The future of occupational and environmental hygiene
A Science becoming more and more essential

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Introduction
This presentation addresses the problem of the future of Occupational Hygiene for an audience composed mainly of occupational hygienists, assuming therefore that most of them are believing in the future of their profession. I am convinced that every single occupational hygienist is willing to defend his profession, to increase its visibility and to endorse his or her responsibility by working at the highest level of competence, quality and ethics. I would like to take advantage of my long experience in this field to stress the challenges we have ahead of us and the best ways we could use to cope with and to promote our profession by taking into account the new paradigms governing our society.

Occupational Hygiene is one of the relevant fields of Occupational Health which is itself, a significant part of Public Health (Figure 1). It is very important to have first this very broad overview of the area where we have to play in. It has changed over the last years and the traditional Occupational Safety and Health domain is now much broader than before and includes a lot of new relevant actors such as the human resource managers, economists, lawyers, sociologists, etc. Therefore we have to redefine our role in this new environment as well as our relationship with these new actors.

Today my focus will be more societal than technical: I will try to demonstrate why Occupational Hygiene is a science and a profession which is becoming more and more essential not only for the risk management but also for more ambitious objectives aiming at a better society thanks to its core values. In other words, I want to share with you my intimate conviction that our wonderful profession is really necessary nowadays to progress toward a better society [Guillemin, 2010].

A relevant new paradigm: the fear of risks
Our society is becoming more and more anxious about the risks we have to live with, among them: toxic chemicals in
food, water air - factors promoting cancer and cardiovascular diseases - flu pandemic episodes - electromagnetic radiations - radioactivity - etc. People want to be protected against anything and the concept of risk is not well understood by the majority of the population.

Occupational Hygiene being the science of the chronic risk management at the workplace and also in the general environment, has therefore a key role to play in the process to educate, explain and inform the population about the risks and the way they are assessed, evaluated and controlled.

Occupational Hygiene is frequently coupled with Environmental Hygiene as illustrated by the name of our American journal: *Journal of Occupational and Environmental Hygiene*. This sounds logic due to the fact that the approaches for managing the hazards are similar in both types of environment.

The characterization of risks (mainly chronic risks) is similar in both types of environment, the main challenge being to assess properly the exposure which is then transformed into a “dose” which then may relate to an “effect”.

But the way the risk is evaluated, is quite different in the general environment and in the occupational environment. In the general environment where the whole population is concerned, including the children and different vulnerable populations, the principle of precaution as defined during the Rio Conference [United Nations, 1992] is usually accepted (with some exceptions). But in the occupational environment, where there are only adults in good health (with some exceptions) the acceptability of risk is based on scientific evidence as illustrated by the setting up of OELs (Occupational Exposure Limits) [Bolt, Huici-Montagud, 2008].

Due to the fact that the risk management belongs to the core competence of our profession and that the fear of any risk is growing in our society, the role of Occupational and Environmental Hygiene becomes more and more important.

The main topics of concern in Occupational Health

Objective hazards and problems

There are issues which are either emerging ones or “actual” ones which represent the main areas of concern for our profession at the moment. A qualitative screening of the articles published in journals devoted to occupational hygiene or related fields shows that the topics are those briefly summarized here below.

Since the introduction of the European regulation about the chemicals (REACH: Registration, Evaluation, Authorization and restriction of Chemicals), the opportunity to promote Occupational Hygiene has been clearly seen by the profession and efforts have been made to act in this direction. Several aspects of this regulation belong to the competence of our profession: exposure scenarios, dermal exposure, risk assessment and evaluation (DNEls), etc.

The nanotechnology “miracle” has raised huge hopes and fears. Billions of dollars are devoted to the research and development in this area around the world. There are indications that some nanoparticles may be toxic and able to reach any organs due to their extremely small size. But for the moment our knowledge is far from being sufficient to properly assess the risk related to exposure to these particles. There is not yet a consensus about the most appropriate metrics to evaluate the occupational exposure and no consensus about the best analytical methods and strategies to apply. Those in charge of conducting appropriate research to eventually propose the best strategies and methods to assess the exposure in the occupational environment are the hygienists.

