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# Current Trends in Biosafety and Health Education: A Journey on the Road towards Unity in Diversity

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Biological safety has been recognized as an important topic for a long time. Since the 1983 WHO I-st edition of the "Laboratory biosafety manual", a continuous effort for the implementation of basic elements and notions regarding biological safety led to national codes of laboratory practice for the safe manipulation and processing of pathogenic microorganisms and for potentially contaminated biological products.

## Challenges in the Management of Biosafety and Biosecurity

Microbial taxonomy has been constantly readjusted following the development of techniques and equipments. New clinical entities were discovered and described as "emergent infectious diseases". Also, the epidemic dimension and clinical evolution of some communicable diseases have been marked by important changes; this led to these diseases being labeled as "reemergent". Together with newly discovered/ re-classified microorganisms, the phenomenon of increased antibiotic resistence is generating problems all over the world.

Consequently, biosafety rules, guidance and recommendations had to be constantly revised [1]. Important steps were taken for protecting both laboratory staff and the community against accidental release of hazardous biological agents. Moreover, the intentional use and spread of biological agents (bioterrorism), including the "deliberately modified microorganisms" further complicated the picture. As such, education systems in general and health education in particular had to keep up the pace.Worldwide, countries and regions are characterised by discrepancies in the biosafety and biosecurity phylosophy, with various approaches and levels of acknowledgement.

### The Biosafety Professional - Approaches and Strategies

As biosafety and biosecurity progressively organised and grew into an important component of all activities involving manipulation of biological agents and materials, we have been witnessing the emergence and development of a novel profession/qualification: the biosafety professional.

Who might this person be? What skills and educational background would he or she need?

In order to answer such questions, the first step was to identify the tasks to be fulfiled in all areas involving the manipulation of biological materials, such as (but not limited to) diagnostic, research, public health, production. Once these were systematically described, the most suitable educational background(s) and working experience, as well additional training and qualifications were to be identified for potential candidates to occupy such positions. Last but not least, new education strategies were to be designed with biosafety and biosecurity topics included in the curricula of relevant teaching institutions.

There is an increasing need for the previously mentioned challenges to be matched by human resource strategies. Many of these have and are still being dealt with at national level, even if general international frameworks exist and harmonization efforts are being made. There is a wide diversity of solutions found by human societies in different parts of the world in terms of education and work, obviously shaped according to cultural, political parameters and availability of financial and human resources. History has demonstrated that specific goals might be reached in different ways. Nevertheless, since microbes have started to "travel" much easier and faster these days, international efforts have become a must if we aim to successfully manage biorisk.

Easier said than done, isn't it? Where and how to start? Who was to be the promoter of such cross border initiatives? Again, there was not one single answer but the actors were already there and ready to act. International organizations (WHO, CDC, UN, NATO, ECDC, etc.) identified resources, created programmes and dedicated divisions and departments to support the necessary actions. Professional organizations, academic groups, research institutions, universities united efforts, designed projects, sought for available resources. Harmonization, standardization, quality management would be among the "keywords" to describe the needs for both biosafety and biosecurity and biorisk management and for drawing the portrait of that biosafety professional previously mentioned.

### **International Projects and Collaborations**

Among recent international initiatives, I think we must mention at least two projects which will undoubtedly make a great difference in the years to come: CEN Workshops 55 and 53 (CEN=European Committee for Standardization). They both must be regarded as aditional documents to the CWA 15793:2008 'Laboratory biorisk management' (CWA=CEN Workshop Agreement).

CEN WS 55 is an international collaboration which started in 2010 with the purpose of ellaborating an implementing a guidance for CEN Workshop Agreement 15793:2008 – the first internationally acknowledged management system specifically approaching biological threats associated to laboratory activities. The final version of the guidance document has recently been published as CWA 16393:2012 (more information to be found at http://www.ebsaweb.eu/activities. html).

CEN Workshop 53 "Biosafety Professional Competence" aimed to describe competences of the biosafety professional, also offering model

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training specifications (more information to be found at http://www.ebsaweb.eu/Projects+\_+Activities/Biosafety+Professional+Competen ce.html).

At present, the global picture consists of a combination of requirements, initiatives and already accomplished stages, depending on the area of the world. The reshaping of under- and postgraduate medical and biomedical education curricula to include biosafety and biosecurity topics is already in place in some areas of the world such as the USA where university training and education programmes are widely available (e.g. http://www.glrce.org/biosafety/) or acknowledged as a necessity in other countries [2,3].

### The "Romanian Story"

Allow me to briefly describe the closest possible example i.e. the situation in my country, Romania. The premises for harmonizing the Romanian public health system to European and international standards were put with the support of international programmers during the period between the years 2003-2007. Increasing the capacity of public health laboratories was one of the major goals and all action plans focused on human and material resources, quality management and biosafety and biosecurity.

In 2007, with the support of Dr. Robert Stevens who had been Project coordinator of a PHARE program on the improvement of the Romanian system for surveillance and control of communicable diseases, we obtained a NATO grant to organize an advanced research workshop in Timisoara focusing on biosafety and biosecurity as medical countermeasures against bioterrorism [4].

Following the professional connections made on that occasion, the next year we joined the "Biosafety Europe" project (more information to be found at http://www.ebsaweb.eu/Projects+\_+Activities/Biosafety+Europe.html).

As demonstrated by this Romanian example, networking should be another keyword to add on the above list. Without trying to "reinvent the wheel" or "rediscover America", we must always remember the importance of staying in touch with colleagues, learning lessons and sharing knowledge. Effective training programs and the availability of information, as well as peer group communication are major assets. Postgraduate training of our specialists in intervention epidemiology and the subsequent better functioning of the epidemiologistmicrobiologist team could be the most important achievement in this direction.

But there is still work to be done and the needed changes sometimes occur slower than we would wish. Just to give an example, there is insufficient uniformity of the "specialist language". For instance, translating terms such as "containment", "biosafety cabinet" or even "biosafety" into Romanian has been debated. We have to take care not to be "lost in translation" as no ambiguous terms should be present in documents and records. Getting better in touch with other national systems should also be on our agenda.

We have come a long way, we had to burn some stages, sometimes the steps we had to take seemed "giant steps", there is still a lot to be done and there is not enough time...Or maybe we are too impatient?...

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