



## Developing Countries Can Reduce Occupational Hazards

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Workers everywhere face chemical, biological, physical, and psychosocial workplace hazards. However, people in developing countries bear more than 80 percent of the global burden of occupational disease and injury. Some diseases, such as lead poisoning, which have been largely eliminated in developed countries, remain a major problem in the rest of the world.

### Burden of Disease from Occupational Exposures

In the developing world, workers often face unregulated and unprotected exposure to known hazards, such as silica and asbestos. Decades ago, these minerals were the source of problems commonly faced by millions of workers in the developed world. However, the difference now is that developing country workers are being exposed when widespread knowledge is available about the risks and effective preventive measures.<sup>1</sup>

In some cases, nonoccupational health hazards increase the risk for workers, as in the case of lung cancer—smoking can exacerbate the effects of occupational exposure to asbestos. Both of these dangerous products are still aggressively marketed and exported by the developed world to developing countries. In places like China, asbestos exposure abounds and cigarette smoking is rising—producing a slow epidemic of lung cancer and other diseases. Thus, a comprehensive approach is necessary, rather than interventions that target a single risk factor or behavior.

Important differences exist between developing and developed country workforces:

- About 70 percent of developing countries' economically active population works in agriculture.
- The informal workforce in developing countries (self-employed, household-based unpaid labor, and independent service workers, such as street vendors) may contribute up to 60 percent of the gross domestic product (GDP).<sup>2</sup>

- The migrant workforce, estimated at 120 million and increasing worldwide, is often poorly protected from occupational hazards and at great risk of contracting silicosis, tuberculosis, and HIV/AIDS, which have been linked to workplace, housing, and economic factors.<sup>3</sup>

Dramatic changes are occurring in the global labor force, as globalization and population growth continue to shape the world economy. In Latin America and the Caribbean, the labor force is one of the fastest growing in the world: 217 million workers in 2000 are projected to reach 270 million in 2010.<sup>4</sup> Although the data are incomplete, the International Labour Organization (ILO) estimates that among the world's 2.7 billion workers, at least 2 million deaths per year are attributable to occupational diseases and injuries. However, this ILO estimate is really just the tip of the iceberg, because data for estimating nonfatal illness and injury are not available in most developing countries.

According to a recent comparative risk assessment of a handful of occupational hazards conducted by World Health Organization, the leading occupational causes of death were chronic obstructive pulmonary disease (COPD), followed by unintentional injuries and lung cancer. Although the WHO assessment only accounts for 40 percent (800,000) of the ILO-estimated 2 million deaths, findings showed that unintentional injuries caused 312,000 deaths globally per year for the world's 2.7 billion workers, compared to 6,000 deaths per year for 150 million workers in the United States. Deaths are clustered primarily in the agricultural, construction, and mining sectors. Occupational injuries alone account for more than 10 million Disability-Adjusted Life Years (DALYs) lost,<sup>5</sup> or healthy years of life lost whether to disability or premature death, and 8 percent of unintentional injuries worldwide.

With regard to disability, WHO found that back pain accounts for the largest portion of non-fatal conditions: 37 percent of all back pain worldwide is attributable to work, resulting in an estimated 800,000 DALYs lost, a significant loss of time from work, at a high economic cost. The table below shows the

contribution of selected occupational risks to the disease burden, deaths, and DALYs for the most common workplace injuries.<sup>6</sup>

**TABLE 1. GLOBAL DISEASE AND INJURY ATTRIBUTABLE TO OCCUPATIONAL RISK FACTORS, WHO, 2005**

CONDITION	PERCENT OF GLOBAL BURDEN ATTRIBUTABLE TO OCCUPATIONAL RISK FACTORS	DEATHS PER YEAR	DALYS (IN MILLIONS)
Low back pain	37	not estimated	0.8
Hearing loss	16	not estimated	4.2
COPD	13	318,000	3.7
Asthma	11	38,000	1.6
Trachea, bronchus, or lung cancer	9	102,000	1.0
Leukemia	2	7,000	0.1
Unintentional injuries	8	312,000	10

