# The Occupational Health Needs Of Workers: The Need for a New International Approach

**Françoise Barten, Suzanne Fustukian, and Sylvia de Haan**

WORKERS REPRESENT AN IMPORTANT GROUP IN A POPULATION. IF, AS THE U.N. Universal Declaration of Human Rights declares, all people have a right to the highest level of health attainable, then surely the health of those who produce all valued products used by society is of basic concern. Yet, workers are one of the most vulnerable groups in the population. The effects of the health hazards they face are often added to those of poor living environments, poor nutrition, and unsatisfactory housing.

Workers' health status usually reflects the general health conditions of the population. At the same time, their working conditions influence the socioeconomic status, health status, and living environment of their dependents. This is particularly true for developing countries where, for the majority of workers, survival depends on work undertaken in exploitative conditions, with low incomes and unhealthy working conditions.

---

FRANÇOISE BARTEN (Nijmegan Institute for International Health, P.O. Box 9101, 6500 HB, Nijmegan, The Netherlands) graduated in medicine from the University of Nijmegen, The Netherlands, and studied community health at the London School of Hygiene and Tropical Medicine. She has worked in Nicaragua's Ministry of Health to develop primary health care and in 1995 received the title of honorary professor at the Universidad Nacional Autónoma de Nicaragua for her contribution to academic development of the Public Health School of Nicaragua. She is a lecturer at the University of Nijmegen's Institute for International Health and is establishing a research and information network, "Health and Environment in Cities."

SUZANNE FUSTUKIAN (AHRTAG, Farringdon Point, 29-35 Farringdon Road, London, EC1M 3JB England) completed an M.Sc. in Social Policy and Planning in Developing Countries at the London School of Economics and has been codirector of the Appropriate Health Resources & Technologies Action Group (AHRTAG) since 1988. AHRTAG supports primary health care and disability workers in the South. She is currently collaborating with Françoise Barten in setting up the "Health and Environment in the Cities" network and is the principal editor of "Health Action," an international newsletter on primary health care.

SYLVIA DE HAAN (Nijmegan Institute for International Health, P.O. Box 9101, 6500 HB, Nijmegan, The Netherlands) studied health sciences at the University of Nijmegen. She has studied the air pollution caused by local industries and its influence on human health in Niamey, Niger, and in Arnhem, The Netherlands, and has taught environmental health to health science students. Since 1994 she has been a research fellow in Tanzania on the project "Environmental and Occupational Health Hazards Related to Small-Scale Industries in Low-Income Urban Areas in Dar-es-Salaam, Tanzania."

In many developing countries, rapid industrialization has occurred without adequate provision for the protection of workers. Their health has become an increasingly serious issue, as modern industrial and agricultural methods rely more heavily on hazardous substances. This has led to an increase in exposure to a wide range of occupational health hazards.

While concern for the health and ecological effects of air, water, and soil pollution has resulted in greater controls in developed countries, many governments of developing countries, under pressure from structural adjustment programs and the debt crisis, have offered their resources and communities as "pollution havens" for industrial development. By shifting hazardous production processes to locations where little or no environmental regulation exists, manufacturers avoid investing in equipment and procedures necessary to control hazardous exposures. Combined with lower wages, taxes, and energy costs, this contributes to higher profits. It is the workers and people living in the surrounding communities who pay for this gain through exposure to disease-producing substances.

The past few decades have witnessed a rapid growth of the urban population in the South that has created pressure on the employment market as well as on the city environment. The increase in the number of job seekers has not kept pace with the growth of the formal sector and the chance of finding a regular paid job in a city has become even more limited.

Many households in Third World cities confront the challenge of survival through a complex system of informal activities, varying from street vendors to activities in small-scale industries. Exposure to occupational health hazards is of very little concern in this unregulated informal sector. Furthermore, poor working conditions may not only create health hazards for workers, but may also have an effect upon the health status of people living in the neighborhood of a small-scale factory.

