation); chemical hazards (pesticides, solvents, heavy metals, dust); biological hazards (bloodborne pathogens, zoonoses, waste-related exposure); psychosocial hazards (working hours, violence and harassment, forced labor). Activity: select one hazard from each of the four categories covered in this module and, for each, propose one practical control measure appropriate to a low-resource setting, applying the hierarchy of controls introduced in Module 1. Assessment: short quiz classifying hazard scenarios by category and matching them to appropriate control strategies.

3.3 Module 3 — High-Risk Sectors and Vulnerable Workers

This module examines the sectors and worker populations where occupational health risk concentrates most heavily in developing economies. Learning objectives: describe the occupational health risk profile of agriculture, artisanal mining, construction, textile manufacturing, domestic work, and waste management; explain why informality is strongly associated with elevated occupational health risk; describe the particular vulnerabilities of children, women, and migrant workers within high-risk sectors. Core content: Sections 2.5 and 2.6 of this course; sector-specific hazard combinations; the relationship between informality and risk; child labor and ILO Convention 182; gender and migration dimensions of occupational vulnerability. Activity: using Table 1 as a starting point, choose one high-risk sector relevant to a country or region of interest to you and write a short profile (300–500 words) describing its dominant hazards, typical worker population, and one realistic barrier to improving conditions in that sector. Assessment: complete the Section 2.0 knowledge check in full.

3.4 Module 4 — Building Occupational Health Systems

Understanding hazards and sectors is only the first step; this module addresses how countries build the policy, surveillance, and enforcement systems needed to protect workers, with particular attention to strategies that can reach informal and hard-to-regulate segments of the workforce. Learning objectives: describe the core components of a national occupational health system; identify practical strategies for extending occupational health protection to informal workers; explain the role of surveillance and data systems in identifying and prioritizing occupational health risks; evaluate common policy and program approaches used in resource-constrained settings. Core content — Policy and legal frameworks: national OSH policy typically establishes the legal duty of employers to provide safe working conditions, defines occupational exposure limits and reporting requirements, and assigns institutional responsibility for enforcement, most commonly to a labor ministry or dedicated OSH authority. Core content — Surveillance systems: effective occupational health systems depend on reliable data — injury and illness reporting, sentinel event systems, and, where feasible, integration of occupational health indicators into routine primary health care records — to identify emerging hazards and target interventions where they are most needed. Core content — Enforcement in resource-constrained settings: where formal labor inspection capacity is limited relative to the size of the workforce, complementary strategies include risk-based inspection targeting the highest-hazard sectors and enterprises, partnerships with worker organizations and cooperatives to extend outreach, and integration of basic occupational health messaging into existing primary health care and community health worker programs. Core content — Extending protection to informal workers: because informal workers fall outside conventional enterprise-based regulation, approaches that have shown promise include organizing informal workers into associations or cooperatives that can collectively negotiate safer practices or equipment access, basic occupational health service delivery through primary care rather than workplace-based occupational health services, and targeted training and low-cost protective equipment distribution through sector-specific programs (for example, provision of respirators or ventilation guidance to artisanal miners, or heat-safety guidance to outdoor agricultural workers). Activity: for the sector you profiled in Module 3, propose one realistic, low-cost intervention that could plausibly be implemented by a government agency, NGO, or worker cooperative to reduce occupational health risk in that sector, and briefly justify why it is appropriate given likely resource constraints. Assessment: scenario-based quiz: given a description of a country's labor market structure and institutional capacity, recommend an appropriate combination of policy, surveillance, and enforcement strategies.

3.5 Module 5 — Capstone Project and Professional Pathways

The final module consolidates the entire course into a single applied deliverable and connects the learner's new knowledge to further study and professional pathways in occupational health. Capstone project brief: learners select a real or hypothetical sector, workplace, or worker population in a low- or middle-income country context and develop a short occupational health intervention proposal (typically 4–6 pages), including: (a) a description of the target sector or worker population and its primary occupational health risks, drawing on Section 2.0; (b) an assessment of the hazard categories involved and their likely health effects, drawing on Section 1.0 and 2.0; (c) a proposed intervention, applying the hierarchy of controls and appropriate to the likely resource and enforcement constraints described in Module 4; and (d) a brief discussion of how the intervention's impact could be monitored, referencing relevant surveillance approaches. Peer or self-review: learners are encouraged to exchange capstone projects with a peer, mentor, or study group for structured feedback, using the learning objectives from Sections 1.0–3.0 as a review checklist. Professional and certification pathways: learners who complete this course are well positioned to pursue further specialization, including formal training or certification in occupational health and safety, occupational medicine or occupational health nursing, industrial hygiene, or labor inspection; and roles in public health ministries, labor inspectorates, international development organizations, worker cooperatives, and corporate health and safety functions. Continuing education: learners are encouraged to stay current with the field through reputable, regularly updated sources such as the International Labour Organization (ILO), the World Health Organization (WHO), and the International Commission on Occupational Health (ICOH), several of which are listed in the Further Reading section of this course.

3.6 Course Completion Checklist

Completed Module 1 core content and passed the Section 1.0 knowledge check. Completed Module 2 core content, the hazard-to-control activity, and the hazard classification quiz. Completed Module 3 core content, the sector risk profile activity, and the Section 2.0 knowledge check. Completed Module 4 core content, the intervention design activity, and the scenario-based quiz. Completed and reviewed the Module 5 capstone occupational health intervention proposal.

Final Assessment & Certificate

The final test draws on questions from every module. The pass mark is 80%. When you pass, Tapi Learn issues a certificate of completion bearing your name, the course title, your final score, a unique certificate number and the signature of the CEO of the Pan African Network for Climate Action (PANFCA). Each certificate carries a verification URL (acla.io/verify/<number>) so employers and partners can confirm its authenticity. You can download the certificate as a PDF directly from the app at any time, and your progress and certificates are backed up to the cloud under your email address.

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