**Source:** Adapted from Nelson et al., "The Global Burden of Selected Occupational Diseases and Injury Risks: Methodology and Summary," 2005.<sup>7</sup>

Because of a lack of data, the findings from this WHO study cannot paint a complete picture of the burden of disease for all occupational diseases and injuries. For example, children under age 15 who work were excluded; so were occupational risks for many important occupational conditions, including reproductive disorders, dermatitis, infectious disease, coronary heart disease, intentional injuries, musculoskeletal disorders of the upper extremities, most cancers, psychosocial conditions, and pesticide, heavy metals, or solvents exposures.

## Interventions are Available but Resources and Expertise are Lacking

A major role in implementing interventions to address occupational health falls to national governments whose job it is to establish workplace rules and provide a system of information dissemination and enforcement of regulations. A large hurdle for most developing countries is garnering enough resources to ensure compliance to educate health professionals in occupational health, to attract adequately trained personnel to conduct inspections, and to establish and monitor laboratories to support regulatory efforts.

In the developing country workplace, how much employers

know about industrial hygiene, safety and health practices, and available controls varies. Insurance agencies, local safety groups, and trade unions may promote workplace safety. However, on-site industrial hygiene expertise is largely lacking in most parts of the developing world.

Cost is often a factor that influences whether or not a workplace adopts effective interventions to address occupational hazards. Training of supervisors and workers, although beneficial, may be difficult because of impediments such as educational proficiency, language barriers, and the applicability of training materials to local contexts. Broad agreement exists on the value of surveillance and reporting, but even injury reports are largely nonexistent in developing countries.

Access to health care in the developing world is critical both for work-related and other health issues. In many areas, work-site services may be the only health care services available to workers and their families.

In developing countries, especially at large, remote industrial complexes and farms, workers (with or without families) often live and work in the same place where the workplace hazards, including noise, chemicals, and biohazards, are part of their nonwork environment. Pesticides, for example, result in hundreds of thousands of poisoning cases a year, many from the misuse of farm chemicals for nonwork purposes, such as the appropriation of empty drums for transporting water or other household goods. Children and family members should be apprised of all potential hazards, and denied access to dangerous areas, but carrying out this recommendation is difficult because many children themselves work.

Capacity building of professional expertise is critical to improving working conditions. Where capacity exists, the expertise tends to be medical, rather than related to industrial hygiene, engineering, or ergonomics.<sup>8</sup> In most countries, ministries of health and labor have jurisdiction over working conditions, but often suffer from too few experts and inadequate coordination.

## ECONOMIC ASPECTS OF FIXING THE PROBLEM

The ILO estimates that about 4 percent of gross domestic product (GDP) worldwide is lost to work-related diseases and injuries.<sup>9</sup> In developed countries, compelling economic incentives exist for employers to control risks for injury and illness on the job, especially those that result in lost work or function. However, in the developing world, these incentives

are not strong—labor is plentiful, its replacement cost is low, and a high portion of the real cost of the injury and illness will not be borne by the employer. In Latin America, although an estimated 2 to 4 percent of the GDP of the region is lost to occupational deaths, little evidence exists of private sector investment to reduce the risk.<sup>10</sup> Multinational companies appear to be the exception.

Identifying interventions to successfully prevent or reduce workplace injuries and illnesses will benefit society, employers, and workers. For example, three studies of U.S. Internal Revenue Service data-entry clerks found that short, strategically placed rest breaks of five to 15 minutes during the regular daily schedule reliably reduced eye strain, fatigue, and musculoskeletal discomfort for video-display terminal operators without decreasing productivity.<sup>11</sup>

### INTERVENTIONS TO REDUCE RISKS FOR BACK PAIN

Cost-effectiveness research on occupational health topics is rare. However, some evidence exists in a few areas. The most effective intervention for back pain, for example, is a full ergonomics program that includes awareness education and hazardous job training for workers, as well as engineering control—physical measures that control exposure to the hazard, such as equipment that assists lifting, pushing, or pulling. A full ergonomics program such as this provides up to a 74 percent reduction in back-pain incidence, compared to either engineering control<sup>12</sup> (56 percent reduction) or worker training (20 percent reduction) alone. Experts estimated that the cost-effectiveness was virtually the same for each of these interventions for three regions (The Americas, Europe, and Southeast Asia).

