Assessment and communication of old and new hazards and risks

ABSTRACT
Risk is a function of the presence of a hazard in an exposed subject/population. Assessment and communication of hazards and risks at work begins with a previous or suspected knowledge of a harmful effect of an agent. Recent changes in the world economy pose new situations of working conditions which have a major impact on workers’ health, creating room for the emergence of hidden hazards and risks, and an increase in new risks. Emergent and new hazards and risks coexist with old ones in the developed and developing world and their relative importance, intensity and frequency vary according to the economic profile of the country. Assessment and communication of hazards and risks is an ongoing effort, composed of actions delivered in steps, according to a complex combination of social and health policies, political will, health infrastructure, educational status and cultural values of the community. Proper delivery should be tailored and planned to individual situations, with the final goal of preventing the occurrence of injury, disease and disability in working populations.

Key words: workers’ health, assessment and communication of hazards and risks

INTRODUCTION
Occupational health, along with most branches of health, deals with concepts of hazard and risk. Both concepts are highly influenced by culture and subjectivity.

The concepts of “hazard” and “risk” have evolved in the last 400 years from observational/intuitive deductions to present day scientific methods, led by enlightened people. Risk can be interpreted as a function of hazard X exposure.1 Hazard can be thought of as something that causes any kind of harm and exposure refers to certain characteristics such as frequency of contact combined with hazard characteristics. For the purposes of this paper hazard is thus defined as something that causes injury, disease, impairment or disability. Risk is a probabilistic occurrence involving uncertainty.

Within occupational epidemiology there are many examples of risk, hazard and exposure. Job-exposure matrices are based on information on hazards in order to calculate exposed populations: there are around 2 million Brazilians exposed to crystalline silica (hazard) for as much as 30% of their working hours in the formal market.2 However, the probability of developing silica-associated diseases (risk) is largely unknown. In the US, around 1 million workers are exposed to silica but only 10% are at risk of developing disease.3

Hazards and risks have been always present at work. Some are old and persistent such as the accidents that typically occur in construction or mineral dust diseases.

Others have always been present, but their recognition was halted for a number of reasons:
• due to long latency of presentation, like mesotheliomas;
• due to a decrease in competing morbidity/mortality, such as the emergence of silica as a carcinogen in silica-exposed populations;
• due to an efficient control of traditional hazards and risks giving rise to new fields of interest/research, such as psychosocial factors and mental health problems; and
• due to a better understanding of mechanisms of “harm” in old risks like repetitive movements and musculoskeletal disorders.

They can be named as emergent. Some of them involve a large proportion of risk factors that are non-work related. New risks continue to increase and pose a threat to workers, managers, health professionals and researchers, like chemical exposures, exemplified by the growing list of agents causing occupational asthma,4 and also chemicals and other particles manipulated at the nanoscale.5 Interestingly, there are old hazards interacting with new situations giving rise to new risks such as the epidemics of respiratory disease in HIV positive workers exposed to silica.6

Occupational safety and health (OSH) practice directed to traditional forms of work relations, namely formal employment, had its foundations based not only in health practices, but intermingled with issues around working contracts, compensation aspects and liabilities. The understanding of the importance of non-work factors as determinants of disease in workers calls for a more comprehensive approach to assessment and communication of hazards and risks.7

ASSESSMENT AND COMMUNICATION OF HAZARDS AND RISKS
Assessment and communication of risks and hazards are part of our routine in OSH practice. The emphasis on which
hazards and risks will be included as priorities in a working agenda varies according to a complex interaction of economic development, social and health policies and political will. How the assessment and communication is made depends not only on the above factors but also on OSH infrastructure, educational status and the cultural values of the community.

The main advantages for developed countries in a globalised economy reside in the social protection and economic and educational levels of their populations, leading to less social disparities and easier access to information. Even so, many relevant challenges have been identified, as explained hereafter.

**Limited time contracts, third party contracts and a growing informal economy:** Formal employment has been severed by a new economic order that calls for cuts in production costs, job cuts and increased productivity. New forms of working contracts do contribute to lower costs but at the same time create stress, job dissatisfaction and lower social protection. Third party contracts are frequently sought for risky work (for example deep diving), specialised work (such as asbestos removal) or work that has no connection with the main activity (for example construction on mine sites). Informal and domestic work (for example electronic parts assembly) may also bring hazards to the household.9

**Emerging and new risks:** As previously stated, there are emerging and new risks coexisting with old risks in developed countries. The surge of diseases caused by a combination of occupational and non-occupational factors such as musculoskeletal disorders or job stress demand a much more comprehensive approach than traditional OSH practice.7,8

Nanotechnology is at the top of the list of new environmental risks, primarily due to the very limited knowledge about the toxicity of nanoproducts that are already being produced and marketed. Knowledge of the possible health consequences learned from past experiences with other hazards was not sufficient to balance the fevered enthusiasm for an early introduction of these technologies.9

**Special groups:** Immigrant working populations are rapidly growing in numbers. They tend to have a lower educational background and to take up jobs where the hazards and exposures are poorly controlled. Communication may be made difficult by language limitations and cultural values, leading to barriers that require prejudices to be overcome, designing appropriate policies and programmes and applying proper strategies for approaching the problems.10

In contrast, developing countries struggle in finding a balance between the need for economic development and the need for sustainable social and environmental progress. Common problems in those countries are outlined hereafter.

