Commentaries

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Collaboration between developing and developed countries and between developing countries in occupational health research and surveillance[1]

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Collaborative occupational health and safety studies between counterparts in developing and developed countries and between developing countries have demonstrated their potential for improving occupational health and safety. Such collaboration in occupational health and safety is encouraged in the development of infrastructure in research empowerment and capacity building. This action includes the setting of priorities, the identification and documentation of problems, sponsorship, data bases and surveillance systems, technical support, methodology, publishing, research and training programs, controlled intervention, information exchange, and networking. Examples of priorities in occupational health and safety in the developing world include the informal sector (informally hired and independent workers), temporary work, pesticides, accidents, dusts, carcinogens, solvents, ergonomics, women and child labor, human immunodeficiency virus/acquired immunodeficiencey syndrome (HIV/AIDS), and transfer of hazardous materials and technologies. The sustainability of occupational health and safety structures and functions in the developing countries is a primary concern. Socioethical principles emphasize local, national, mutual and global gains. Examples of collaboration are given. Pervasive problems and strategies toward their solution are highlighted. *Key terms* cooperation, empowerment, infrastructure, impact, priorities, sponsorship, sustainability, training, tropics.

Research on occupational health and safety is occasionally conducted jointly between developing and industrialized ("developed") countries. Five percent of all health research takes place in the developing countries (1, 2), a severe imbalance, considering their share of the world population and the severity of health problems in these countries. This disproportion prevails in all likelihood also for occupational health and safety research, which

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is not always even adequate for the needs of these countries. Thus acute pesticide poisonings represent a major concern. Yet only 2% of all health-related research in these countries was done on acute pesticide poisonings (2). In a survey of 500 occupational and environmental epidemiologic studies undertaken in developing countries (3), only 65, or 13%, received funding from international donors. Studies conducted in Africa have generated a wealth of data. Yet less than 0.5% of occupational health and safety publications, including epidemiologic articles, are about or from Africa (4).

Collaborative studies have a potential for impact, however. Thus 24% of 53 occupational health and safety studies involving such collaborations and supported by the International Development Research Centre (IDRC) of Canada had contributed to changes in legislation, including banning of the use and importation of chemical products; 33% had contributed to changes in regulation; 38% resulted in changes in the accessibility of occupational health and safety information; 40% had facilitated changes in the type and organization of occupational health and safety information; 49% had led to improvements in occupational health and safety; and 65% had resulted in changes in the occupational health and safety practices (5).

Socioethical considerations

A workshop *Epidemiology in Occupational Health*, held in 1997 in Santafé de Bogotá, Colombia, identified the following principles for collaborative research in occupational health and safety: compatibility with the culture of the target population; nondiscrimination against some sector of the working population, such as women; high national or regional priority; integration with occupational health and safety legislation, regulations and data systems and their development; inclusion, whenever feasible, of considerations of general environment and the import-export of hazards; encouragement of participation and support from trade unions and nongovernmental organizations; and autonomy for the collaborative research group in the selection of research methods and in the publication of the results. Assurance of appropriateness for human subject participation, including informed consent in nonobservational studies, and notification of subjects of significant findings can be added.

Forms of collaboration

Collaboration incorporates programs, research, meetings, conferences, symposiums, workshops, and publications. Technical support and training enhances instrumentation (eg, biological and environmental sampling and analysis and computing); availability of literature and other data bases, data management and analysis; local surveillance systems; and publishing. Investigators from developing countries can participate in academic programs at universities in developed countries, using data from their home nation for their theses. This effort would empower developing countries to enhance postgraduate competence in occupational health and safety and to create peers in the developing countries that would address occupational health and safety issues in collaboration with developed countries. Training and skills transfer in occupational health and safety research and practice should be an express goal in every collaborative study.

Collaboration between developing countries

Circumstances in developing regions call for mutual collaboration. The Latin American-Caribbean and also the African regions may benefit from upgrading some centers into a regional role. The Central American Institute of Studies on Toxic Substances, Universidad Nacional, Heredia, Costa Rica, is a recent example. Promoting the exchange of data and experiences between developing countries and regions represents high priority. Supporting regional journals is a continuous matter of importance. It is of equal importance that scientists from developing countries be encouraged and assisted in disseminating their research results in national and regional journals and newsletters.

Networking

Networking takes on various forms. There are informal networks of individuals, networks of institutes (eg, the WHO collaborating centers of occupational health and health of seafarers, which unfortunately have meager representation from the developing world, especially Africa), action or research networks, or computer-based networks. A tripartite Asian-Pacific Network on Occupational Safety and Health Information has been established as part of an International Labour Office/Finnish International Development Agency (ILO/ FINNIDA) project between 24 countries in the region (6). An information network for occupational health and safety is being established between Botswana, Lesotho, and Swaziland (7).

Examples

Supported by IDRC, the Finnish Institute of Occupational Health, the Agricultural University of Wageningen (The Netherlands), and the University of Manchester (United Kingdom), the East Africa Pesticide Network (EAPN) (8—12), a joint field study of the Kenya Medical Research Institute, the Tropical Pesticide Research Institute (Tanzania), and the Occupational Health Department, Ministry of Labor (Uganda), was conducted on several farms and estates. Data were collected on pesticide use, crops, poisonings, knowledge, attitudes, work practices, symptoms, biomarkers of exposure, and related matters. The network has brought about stricter regulation on use and importation of pesticides. In Nicaragua, a collaborative program resulted in the emergence of an

occupational health and safety group with new tools to tackle problems. It led to growing collaboration between Central American institutions. This is a research training program sponsored by the Research Department (SAREC) of the Swedish International Development Authority, run since 1987. It has resulted in the completion of three doctoral programs in occupational epidemiology and the publication of several reports (13—18). The program addresses miners' health, lung function in workers with various exposures, and neurotoxic effects of organophosphate insecticides. United States collaboration include studies of the National Cancer Institute (NCI), for example, on workers exposed to benzene and silica dust (19—23), and studies of the National Institute for Occupational Safety and Health (NIOSH) in Mexico, Bolivia, and Colombia (24—26). NIOSH has recently developed occupational health and safety agreements with Mexico, Vietnam, and South Africa. Several occupational health and safety studies conducted in developing countries have been supported by IDRC, Canada (5). Substantial collaboration has been going on in occupational health and safety since the late 1970s between developing and developed countries involving South Africa, a key regional country for Africa (27—30). Pesticide hazards have been an important topic.