Since many workers in small-scale industries are poor, they also show the disease patterns of the urban poor. This has implications for the development of occupational standards for exposure to toxic substances. Standards based on those used in the North are often inappropriate to the work situation in developing countries for a number of reasons:

1. The high prevalence of epidemic diseases reduces the resistance of those infected (Michaels et al., 1985: 536–542);
2. The length of the working day in the South is much longer — standards are often based on the 40-hour work week common in the North. Hence, Third World workers will receive, on average, much higher levels of exposure (*Ibid.*);
3. The standards do not take into account differences in climate, nutritional status, or genetic predisposition (Rossiter and El Batawi, 1987: 3–11).

## Impact of Informalization

The informalization of industry is one of the key developments of the 1990s; small-scale enterprises are growing faster than any others in developing countries, providing opportunities for survival to the poor and profit to the industrialists (Ghai, 1991). A clear distinction has often been made between formal and informal sector activities. However, this distinction has been criticized as research in several countries has highlighted the strong links between the two sectors. The functioning of small-scale industries is often closely connected to larger industrial plants, with small-scale enterprises providing larger industries with products essential to their operation (Portes et al., 1989). By shifting out of the formal into the informal sector, the payment of fixed overheads and workers' benefits are eliminated.

There appears to be a difference, however, between the number of occupational health hazards found in small-scale and large-scale industries. These differences may be explained by two factors. The first is the need for survival by workers in small-scale enterprises, who may consider occupational health hazards of less importance than the urgency of earning a living. Without the protection of labor regulations or access to free and adequate health services, workers in the informal sector are at significant risk from work-related diseases and injuries.

Second, the activities of small-scale industry generally fall outside the scope of the authorities. In many countries, small-scale enterprises are often legally exempt from labor regulations, including health and safety (WHO, 1992). Most laws regulating occupational health and safety apply only to medium– or large-scale industries, usually identified by the number of workers employed, normally over 25 to 50. For example, the Philippines is introducing the "Law of 20," in which enterprises with 20 workers or under will be exempt from most existing labor laws, in the expectation that this will encourage more enterprises and generate jobs (Reverente, 1992).

Christiani (1990: 393–401) gives several characteristics of the informal sector that indicate that occupational health may be a severe problem for workers in small-scale industries. Informal-sector workers are often very young (children) or very old (grandparents), and include reproductively active men and women — many of whom are pregnant. There is thus a strong link to maternal and child health considerations.

Children and young people make up a large and growing percentage of the informal work force. Millions of children, some as young as five years old, spend their time in economically productive activities that deprive them of formal education, good physical health, and psychosocial well-being. Accurate figures are impossible to obtain, as child labor is illegal in most countries and therefore goes unrecorded. Nevertheless, United Nations' estimates for 1981 pointed to 145

million children under the age of 15, rising to 375 million by the year 2000 (Lee-Wright, 1990).

Where it is illegal and hidden, child labor is outside the range of protective legislation. A child's wage, for example, may be half that of an adult's. Children are also more susceptible than adults to accident, injury, and occupational disease. Small, weak, and inexperienced workers are more at risk from dangerous machinery and materials, heavy weights, and the heat of industrial processes (Michaels et al., 1985). They are also more prone to poisoning and respiratory complaints caused by a multitude of airborne hazards. Examples of the health effects of child labor are not hard to find: tens of thousands of children work in the glass industry in Firozabad, India, and are exposed to excessive heat, noise, accidental burns, and cuts and lacerations caused by broken glass. They work through the night, often with no break for rest or food, and have a high incidence of tuberculosis (Mohan, 1992). In many countries worldwide, tourism and the sex trade rely heavily on child workers and child prostitutes.

## Links Between Work and the Living Environment

Benavides (1992) argues that most small-scale industries do not have a significant impact on the environment. On the contrary, it can be argued that these industries do, in fact, make a significant contribution to environmental contamination at the local level, i.e., in the neighborhoods of small-scale industries. Such contamination can have a serious impact upon the state of health of the people living in these neighborhoods (Barten, 1992). In these situations, distinctions made between general health hazards and the more specific hazards of industry are rather artificial.

