

Russian System of Medical Specialists Training on CBRN Protection Issues



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- 2014-2015 – Rector of the Institute of Postgraduate Education of the Russian Center of Emergency and Radiation Medicine of the Ministry of Civil Protection and Emergency Situations
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Peter the Great Stood at the Origins of Russian Medicine and Medical Education

3



- Until the 18th century there was no medical education in Russia. Physicians were invited from other European countries, mainly from Germany, Scotland and the Netherlands
- During his trip to the Netherlands in 1697-1698 and in 1716-1717, the Emperor Peter the Great learned how to build ships, and also listened to lectures by Prof *Frederik Ruysch* and Prof *Herman Boerhaave* on anatomy and clinic medicine
- Returning from Europe, Peter the Great founded the Main Hospital in Moscow (1707), in St. Petersburg – the Admiralty (1715) and Army (1717) Hospitals, in Kronstadt – the Naval Hospital (1720)
- The task of these hospitals was not only the treatment of patients, but also the training of doctors for the Russian Army and Navy

European Doctors in the History of Russian Medicine and Medical Education

4



Samuel Collins

**Personal physician
of the Tsar Alexey
(1659 – 1666)**



Nicolaas Bidloo
**Personal physician
of Peter the Great,
Chief physician of
the Moscow hospital
(1706 – 1735)**



*Laurentius
Blumentrost*
**First President of the
Russian Academy of
Sciences
(1725 – 1733)**



*Jean Armand de
l'Estocq*
**Personal physician and
favorite of the Empress
Elizabeth
(1725 – 1745)**

Robert Erskine
**An advisor to Peter the
Great, the First President of
the Apothecary Chancellery**

*Johann Bernhard
von Fischer*
**Chief Director
of the Medical Chancellery**

*Johann-Christian
Ringebroig*
**First Rector of the Military
Medical Academy**

Military Medical Academy as the Cradle of Russian Medicine and Medical Education

5



Sir James Wylie, Bart.
**Russian Imperial Court
Surgeon in 1799—1854
and President of the
Imperial Medical
Surgery Academy in
1808—1838**

- In 1733 Medical schools at the Admiralty and Army Hospitals in St. Petersburg were founded
- In 1798 new buildings for these schools were constructed, and schools were renamed into Medical Surgery Academy by the decree of Emperor Paul I (in 1802 – Imperial Medical Surgery Academy; since 1881 – Military Medical Academy)
- In 1808 three faculties were created in the Academy: medical, veterinary and pharmaceutical. Thanks to this, the Academy started not only medical, but also veterinary and pharmaceutical higher education in Russia
- In 1845 the Department of Forensic Medicine and Toxicology with Hygiene and Medical Police was created in the Academy. It was the first specialized department in Russia where students listened to lectures and received practical skills in toxicology

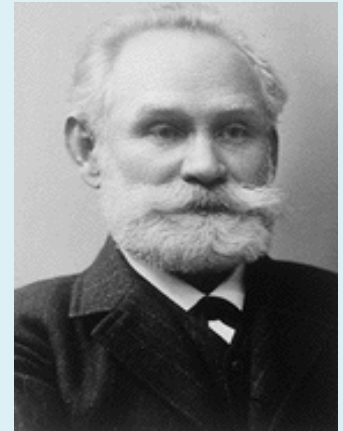
Military Medical Academy as the Cradle of Russian Medicine and Medical Education

6

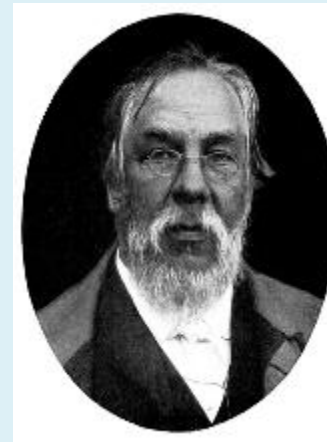
- In 1858 the Institute for Teacher Training (the prototype of modern postgraduate study) was created in Academy. This Institute trained teachers not only for the Academy, but also for the medical faculties of all Russian universities
- In 1872 the Academy opened a “special women's course for the training of midwives“, transformed into women's medical courses in 1876. So the Military Medical Academy initiated the formation of women's higher medical education for the first time in history
- The Fame of the Academy was created by *Nikolay Pirogov, Ivan Pavlov, Vladimir Behterev, Sergey Botkin, Alexander Maximov, Nikolay Zinin, Alexander Borodin, Nikolay Korotkov*, etc.