### INTERVENTIONS TO REDUCE RISK OF SILICOSIS

Silicosis is a disabling and often fatal workplace lung disease caused by inhalation of silica dust found most commonly in construction, mining and mineral processing, foundries, and in places that manufacture pottery and glass. Silicosis affects workers worldwide. Effective engineering control interventions include protecting workers by spraying a surface or wetting a blade to reduce dust, ventilating exhaust, or ventilating entire facilities. Worker training and personal protective equipment (comfort masks, dust masks, full-face respirators, and half-face respirators) are also effective. Experts concluded that engineering controls are the most cost-effective interventions, reducing exposure by 70 to 85 percent over 10 years, after a high initial capital investment. Table 2 below shows that engineering controls in both more

developed and less developed regions are the most cost-effective interventions, costing between US\$106 and US\$109 per DALY in the two regions compared.

**TABLE 2. INTERVENTIONS FOR SILICOSIS: COST PER DALY GAINED IN TWO REGIONS, 2005**

INTERVENTION	AMERICAS	WESTERN PACIFIC
Engineering control	\$106	\$109
Comfort mask	\$111	\$117
Dust mask	\$191	\$174
Half-face respirator	\$300	\$272
Full-face respirator	\$305	\$266

**Source:** Lahiri et al., “The Cost Effectiveness of Occupational Health Interventions: Prevention of Silicosis,” 2005.<sup>13</sup>

## Moving Forward

Key elements in improving worker health and safety include:

- Regulatory and enforcement frameworks;
- Worker, employer, and health professional education;
- Adequate surveillance and reporting systems; and
- Dissemination and implementation of best practices.

As developing countries undergo rapid economic development, industrialization, and feel the effects of globalization, leaders need to draw on available occupational health system models to develop their national occupational health systems. Government involvement is necessary but not sufficient. International influence, assistance, and regulation play a key role in encouraging developing and industrializing nations to adopt appropriate laws and policies to create healthy workplaces. Unfortunately, although promising, multinational trade agreements have largely failed to ensure worker health and safety thus far. Much remains to be done, and the ILO can provide strong guidance.

Governments need to:

- Coordinate occupational health services with overall health services;
- Ensure employer responsibility for hazards and responsibility for access to health services;
- Train and/or strengthen professional expertise in

occupational health; and

- Support key research in public health systems, occupational health policy, intervention effectiveness, hazard control technology and protective equipment, disease and injury, and surveillance.

The burden of occupational health problems is staggering in both human and economic cost, and workers in the developing world bear this burden disproportionately. The most vulnerable—children and the poor—are at highest risk. Yet there are many effective and economically feasible interventions to address these largely preventable conditions. Despite the lack of data, experts know that work-related conditions contribute significantly to overall death and disease. Thus, prevention and mitigation are important. Addressing occupational hazards

depends on effective government regulation and enforcement, education, and implementing best practices. For successful interventions, national and local governments, employers, and workers must work together.

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- 4 Pan American Health Organization. 2002. "The Environment and Public Health." In *Health in the Americas*. Vol. 2. Washington, DC: PAHO and WHO.
- 5 A DALY (disability-adjusted life year) is a composite measure that combines the number of years lived with a disability and the number of years lost to premature death.
- 6 Deaths attributable to workplace exposures to pesticides, heavy metals, solvents, and other chemicals are not included.
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- 8 Ergonomics is the application of scientific information concerning humans to the design of objects, systems, and environment for human use.
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- 12 "Engineering control" refers to efforts to separate workers from hazards, such as placing safety guards on dangerous machines or providing noise buffers to limit noise.
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