The number of small-scale industries in developing countries continues to mushroom, as the shortage of foreign currency forces governments to promote self-help enterprises (Nriagu, 1992: 1–37). Invariably, there are few restrictions or controls on what these operations discharge into the environment and quite often the homes and the surrounding play areas are contaminated with toxic metals. The fact that many people live where they work predisposes them to frequent (and potentially high levels of) exposure to metallic wastes and other hazards that result from such small-scale and cottage industries, obscuring the distinction between occupational and environmental exposure.

Workers themselves rarely distinguish between occupational and nonoccupational illness, although they are acutely aware that much of their physical well-being stems from bad working conditions (Shukla, 1991: 597–603). In India, a study was carried out among tannery workers. The tanneries were stratified on the basis of the tanning process (chrome, vegetable, or mixed) and hide processing capacity (large, medium, or small). The medical profile of the study population was divided between occupational and nonoccupational morbidity. However, many kinds of morbidity existing in the study population tended to be more

embraceable in the WHO concept of "work-related" disease, rather than the narrower concept of "occupational" disease (Jeyaratnam, 1992). The former concept suggests that the causes are multifactorial and may be work-related, but not necessarily directly. For example, diseases such as tuberculosis or asthma may be aggravated, accelerated, or exacerbated by workplace exposures or conditions.

## Informal Sector in Tanzania

An important factor influencing the health of people involved in informal sector work is the insecurity of the working situation. Although the informal sector absorbs and maintains a fast-growing urban labor reserve and contributes significantly to the gross domestic product in many developing countries, national policies aimed at supporting and stimulating the sector are often lacking. In Tanzania, the informal sector is considered a threat and a nuisance by both government officials and the formal sector, since it operates outside official controls, occupies substantial sections of valuable urban land, and defies the official version of development (Schultz, 1995). This often results in incoherent local government measures against informal sector operators.

In Dar-es-Salaam, a consequence of this attitude is insufficient land allocation for informal sector activities by the government, resulting in unofficial occupation of land by informal sector workers. In many cases, they can only protect themselves through a high concentration of their activities, usually in districts with a high population density. From an ongoing study in Dar-es-Salaam, the authors note that this contributes to the plethora of problems that such densely populated areas already have: insufficient garbage collection and inadequate sanitary facilities and water supply that cause problems both for workers and the surrounding community.

Furthermore, a range of hazardous activities is carried out in these districts: small-scale industries such as wood workshops, metal workshops, and garages are set up close to places where women are cooking and selling food. Therefore, besides the hazards of their work, people are exposed to many other hazardous activities carried out in their home environment.

The lack of land allocation also causes an insecure situation for informal sector workers since they can be chased away from their premises any time. This does not stimulate the operators to invest in their enterprises and thereby improve the occupational and environmental conditions. Any investment is seen as a waste of money. The lack of permanent premises also makes it difficult to obtain credit, and leads to job insecurity and low incomes. To what extent these problems affect the mental health of informal sector workers and their productivity is virtually unknown (ILO, 1993). The effect on the health of workers' families is also not considered.

It has been suggested that, even when workers and operators in informal sector workshops were aware of health and safety issues, these were not their

priority concern (*Ibid.*). It is clear from the study that the struggle to provide the basic needs of life causes a daily burden for workers and their families in Dar-es-Salaam. The exposure of workers and their families to occupational and environmental risks is therefore not chosen voluntarily, but seen as the only possibility to maintain a basic living.

## Failure of the Existing System of Occupational Health Care

Although the cottage factories and sweat shops of the informal sector employ only a very small number of workers each, collectively they represent the vast majority of industrial workers in all developing countries. Still, they lack any kind of organized health service and are entirely dependent on inadequate local health facilities. The same is generally true for agricultural workers.