Nikolay Pirogov



Ivan Pavlov



Sergey Botkin



Alexander Maximov

Modern System of Medical Education in Russian Federation

7

- Russia is one of the largest countries in the world. It has more than 450,000 physicians, pharmacists, dentists, nurses and other medical specialists
- There are 34 medical universities, academies and institutions, as well as 5 medical faculties of universities in Russia, located in 26 cities and major towns
- In 2017 more than 30,000 students were admitted to medical universities; a total of about 150,000 students are trained annually in medical universities
- The biggest medical institutions is the I.M. Sechenov First Moscow State Medical University. Annually it produces about 3,000 certified doctors.
- In addition to civilian medical institutions, there is still a Military Medical Academy and four military training centers of universities for the training of military doctors



Modern System of Medical Education in Russian Federation

8

Types of medical education

- Russian medical universities support the entire health learner spectrum, from Undergraduate Medical Education (UME), through Graduate Medical Education (GME), and extending to Continuing Medical Education (CME)
- Secondary medical professional education (nurse training) – medical colleges
- Higher medical education (training of doctors, pharmacists, dentists and others) – medical universities and academies, medical faculties and military training centers of universities
- Retraining and advanced training of nurses and doctors – institutes and academies of postgraduate and continuing medical education

Structure of the training of medical specialists

- UME is realized for 6 years for training under the programs of General Medicine and Pediatrics, and for 5 years for the training under the programs of Preventive Medicine, Dentistry, Pharmacy, Medical Biophysics, Medical Biochemistry, Medical Cybernetics, and Clinical Psychology
- GME is realized during 2 or 3 years of training in clinical residency or postgraduate studies, as well as six-month retraining courses in one of the 94 accredited medical specialties programs
- CME is realized during the whole professional career through participation in conferences, seminars, and also training in advanced training courses at least once every 5 years

Features of the Russian System of Medical Education

9

The Russian medical education system is based on *three principles*:

- Medical education should be based on natural science disciplines – biology, chemistry, physics, physiology, anatomy, etc.
- Physician's education should take place at the patient's bedside (not only in a classroom, but in a clinic) so that students were as soon as possible involved in a medical profession
- Medical education should be comprehensive and include not only clinical medicine, but also public health management, preventive medicine, pharmacy, dentistry, psychology, *military and extreme medicine*



The Reasons to Start Training Medical Specialists on CBRN Protection Issues

10

- The main reason to begin medical specialists training on CBRN protection issues was the use of chemical weapons in the First World War
- In 1925-1927 the first group of military toxicology studied at the the Military Medical Academy
- In 1931 the the Department of Military Chemical Problems was created, which later divided into Department of Pathology and Therapy of Injures of Chemical Warfare Agents (1936) and Department of Sanitary and Chemical Protection (1938)



City Population	Hiroshima 195 000	Nagasaki 255 000
Died	39 000	66 000
Injured	25 000	69 000
Total victims	64 000	135 000

- Another reason to begin medical specialists training on CBRN protection was the USA atomic bombing of Japanese cities Hiroshima and Nagasaki in 6 and 9 August 1945
- As a response, a Research Laboratory No. 1 to study the biological effects of radiation (1949) and the Department of Nuclear Weapons and Radiation Protection (1953) were created

Training Medical Specialists on Protection from Weapons of Mass Destruction in the Soviet Union

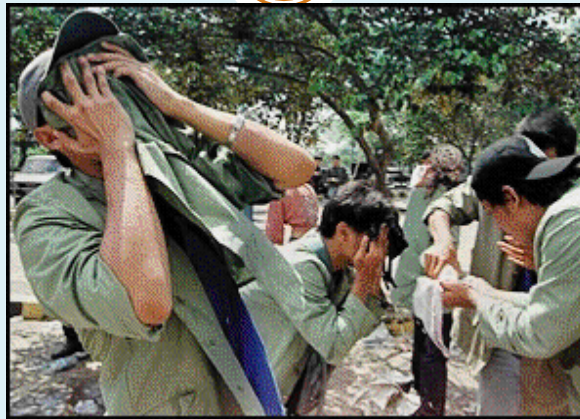
11



- In the second half of XX century the most important element of the war hazard was a threat of nuclear, biological and chemical weapons (NBC) using
- As a result, in those years Departments of Military Medicine, where students studied the issues of protection from weapons of mass destruction (WMD), were opened in all medical universities of the Soviet Union
- All training programs for medical specialists were focused on nuclear weapons injures and toxicology of chemical warfare agents
- After the end of the Cold War and the Soviet Union collapse, these Departments were were restructured and converted

New CBRN Threats in XXI Century

12



- Nuclear, Biological and Chemical weapons
- Battle smokes, masking curtains and aerosols
- Chemical, Biological and Radiological accidents
- Defoliants and riot-control agents
- Drugs, insecticides, household chemicals
- Poisonous animals and plants, natural zones of infectious diseases
- Chemical, Biological, Radiological and Nuclear terrorism



Training Students of Medical Universities on CBRN Protection Issues at Present

13

Life Safety (1-2 course)

- Methodological and legal foundations of human life safety
- National security
- State system of prevention and elimination of the consequences of emergency situations
- Human protection from extreme factors of natural disasters and technogenic accidents
- Medical psychological support of population, medical specialists and rescuers in emergency situations
- Life safety in medical organizations

Disaster Medicine (4-5 course)