The same is true for the biohazards including all sorts of toxins as well as genetically modified organisms. Here progresses have been done for some specific biohazards and occupational exposure limits have been proposed. But there are still a lot of problems to solve by proper research programs.

Indoor air quality is not a new topic but is still a problem of concern more as a public health issue than an occupational one. It is quite an interesting and challenging field due to the overlapping of different environments (public, para-occupational and occupational) where the risk is evaluated with different criteria. Here again, the crucial role of the occupational hygienists is obvious and does not need to be emphasized again.

In front of all these challenges where the lack of knowledge is the main barrier to develop scientific tools, the hygienists place their efforts in three directions:

1. The improvement of the way we use and interpret the results of our exposure measurements. In this respect a better statistical treatment of the data, including the Bayesian theorem has produced significant progresses;
2. The development of models to derive the workers’ exposure from data related to the emission of the concerned substances, the ventilation factors, the workplace design, the thermal conditions, etc. At the moment, the results are not yet satisfactory due to the fact that all the relevant exposure determinants are not well identified and quantified. More research is still needed to arrive to reliable tools. However in the field of biological monitoring which also belong to occupational hygiene when the goal is the exposure assessment, the pharmacokinetic models based on physiology are well developed and has already shown their usefulness;
3. The development of simplified tools such as the “control banding” (CB) which offer a pragmatic approach to control the hazards by using the best available knowledge combined with an expert judgment. In the case of nanoparticles for instance such an approach has been developed [Paik et al., 2008]. Behind the simplicity of the CB, there is a rationale which is not simple and often refers to models and experiences close to the “state of the art” for the problems tackled.

The examples of some key issues summarized here prove how important Occupational Hygiene is to contribute to keep the control on these potential threats on the workers and on the population.

We should not forget that the “traditional problems” (silica, asbestos, metals, solvents, etc.), even if in some countries they are better controlled than before, are far from being adequately managed even in the so called “developed countries”.

The challenge of psychosocial hazards

The European Foundation for the Improvement of Working Life in Dublin is carrying out regular surveys in all the European countries about the working conditions and their perceived health effects, every five years since 1990 [Parent-Thirion, 2007]. It is striking to observe that some factors related to stress and psychosocial problems are increasing continuously since 20 years illustrating that they are not controlled at all (Figure 2).
Too many occupational hygienists believe that they are not concerned by such problems since they are more related to ergonomics or occupational psychology and work organization. This is too a simplistic view for two main reasons:

1. Mental health may be affected not only by psychosocial issues, but also by "objective" factors such as solvents (the psycho-organic syndrome) or other contaminants toxic to the nervous system;

2. Some ergonomic factors are closely related to occupational hygiene factors and have to be taken into account by the hygienists as illustrated the TLV booklet of the ACGIH which includes evaluation guidelines in this field [ACGIH, 2010].

This last point reminds us that the control of occupational hazards is always a multidisciplinary and team approach. To cope with such complex issues many different competencies are needed and cannot be in the hands of one single person.

The strength of the core values of Occupational Hygiene

Excellence and Professionalism

The quality of training and education in Occupational Hygiene has always been one of the major issues of our professional societies and associations. Certification schemes as the one adopted by the IOHA and run by its National Accreditation Recognition committee is a good illustration of this strong will to have professional occupational hygienists of a high level of competence and behaviour (ethics). We have to continue to cultivate our excellence and our professionalism in order to be progressively better recognized as unavoidable partners by the other occupational health professionals and by the social partners and the public.

A Science and an Art

Occupational Hygiene is a "hard science" and builds its approach on "scientific evidence". This makes it very powerful in the Occupational Health field where other more "subjective" approaches are often criticized or neglected. In my opinion this power frightens sometimes politicians or unfair stakeholders who are not happy to be in front of "hard facts" impossible to deny. This may explain some trend these last years, in different European countries (Sweden, Switzerland, Italy), against institutes and research teams in the field of occupational health. We should interpret these fears as a very good sign of our importance and we should not be afraid of this "rearguard fighting" which only slows down a little bit the ongoing inexorable progresses.