One of the most important failings in the current approach to occupational health problems is the predominance of a medical-technical and reactive approach. Occupational health problems are theoretically preventable and are not primarily technical. Although they often involve technical data, the origin and persistence of occupational health problems have fundamentally more to do with the social relations of production (Schilling and Andersson, 1986: 6).

Unfortunately, equity in health is still merely seen in terms of access to medical services, rather than in terms of all aspects that determine health, such as work, housing, food, water, etc. At the district level of the health system, analysis of the district's health needs and problems seldom includes an assessment of industrial hazards, workplaces, and work processes, nor are they generally carried out with the participation of workers and other community members. At the primary care level, information on work hazards is rarely collected routinely in terms of exposure levels, etc., while an intersectoral approach is often lacking.

The occupational and environmental health problems of workers, particularly in the informal sector, present a challenge to health and labor ministries to develop a new approach. The model in the North of moving occupational health from the health ministry to the labor ministry is inappropriate in a situation where most workers are unorganized, are women and children whose health needs cannot be separated into "home" and "work," and where industrial processes may affect not only workers' health, but also that of the population living nearby. This is illustrated by the following evidence.

In Kingston, Jamaica, Matte investigated the risk of lead poisoning among household members exposed to backyard battery repair shops. These shops are involved in the repair or rebuilding of lead-acid car batteries and are usually located on the same premises where the owner/operator and his family live. The survey found a high risk of elevated blood lead levels among subjects living in backyard battery repair shops, and found that the risk was not attributable to general environmental contamination of urban Kingston (Matte et al., 1989: 874–881). Disturbances in neurologic and systemic functions have been identified at

levels that were once thought not to be a cause for concern (i.e., 10 to 25 micrograms per deciliter). There is strong evidence that low-level exposure impairs cognitive development in children, and long-term effects of childhood exposure have been reported.

Cottage factories for melting lead and repairing and recharging batteries are to be found in all cities of the South. In Managua, the capital of Nicaragua, the total number of these cottage factories was estimated at 200 in 1989; by 1993, the total number exceeded 300 (Morales, 1994). In 1985, the Regional Commission on Occupational Health of the Ministry of Health of Nicaragua carried out a study of 133 workers in 42 of these cottage factories; 64 workers had high levels of lead in their blood, with a range of 36 to 164 micrograms per deciliter of blood, and an average of 74 micrograms per deciliter (MINSA, 1985). Moreover, the commission detected 16 cases of lead poisoning among children living in these cottage factories; three children — less than six years of age — died of lead poisoning.

The commission described the cottage factories as follows: "The cottage factories are very small places, with an earthen floor, where residuals of lead are piled up and there is no periodic cleaning. The melting process of lead is realized by a totally artesanal method, with poor ventilation and no facilities for personal hygiene. Food and water for daily consumption are kept without any protection in the working places, where they are also consumed by the workers. In some cottage factories the risks are even higher, because they are situated in the owner's house or near public food selling places, exposing in an excessive way the members of the worker's own family (children, women) and the neighborhood" (*Ibid.*).

In May 1987, a four-year-old child died of lead poisoning in the Managua neighborhood of Domitila Lugo; two other children of the same family also had to be admitted to a hospital because of suspected lead poisoning. They all lived in a one-room house, partly built of old car batteries, where their father melted lead (Barten, 1992). Following a visit to this cottage factory, it was reported as follows:

> The work was carried out in a corner of a one-room shelter of approximately 4 x 4 $m^2$, constructed of planks and corrugated iron. In the same room there was sleeping accommodation. The surroundings were clearly polluted with the remainders of batteries. A sample of soil collected from the front yard of the house, situated at a distance of 300 meters from a battery plant, contained 20 times the acceptable concentration of lead. A family had lived there until a child died of lead intoxication (Zwennis, 1987).