- Basis of medical support of population during emergency situations in peacetime and wartime
- Health care in eliminating consequences of chemical and radiation accidents
- Health care in eliminating the consequences of disasters, traffic accidents, explosions and fires
- Sanitary preventive measures at eliminating of consequences of emergency situations
- Pharmacy in emergency situations
- Tasks and structure of the Russian Disaster Medicine Service

Training Students of Pharmaceutical Universities on CBRN Protection Issues at Present

14

- Students of pharmaceutical universities have not only academic discipline “Life Safety and Disaster Medicine”, but also academic discipline “Toxicological chemistry”
- The curriculum provides practical skills in the indication of highly toxic substances, methods of decontamination and detoxification.
- In addition, students of pharmaceutical universities have a large courses of pharmacology and pharmacognosy, where they study in detail antidotes and radioprotectors

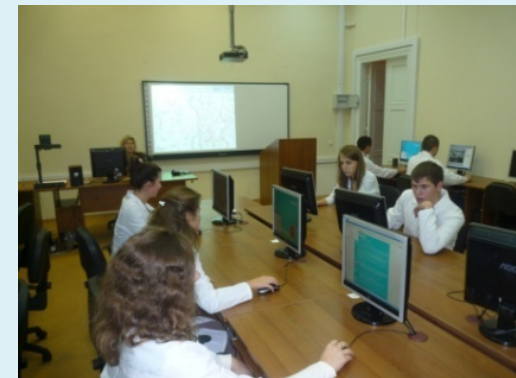


Training Students of Military Training Centers on CBRN Protection Issues at Present

15



- In Russia there are four military medical training centers; the largest of them located into the I.M. Sechenov First Moscow Medical University
- In these centers, ordinary civilian students have additional military medical training including CBRN protection issues
- After graduation, they can conclude a contract and become military doctors



Training Cadets of Military Medical Academy on CBRN Protection Issues at Present

16

Toxicology



Radiology

- Subject, purpose and basic concepts of toxicology
- Toxicity, kinetics, mechanisms
- Toxicology of riot-control agents (irritants)
- Toxicology of pulmonary (lung-damaging) agents
- Toxicology of vesicants
- Toxicology of cyanides and blood-damaging agents
- Toxicology of nerve agents
- Toxicology of incapacitating agents

- Subject, purpose and basic concepts of radiology
- Doses and sources of radiation exposure
- Physical, chemical and biological effects of ionizing radiation
- Acute radiation syndrome
- Cutaneous radiation syndrome
- Incorporation of radionuclides
- Combined radiation injures
- Chronic radiation injures
- Effects of low doses of radiation

Training Cadets of Military Medical Academy on CBRN Protection Issues at Present

17



Health Protection and Medical Defense

- Subject and basic concepts of medical protection
- Chemicals and radiation detection, methods and apparatus
- Decontamination, disinfection and sanitary treatment of injuries
- Medical prophylaxis and treatment of chemical injuries (antidotes)
- Medical prophylaxis and treatment of radiation injuries (protectors)
- Chemical and radiation protective equipment
- Health protection and casualty management in areas of chemical hazard
- Health protection and casualty management in areas of radiation hazard

Training Cadets of Military Medical Academy on CBRN Protection Issues at Present

18

- Health Protection and Medical Defense at Biological Threats is a multidisciplinary course
- It is taught on Department of Microbiology, Department of General and Military Epidemiology, Department of Infectious Diseases, Department of Toxicology and Health Protection, and Department of Organization and Tactics of Medical Service

Pathogens	<i>Bacillus anthracis</i> (Anthrax) <i>Francisella tularensis</i> (Tularemia) <i>Yersinia pestis</i> (Plague) <i>Brucella species</i> (Brucellosis) <i>Vibrio cholerae</i> (Cholera) <i>Variola species</i> (Smallpox) <i>Viral Hemorrhagic Fevers</i>
Toxins	<i>Botulinum Toxin</i> , <i>Mycotoxins</i> , <i>Enterotoxins</i> , <i>Ricin</i>



Training Cadets of Military Medical Academy on CBRN Protection Issues at Present

19

- Every year the Academy carries out a special military medical exercise
- It is held at the Academy Training Camp in the field near St. Petersburg and involves up to 1 000 participants. All cadets of the first, second and fifth courses and officers from residency of Faculty of Managerial Medical Personnel take part in it
- First-year cadets have practical experience in self-aid and detection of chemicals, biological agents or irradiation
- Second-year cadets get practical skills in working as paramedics and nurses
- Five-year cadets have a practice in medical management and triage as military doctors of medical units



Take Home Message

20

- CBRN threats are equally dangerous to all countries of the world and any military political alliances
- It is necessary to prepare for response to CBRN threats in advance
- Educational programs for students of medical and pharmaceuticals universities have to contain materials on counteraction to CBRN threats and health protection
- Adequate education, training and exercises of Army and Navy medical personnel for CBRN operations is necessary





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Thanks for your attention!