The first definition of Occupational Hygiene I discovered in the seventies in the USA and still endorsed by the AIHA, described this field as a science and an art. I like very much these terms because they put together two elements that should compose all the professions: the scientific and the technical part (professional competence) and the creative and "immeasurable" part which brings the other dimensions of any human activity (human competence). We all know that those working only on the cold side of science and techniques will not be as efficient as those taking into account the other aspects (social, cultural, individual, etc.) impacting on their assessment and advice.

Ethics and Transparency

We are dealing here with the very touchy topic of Ethics and Transparency. It is amazing to see the trend in the last decades related to the fear of conflicts of interest. Every scientific journal and even organizer of congresses and conferences requires a "declaration of lack of conflict of interest" to testify that the author of a paper or of a presentation will not advertise in a way or another a product or a service which may serve is or her own interests. This is a reaction to a lot of scandals which have discredited the Occupational Health professionals. Even at very high levels such as the WHO, it seems that conflicts of interests played a role in the last announced H1N1 pandemia [Cohen, 2010] or in the choice of the director of the IARC in 2006 [Hagmar, 2005].

IOHA and every single society belonging to it have a "Code of Ethics" (Example of the Swiss Society of Occupational Hygiene [SSOH, 2010]). This underlines the importance placed by our profession on the respect of moral rules aiming to never forget that the priority in our job is the protection of workers' health. The hygienists employed in companies or providing services as private consultants have sometimes difficulties or moral problems to follow their code of ethics. The independence of occupational physicians is usually warranted by law due to the well accepted medical secret. But this is not the case for the other health related profession such as occupational hygiene. Several years ago, the American Industrial Hygiene Association conducted a survey on these issues among its members [Goldberg et al., 1993] and the results were worrying: approximately one out of three occupational hygienists admitted a behaviour diverging from the Code of Ethics.

Cross fertilization

Another core value we have been defending for years is the cross-fertilization between different disciplines related to Occupational Health. We have already stressed above the multidisciplinary and team approaches we are used to. Cross-fertilization is much more than multidisciplinary work since it produces new knowledge and new strategies by the exchange of ideas, competencies and experiences from various fields. I think that it is a specific mark of our profession which has learned from the beginning to work with the other experts such as the occupational physicians to prevent specific diseases, with the toxicologists to develop the OELs, with the epidemiologists to reconstruct the past exposures, etc.

Emerging values

Solidarity - social responsibility - fair trade - health promoting factors are, among others, new emerging values in our society and we should include them in our field. The choice of the title of this
8th International Scientific Conference of the IOHA illustrates this trend. The values related to moral and social aspects of the work (solidarity, fair trade, for instance) should be part of our Code of Ethics. We have to be aware of the social responsibility of the enterprises (they are called in French “enterprises citoyennes”) in order to incorporate this aspect in our day to day activity and advice to the social partners. Another point is the development of the workers’ well being which is becoming a new area of competence. It has to be part of our profession because it represents a new important direction in Occupational Health. Up to now we have been used to react against bad working conditions once they have been shown to produce unacceptable health effects. Now we have also to move toward the improvement of the occupational environment and work organization without waiting (as before) to be sure that the conditions are harmful.

In my opinion and due to the fact that we bear a very important responsibility in assessing risks and providing relevant advice to manage them, we should be in line with the changes in our Society and take advantage of these positive emerging values to pursue our continuous progresses to play our role at the highest level of competence and ethics. This proactive attitude will contribute to add to our credibility and importance.

The reasons why Occupational Hygiene is essential and has a social responsibility

There are very many reasons why Occupational Hygiene is essential. I will stress here the most relevant ones in my opinion and the consequences in term of responsibility toward the Society.

Better knowledge and reliable tools

In front of many risks we miss relevant knowledge to know how they should be properly assessed, evaluated and controlled. Research is necessary and should be promoted at a much higher rate than it is today. We are aware that the tools we are developing and proposing to respond to the actual needs suffer from lack of scientific evaluation and represent the actual state of the art which is far from being satisfactory. Our profession is able to provide this knowledge and more reliable tools if resources and support were available.