The data suggest that, in Managua, a considerable problem of increased lead exposure and risk of lead poisoning exists not only among workers, but also among the general population — particularly among young children. Of 1,474 people tested since then in various sites throughout Nicaragua, the average blood lead

level was 59 micrograms per deciliter of blood (microg/dl), six times higher than the acceptable level in North America (Morales, 1992; CDC, 1991).

## The Colombo Statement

Evidence such as this clearly indicates that the negative environmental impact of small-scale industries is of major significance, affecting not only workers, but also the general population, particularly the more vulnerable groups such as children and women. Since the scope of occupational health services is limited to workers, mainly those in large-scale industry, the implications for the community are not of primary concern to occupational health institutions (Christiani, 1990: 393–401). A broader approach is necessary, while a reduction of the occupational health hazards should also reduce the environmental health hazards.

Such an approach was suggested at the First Conference on Occupational Health in Developing Countries held in Sri Lanka in 1981. The Colombo Statement, issued by the conference, highlighted three key issues: the provision of health for neglected working populations in agriculture and small-scale industries, the situation of migrant workers, and the need for occupational health training in developing countries. It stressed the integration of occupational health services with primary health care (PHC). Because PHC advocates an integrated and comprehensive approach to the health needs and problems of working populations, with a focus on equity and workers' participation in decision-making processes (WHO, 1978), it has the potential to improve the health status of both workers and populations living in industrial zones.

Before this can be achieved, however, health authorities need to be more aware of the health conditions of workers. District health systems need to be strengthened and reoriented toward health promotion, prevention, and protection. Attention is needed to ensure that the integration of occupational health with PHC goes beyond the establishment of another separate, vertical technical program (Macdonald, 1993). For example, health promotion aims to work with people in the "settings" of their everyday life, focusing on building up "healthy workplaces" or "healthy neighborhoods," rather than focusing on people at risk from specific conditions or already in contact with the health services (Ashton and Seymour, 1988). Establishing local information systems can promote links between environmental/occupational health data and health conditions; local resource centers have proved to be important tools in mobilizing all possible sectors.

Since the conference in Sri Lanka, several alternative approaches have been developed to meet workers' health needs. One is to integrate public health services with occupational health to cover workers in small-scale industries. A district health center, with responsibility for the population in an industrial area, would thus expand its services and provide both occupational and PHC services for these workers (El Batawi and Husbumrer, 1987: 288–292). This requires a number of steps, including the routine analysis of the work environment and training district

health workers to identify work-related health problems. An effective referral system to other levels of the health system, with skills in a range of work-related diseases and injuries, is also essential.

Another approach is to take an integrated occupational/PHC service to the workplace; health workers treat certain conditions on the spot, or refer them either to a local health facility or to an occupational health unit, established as a referral center. In Botswana, workers considered this to be the most acceptable, since they got the care they needed without loss of work time (Rojas, 1990; 108–113). This approach also allows a stronger link between the health system and the employer, with the opportunity for regular assessment of working conditions.

Establishing a comprehensive approach relies heavily on the involvement of an active, organized, and informed work force working in alliance with its community. Worker participation is essential to ensure "healthy workplaces": discussing health problems, identifying opportunities for change, planning and organizing strategies for prevention and control, and playing a role in the surveillance of risks and monitoring of enforcement of laws and regulations.

Many workers' organizations have set up their own occupational clinics or run mobile clinics at workplaces or community venues. Some worker-based health schemes, such as the one run by the Ray Alexander Workers Clinic in South Africa, are committed to a PHC approach and address wider community health needs (London, 1993: 1521–1527). In this way, unemployed and informal sector workers are covered, thus promoting equity and preventing the problem of providing health services for the skilled work force alone. However, this can only be an interim response; many of those involved with such schemes advocate that these clinics should be integrated into a national health service based on PHC.

In Nicaragua, for example, explicit attention to workers' health began after the victory of the Sandinista Revolution in 1979. An innovative approach was taken by establishing primary care teams at area level, involving health workers, a local union representative, and *brigadistas obreros* (worker-volunteers with responsibility for occupational health within a specific factory). Inspections and health screenings were carried out by the teams, with support from the occupational health specialist of the regional team. Results were then discussed with the factory directors; a start was thus made in improving factory conditions.

