nature of etiologic agent and the worst-case accident scenario.

Meteorological factors such as wind speed, relative humidity, sunlight, ultraviolet rays, and temperature to account for destruction or inactivation of released organisms.

This paper will describe our analytical tools used in facility biosafety and biosecurity assessment for biotechnology processing industry, biological agents testing facilities, and biological specimen repositories involved in the biodefense vaccine development program.



## 89. THE RELATIONSHIP OF MICROORGANISM CLASSIFICATION BY US GOVERNMENT GUIDELINES TO THE DESIGN OF LABORATORY FACILITIES *(1)*

**Dr. David M. Robinson**
DVM, MS, PhD
Vice President, Chief Biologist, Battelle Crystal City Operations, Suite 501, 1550 Crystal Drive, Arlington VA 22202, **USA**

When the first edition of the Biosafety in Microbiological and Biomedical Laboratories, (BMBL) series was published approximately 40 years ago its purpose was to provide a code of practice, guidelines and standards for the prevention of laboratory acquired infections to the laboratorian working in an infectious disease laboratory.

The BMBL is based on the microorganism being worked on and is a set of recommendations, which are advisory. While this is true, many agencies in the US government have incorporated all or parts of the BMBL in their regulations. This has led to the BMBL being accepted as the de facto US standard for the design and operation of infectious disease laboratories.

The concept of biosecurity has evolved as a result of concerns related to access to microorganisms by terrorists following the anthrax letters of October 2001.

While related to biosafety the specific requirements vary from those related to biosafety and are based on laws passed by the US Congress. The Select Agent Program of the US Centers for Disease Control has been given the responsibility for codifying and enforcing these regulations.

Both biosafety and biosecurity need to be considered in the design of a laboratory facility. The occasionally conflicting regulatory requirements can be best resolved by conducting a Risk Assessment, which takes into account the microorganisms and the manipulations planned for the laboratory. This is an essential step for both laboratory design and subsequent laboratory operation.



## 90. BIOSAFETY EDUCATION AND TRAINING PROGRAMS FOR UKRAINIAN MICROBIOLOGISTS *(14)*

**Dr. Valentina Pushkina**, Dr. Andrey Volyansky, Dr. Natalia Popova
Ukrainian Mechnikov Anti-Plaque Research Institute Cerkovna, 2/4, Odessa, 65003, **Ukraine**

In the period of the Soviet Union Ukrainian Mechnikov Anti-Plaque Research Institute was one of the main bases of centralized training for laboratory diagnosis of especially dangerous infections. Not only specialists, but medical technicians were obligatory trained. In training programs special attention was paid to the safety regime in accurate work out of practical manipulations in investigational classical methods (cultivating technique, pipeting, animals' infection and dissection, etc.), protective clothes usage, anti-epidemic measures use at different accidents.

This approach gave effective results not only in laboratories but also during field work (natural plaque foci investigations, etc.) and at emergencies. Recently in world practice to increase the level of biosafety technical equipment and devices are developed and used very intensively.

During trainings maximal time is paid to their mastering. At such training biosafety practically depends on safe and reliable work of engineer-technical systems. At present in Ukrainian Anti-Plaque Institute with the support of Canadian Government Training Centre on biosafety and biodefense for specialists of Ukraine and FSU countries is being organized.

Teaching programs will include complex study of hand manipulations and modern technical means knowledge. To our mind such initial training had to be available for all specialists of BSL 1-2 microbiological laboratories of any subordination.

For this goal all kinds of programs will be developed. Such complex approach will promote to decrease biological risks in microbiological laboratories and prevent infectious agents import from working territories.

**Key words:** Tactics, Methods, Biosafety Education, Training Programs, Microbiologists



## 91. RADIOACTIVE MATERIALS IN MEDICAL INSTITUTIONS AS A POTENTIAL THREAT *(14)*

**Zeljko Radalj**
Engineer of Physics
ZIRS d.d. - Institute for Research and Safety Development d. d., Vukovarska 68, Zagreb **Croatia**

In numerous health institutions ionizing sources are used in everyday practice. Most of these sources are Roentgen machines and accelerators which produce radiation only when in use.

However, there are many institutions, e.g., Nuclear medicine units, where radioactive materials are used for diagnostic and therapeutic purposes. This institutions store a significant amount of radioactive materials in form of open and closed sources of radiation. Overall activity of open radiation sources

can reach over a few hundred GBq. Open sources of radiation are usually so called short-living isotopes. Since they are used on daily basis, a need for a continuous supply of the radioactive materials exists (on weekly basis). Transportation phase is probably the most sensitive phase because of possible accidents or sabotage.

Radiological terrorism is a new term. Legislation in the area of radiological safety is considered complete and well defined, and based on the present regulatory mechanism, work safety with radiation sources is considered relatively high. However, from time to time smaller accidents do happen due to mishandling, loose of material (possible stealing), etc.

Lately, the safety issue of ionizing sources is becoming more important. In this matter we can expect activities in two directions, one which is going towards stealing and "smuggling" of radioactive materials, and the other which would work or provoke accidents at the location where the radiation sources are.



## 92. CARCINOGENICITY OF MUSTARD GAS: REPORT OF THE CANCER REGISTRY PROJECT AMONG MUSTARD GAS EXPOSED IRANIAN VETERANS *(13)*

**Dr. Mohammad Reza Soroush**
M.D., Janbazan Medical & Engineering Research Center - JMERC, P.O BOX: 19615-616 Tehran, **Iran**

Since 2003 The Janbazan Medical & Engineering Research Center in collaboration with Tehran University has conducted a nationwide cancer registry project among all Iranian Veterans with history of exposure to mustard gas during 1980-1988 Iran Iraq war.

This mixed cohort study has a retrospective phase from the exposure time to 2003 and a prospective phase from 2003 to 2013.
The main goal is to find any possible relationship between exposure to mustard gas and developing cancer as a long term health effect.

A total number of 7500 individual (both military and civilians) with confirmed medical records of exposure to mustard gas have been included in the study to be compared with the same number of control population as well as the statistics of the national cancer registry system.

The follow up of all cases is being done as a part of the national health monitoring program of the Janbazan (veterans) organization.
In this report the latest findings of this project will be presented.

**Key words:** Mustard Gas, Carcinogenicity, Iran-Iraq War, Janbazan