**Hazard and risk exports to developing countries:** Export of hazards and risks is a common practice expressed in different ways, including the selling of obsolete equipment, establishing businesses using inadequate premises, layouts or engineering control measures, creating new markets and establishing plants using hazardous materials such as asbestos. These practices provide the advantage of having cheap labour, tax legislation, absence of inspections and few or irrelevant liabilities. “Many of the developing countries are at very early stages of receiving new technologies...for these countries the introduction of new technologies can represent a very critical, and oftentimes overwhelming, adjustment...lessons learned by the industrialized world can be critical in averting similar experiences in the developing world.”11 This quote acknowledges the problems associated with the introduction of technologies in developing countries and argues that previous experience can be utilised to avoid unnecessary harm. However, it fails to recognise that even with several “lessons learned” the possibility of controlling hazards and risks depends much more on establishing priorities – a function of technical expertise with a strong political influence – that, generally, are far from what would be desirable. Adequate policies and good legislation are necessary, but not sufficient to result in preventive policies.

**Conflict of economic interests versus sustainable policies:** Economic and health issues play on opposing sides. Economic and environmental plans in developing countries are hampered by the lack of standards and lack of interest for developing plans that support sustainable development. The prevailing reasoning values “numbers” such as the creation of new jobs, new taxes for the municipality or political advantages from bringing new business to the area. There are serious doubts that these narrow views are sustainable and beneficial in the long run for developing communities, countries or regions.12

Examples of appalling working conditions driven by economic interests can be easily recounted: coal mining in China, where 188 major accidents were reported from January 2001 to October 2004 resulting in a rate of 1 death for every 7.4 days.13 Ethanol production is a recent example of a burgeoning industry in Brazil contrasting with miserable working conditions of sugar cane cutters hired by the industry or by third parties.14 In Nicaragua, between 2005 and 2007 there were 1420 deaths of sugar cane workers from chronic renal failure,15 possibly related to the misuse of chemicals or by an unknown interaction effect of chemicals in sugar cane fields. These workers in China, Brazil and Nicaragua are being increasingly pressured by unfair organisational systems leading to heavy work loads, coexisting with biological, chemical and physical risks in their routine activity. Assessment and communication of hazards and risks in these situations is far from being
Strategies for implementing good assessment and communication of hazards and risks should be creative and rely not only upon legislation and OSH infrastructure, but on far-reaching strategies, with the participation of basic health services, family practices and special governmental agencies or NGOs devoted to small enterprises. Here, the application of qualitative assessments, such as toolkits directed toward specific types of business, is a strong tool for prevention.

The Brazilian programme for the elimination of silicosis is conducting actions in four priority sectors: mining and mineral transformation, ceramics and glass, metallurgy and construction. The best experience the programme has had so far, is with ornamental stone works. This sub-sector comprises around 7000 small businesses employing 50,000 workers in the country, engaged in cutting, polishing and finishing ornamental stones for construction. Granite represents 60% of the materials dealt. The main hazards and risks are mineral dusts, noise, ergonomics and electrical risks. When the work started the risk of developing silicosis was clear for the researchers but employers were not at all convinced and workers were not aware of it. Thus, the first challenge was to assess and communicate the hazard and better characterise exposure. In 2004, a working group composed of representatives of the employers, employees, government and invited experts, designed a working agenda involving applied research in:

- determining the dust particle size distribution in typical jobs;
- determining crystalline silica concentrations in respirable dust in jobs with different materials; and
- studying noise and vibration.

In parallel, a series of presentations on mining, economic, organisational and social aspects of the sector were scheduled, in order to harmonise information for the working group. By 2007, all proposals were finalised and valuable data was generated in an adequate form for knowledge transfer within the working group and for proposing changes in OSH legislation. In March 2008, dry finishing was prohibited in the country, with a transition period of 18 months for the enterprises to adopt wet processes.

The working group identified new challenges to be tackled, in order to translate research results and new legislation into actions spreading over 7000 establishments. The question is how to conduct the necessary steps for
implementing the recent legislation and to establish indicators of outcomes. At this stage the working group decided to act in two areas:

- a programme for diffusion of information at all levels; and
- an approach between the labour inspectorate and sectoral stakeholders.

Thus, assessment and communication of hazards and risks should be addressed on different levels at different times without losing sight of effective occupational injuries and diseases prevention, including strategies for incorporating these concepts into the values of enterprises and workers.

**CONCLUSION**

Old, emergent and new work-related hazards and risks coexist in both developed and developing countries. They vary in frequency and intensity as a function of the country’s economic profile and stage of development. The relative importance attributed to them determines the country’s priorities and policies. Even between countries with similar development, the same hazards and risks can be treated differently.

Assessment and communication of hazards and risks begins with previous knowledge, or a suspicion of harm, and is delivered in a stepwise manner, reaching, ideally, primary prevention and sustained control of exposures as the last step. Assessing and communicating hazards and risks is an ongoing process, as working populations and work processes are in constant renewal. Strategies for efficient assessment and communication vary according to inherent properties of the hazards and risks and characteristics of the exposed population and should be adequately tailored to reach the final goal for the effective prevention of injury, disease and disability in workers.

**SUMMARY BOX**

- Old, emergent and new hazards and risks coexist and vary in frequency and intensity as a function of the country’s economic profile and stage of development.
- The so called “globalised economy” poses new threats in OSH, particularly in countries in transition where the level of education and social protection is low.
- Assessment and communication of hazards and risks at work is a stepwise and ongoing process, commencing with the identification or suspicion of anything that causes harm to workers, through to knowledge transfer applied in timely planned actions.

**REFERENCES**