Priorities

Research priorities in occupational health and safety are not universal, and they need to be locally identified to maximize impact. Priority setting for health research and its infrastructures in particular circumstances needs to consider matters of both form (programs, studies, registers, interventions, information dissemination, training, manpower, material resources, etc) and content (particular exposures, physical loads, diseases, accidents, etc). By cross-tabulation, forms and contents make up cells that can then be assigned priority values. Urgency, duration, and further dimensions can be added. A sample listing of extensive occupational health and safety problems includes the informal sector and small-scale industries, temporary and seasonal work, underemployment, and the maquiladora industry (31—34); pesticides (8—12, 14, 35—43); accidents; dusts (44—49); carcinogenic exposures (44, 49—51); solvents (50, 51); noise; ergonomics (52); women (27); child labor (51); violence; infections (27); transfer of hazards (27); and work-related HIV/AIDS matters. Lack of human and material resources in the detection and documentation of exposures and health outcomes, in occupational health and safety research and practice and in data systems, registries, occupational health services, surveillance, risk surveys, and hazard assessment is evident (4, 39, 43, 53—59). The identification and documentation of problems are of particular importance. For example, underdiagnosis and underreporting undermine surveillance systems.

A satellite symposium organized in Cape Town by the International Committee on Occupational Health and the International Society for Environmental and Occupational Health (ISEOH) identified two topics for large-scale interdisciplinary studies in various localities in the tropics: *health hazards in the informal sector of the Third World*, and *working and living conditions among agricultural women in the tropics*. These titles cover huge populations in the Third World and entail a host of health hazards and ample room for prevention. A third topic was identified as *the burden of disease and the discriminative policies on HIV/AIDS*. Such discriminative policies currently deny people work, insurance, and other social amenities purely on a person's HIV status.

Approaches

Feasibility assessment is needed before a collaborative study is seriously considered. Such an assessment should include a systematic evaluation of the culture, relevance or priority, acceptability, social impact, resource, sustainability, and technical components of feasibility. Scientific quality must be maintained, with a proper balance between replicability, flexibility, and creativity. Surveillance and field studies with appropriate instrumentation are frequently choices of preference. A variety of available data sources can be exploited. An anthropology or qualitative (unstructured) component can be considered to be included in an occupational health and safety study for improving the understanding of the social structures and dynamics that need to be grasped for successful collaboration, proper interpretation of the study results, and, ultimately, the development and evaluation of preventive intervention. Feasibility considerations frequently dictate what can be done. Thus 15 occupational health and safety reports from Equador were evaluated for motivation, methods, and outcomes (53). The following three recurring themes emerged: a preponderance of cross-sectional designs, limitations in exposure assessment, and non-standardized measures of outcomes. Yet the research was found to be of considerable public importance.

Local hazard or health assessment surveys are occasionally called for. Such a survey was undertaken in an East African cotton mill. It related dust exposure levels and exposure duration with the prevalence of byssinotic symptoms among the workers (57).

Process evaluation ("operational research") could be undertaken as a standard procedure. This evaluation requires the keeping of a logbook on how the actual procedures succeeded in following the original protocol; what the specific problems were; what the causes of the problems were; and how the problems were solved.

Participatory methods (60) can be applied that involve a joint initial definition and a reassessment of goals, hypotheses, methods, and the dissemination of

results between the parties. An intervention element can be included.

Sponsorship

Potential sponsors include sources in the developing countries themselves and supporters in richer countries. While it is impossible to name any sources that would be willing to consider a great number of studies, some might be considered in special circumstances, for example United Nations organizations such as the World Health Organization and the Pan American Health Organization (PAHO), the International Labour Office (ILO), national development aid agencies, the European Union (EU); the International Commission on Occupational Health, various nongovernmental organizations and institutes, and foundations such as Rockefeller, Fogarty and Kellogg.

Recurrent problems

As the support from richer countries ends, activities in a developing nation often dies. This possibility needs to be realized at the outset, and counteractive strategies are needed to ensure sustainability. Capacity building and frequent contacts are essential. Several institutions and sponsors can be considered for joint support.

Recruitment of study personnel is a matter of careful judgment. Scientific qualifications, social skills, language mastery, proficiency in the management of novel circumstances, open-mindedness, and commitment need to be seriously evaluated. The potential for turnover of the project personnel needs be recognized in case of needs for re-recruiting and training. Further delays that need to be anticipated may result from unscheduled circumstances, such as social unrest, climatic circumstances, or shortage of water, fuel or electricity. Opposition may, in some cases, be expected from management, labor, or government.

Concluding remarks

We encourage the extension of collaboration between developing and developed countries and between developing countries in occupational health and safety research. Collaboration is essential in research, in training, and in the dissemination and utilization of research results. Sponsoring agencies and institutions should consider encouraging the support of such collaboration. Scientists from the developed countries should seriously consider the benefits of joint efforts with the developing countries in enhancing surveillance systems, ad hoc studies, training programs, and publishing.

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