For many people living in the *barrios* of Managua's industrial zone, occupational and environmental health became important issues as they came to learn of the potential pollution hazards from the factories in their *barrios*. Due to their heightened awareness and concern, particularly following the deaths of the three small children from lead poisoning, the level of priority given to occupational and environmental hazards was high. Unfortunately, workers' health no longer appears to be a priority for the new government, as the workers' health program set up during the former Sandinista government has ceased to exist. Increased poverty has also meant that the network of cottage workshops has expanded and

they are visible all over Managua. Despite this, awareness and concern about the lead poisoning hazard among workers and the general population are still strong: in September 1994, people living near the FANABASA battery plant demanded its closure following the discovery of more people, including children, with high blood levels (*Barricada*, September 1994).

## An Interdisciplinary Approach

Developing an adequate response to work-related health needs will thus require an interdisciplinary approach, involving not only the health sector, but also other ministries, employers, workers, and communities. No one sector is able to respond in isolation; for example, in most countries the health sector is not officially responsible for ensuring that health and safety regulations are being met by employers. Therefore, each group has a specific contribution to make, which, when coordinated by the public health sector, can offer a comprehensive response to workers' health needs.

The most important first step is to raise awareness about the issue among a wide range of interest groups: government health services and other relevant agencies, employers (both large and small), development agencies and research institutes, and, most importantly, among workers and communities themselves. Workers' health activists, such as the Institute for Occupational Health and Safety Development in the Philippines and the Industrial Health Research Group in South Africa, argue that improving health and working conditions will only be realized through the persistent efforts of workers themselves, as both governments and employers give workers' health a very low priority.

The assessment of occupational and environmental effects of small-scale industries and the eventual improvement of workers' health thus require a political approach that takes into account the social and environmental context of the worker and the workplace. Occupational and environmental health problems associated with industrialization are becoming as prevalent in the South as in the North. As witnessed in Nicaragua, any move to change and improve workers' health require, above all, a political commitment to recognize this as a right.

To challenge the effects of the dominant development model of the 1990s, with its prime focus on economic growth and the marketplace, the highest priority should be given to the protection of workers' health at both the national and international policy levels. The requirements of future occupational health policy can be stated in eight key points:

1. Involve workers' organizations in the strategic planning process of health development at the district and municipal levels, e.g., ensure that "healthy workplaces" is on the agenda of healthy city processes;
2. Put occupational health on the wider agenda of urban development;
3. Consider the specific vulnerability of workers in informal sector activities;

4. Consider the vulnerability of child workers and women of reproductive age;
5. Consider that "occupational" health hazards are only one among many other (often interrelated) environmental health hazards. Low-income urban communities are often exposed to a wide range of other hazards related to poor living environments. The combination of exposure to hazards in the living and working environment may enhance vulnerability;
6. Consider that standards applied in the North may not be valid;
7. Develop integrated approaches at municipal/district level involving all relevant actors/sectors;
8. Occupational health should be developed within primary health care at the primary care level.

## REFERENCES


Ashton, J. and H. Seymour
1988 The New Public Health: The Liverpool Experience. Milton Keynes: Open University Press.

Barten, Françoise
1992 Environmental Lead Exposure of Children in Managua, Nicaragua: An Urban Health Problem. Ph.D. thesis. Nijmegen University.

Benavides, L.
1992 Hazardous Waste Management for Small-Scale and Cottage Industries in Developing Countries. Paper presented at the International Workshop on Planning for Sustainable Urban Development — Cities and Natural Resource Systems in Developing Countries, Cardiff (July 13–17).

CDC, Centers for Disease Control
1991 Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control. Atlanta, Georgia.

Christiani, D.
1990 "Occupational Health in Developing Countries: Review of Research Needs." American Journal of Industrial Medicine 17: 393–401.