Extended competencies in exposure assessment

Our profession is the one with the longer and the better experience in exposure assessment. It can therefore play a key role in anticipating and assessing chronic risks at the workplace and in the environment. This competence is also related to the development of “limit values” to protect the workers or the population. In this period where the future of the traditional OELs may be threatened by the DNELs, the competencies of Occupational Hygiene may be quite relevant to influence the trends in this area.

Essential science for controlling the chronic risks

To adequately manage the risks and to properly allocate the available resources to the key priorities, Occupational Hygiene is really essential. Substitution is actually one of the key issues of the control of chemical hazards. Without an objective view of the situation and hard facts to support this view, an appropriate and targeted risk management is not possible.

Privileged position in the OS&H team

We should take advantage of our privileged position in the OS&H team to promote the cross-fertilization between the different experts. This will strengthen the global field of Occupational Health and make the actors and their respective role more visible. An example of such a boosting of fertilization is what we have in Switzerland: a federation of all the societies related to Occupational Safety and Health (Medicine, Hygiene, Safety, Ergonomics, Psychology, Nurses) which includes also regional (linguistic) groups as well as specific committees (for the OELs and for the scientific research). This federation is called “suisse-pro” and help to promote the visibility of OS&H and the contacts between the different societies [suissepro, 2010]. Meetings are organized each year on topics which concern two or more societies. The federation is also an official partner of the Swiss Confederation to comment projects of laws related to OS&H.

At the international level, the ICOH, which was initially dedicated only to Occupational Medicine, has opened its activities in the last decades to the broader field of Occupational Health and is playing this role when conferences are organized on themes concerning all the occupational health disciplines. ICOH is also a reference in ethics with its Code of Ethics which is common for all the Occupational Health professionals.

Consequences of the fading out of Occupational Hygiene as an identified discipline

I feel we bear also a very important responsibility if we let our profession disappear according the several scenarios I presented at the 6th ISC of IOHA in South Africa [Guillemin, 2006]. If this occurs, different aspects of our field will be taken over by other experts not only dedicated to the chronic risks at the workplace but to broader aspects (safety and health, environment, public health, etc.). The consequences of a lower professionalism and a lower scientific level in the risk management at the workplace will negatively impact on the workers’ health and therefore also on the enterprises and the environment.

Responsibility toward the environment

We are also key actors in the environmental health but unfortunately this is not yet recognized by the stakeholders and the separation between occupational and general environment make the management of the problems related to human health much less efficient. Since we are working, for a lot of different pollution sources, very close to the emissions (in air, water, soil) our control methods are the most effective ones. This is true also for the wastes management, the recycling, the clean production processes, etc. Therefore we bear a responsibility first to be more visible in this role and second to be proactive in the sustainable development as a whole.

Responsibility toward workers, employers

This responsibility is obvious and is well emphasized in our Code of Ethics. There is no reason to repeat these well known arguments. But, our responsibility to raise awareness of the social partners about the difficulties in managing chronic risks without strong competencies which belong to our field should be stressed. Moreover the employees’ health and well being is a common goal for employers and employees (an area where they should not fight!), so this link between the social partners may be strengthened by the occupational hygienists thank to their communication skills and their convincing arguments based on “hard facts”. This is also a relevant responsibility!

Responsibility toward Society

To participate to the development of workplaces not only safe but also promoting good health is impacting very positively on the society. We should not underestimate our role and our responsibility.
bility in front of social problems. Among them I can cite:

- Inequalities among socio-economic classes
- Vulnerable populations (pregnant women, children, aged people, etc.)
- Working poor
- Unemployment
- Increased pressure on the workers
- Etc.

These problems which cannot leave us indifferent, illustrate malfunctioning of our economic and political systems and the public opinion is more and more sensitive to the suffering at work and to these inequalities in front of health and work. We are able to provide quite a significant help and support to alleviate and eventually eradicate this suffering. We have to be aware of this responsibility; we have to accept it and we have to take it.

Gandhi said:

“be the change you would like to see in the world!”

Let me conclude by these words expressing my "credo":

“to dare a dream of a better society is a step toward its construction!”

References