Colombo Statement on Occupational Health in Developing Countries, Sri Lanka
1981 Journal of Occupational Health Safety 2,6 (Aust Nz 1986).

El Batawi, M. and C. Husbumrer
1987 "Epidemiological Approach to Planning and Development of Occupational Health Services at a National Level." International Journal of Epidemiology 16,2: 288–292.

Ghai, D. (ed.)
1991 The IMF and the South: The Social Impact of Crisis and Adjustment. London: Zed Books.

International Labor Organization (ILO)
1993 Selected Papers on Occupational Safety and Health in the Informal Sector in Tanzania. Geneva: African Safety and Health Project.

Jeyaratnam, J. (ed.)
1992 Occupational Health in Developing Countries. Oxford: Oxford University Press.

Lee-Wright, P.
1990 Child Slaves. London: Earthscan Publications.

London, L.
1993 "The Ray Alexander Workers Clinic — A Model for Worker-Based Health Services in South Africa?" Social Science and Medicine 37,12: 1521–1527.

Macdonald, John
1993 Primary Health Care: Medicine in Its Place. U.K.: Earthscan Publications.

Matte, T. et al.
1989 "Lead Poisoning Among Household Members Exposed to Lead-Acid Battery Repair Shops in Kingston, Jamaica." International Journal of Epidemiology 18,4: 874–881.

Michaels, D. et al.
1985 "Economic Development and Occupational Health in Latin America: New Directions for Public Health in Less Developed Countries." American Journal of Public Health 75,5: 536–542.

MINSA (Ministerio de Salud, Regional III)
1985 *Informes del Departamento Regional de Salud Ocupacional 1985*. Nicaragua: Ministerio de Salud.

Mohan, R.
1992 Protection of Working Children in India: Examining Adequacy of the Welfare Measures. London: London School of Economics, unpublished dissertation.

Morales, Carlos
1994 Personal Communication. Managua, Nicaragua: Centro Nacional de Higiene y Diagnostico, Ministerio de Salud.
1992 Assessment of Prevention of Lead Poisoning in Nicaragua: A Model Program for Developing Countries. Managua, Nicaragua: Ministerio de Salud.

Nriagu, T.
1992 "Toxic Metal Pollution in Africa." The Science of the Total Environment 121: 1–37.

Portes, A. et al.
1989 The Informal Economy. Studies in Advanced and Less Developed Countries. Baltimore, MD: Johns Hopkins University Press.

Reverente, T.
1992 "Occupational Health Services for Small-Scale Industries." J. Jeyaratnam (ed.), Occupational Health in Developing Countries. Oxford: Oxford University Press.

Rojas, P. et al.
1990 "Nurses Bring Primary Health Care to Industrial Workers." World Health Forum 11,2: 108–113.

Rossiter, C. and M. El Batawi
1987 "The Working Environment." Industry and Environment 10: 3–11.

Schilling, R. and N. Andersson
1986 "Occupational Epidemiology in Developing Countries." Journal of Occupational Health Safety 2,6 Aust Nz.

Schultz, M.
1995 "The Informal Sector and Structural Adjustment-Strengthening Collective Coping Mechanisms in Tanzania." Small Enterprise Development 6,1.

Shukla, Abhay, S. Kumar, and Ferco Ory
1991 "Occupational Health and the Environment in an Urban Slum in India." Social Science and Medicine 33,5: 597–603.

World Health Organization (WHO)
1992 Our Planet, Our Health. Report of the WHO Commission on Health and Environment. Geneva: WHO.
1982 Review on Occupational Health Services in Small-Scale Industries in Developing Countries.
1978 Primary Health Care. Report of the International Conference on Primary Health Care. Alma Ata, USSR.

Zwennis, Wim
1987 Report on a Visit to the Ministry of Health and the National Institute of Hygiene and Epidemiology in Managua, Nicaragua. MBL, TNO, The Netherlands.