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**SECTION | 5 Clinical Toxicology and Poison Information**

**Chapter 5.3**

**Russia**

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**Origins**

The organization of clinical toxicology in the USSR and Russia began in the

second half of the 20th century. Much credit for this belongs to the research

begun in the therapeutic clinic of the N.V. Sklifosovsky Emergency Medicine

Research Institute (RIA), established in 1923 at the Sheremetev Hospital. This

hospital had been providing emergency medical care for more than 100 years,

and the Emergency Medicine Research Institute had been originally established

in the 1820s.

In the 1950s–1970s widespread use of chemicals began in industry, agriculture,

and home in the USSR. This was associated with the development of the chemical industry and the creation of new medicines and was accompanied by

an increase in the incidence of acute poisoning and their adverse outcomes. The

inadequate treatment of poisoning in hospitals became obvious and required

new therapeutic and organizational approaches. In the N.V. Sklifosovsky RIA,

patients with acute poisoning were hospitalized in the 2nd therapeutic clinic.

The head of this clinic, Professor Pavel Sukhinin, repeatedly raised the issue of

organizing a toxicology department. He sent a memorandum to the director of

the Institute and submitted a report to its Scientific Council on the organization

of a toxicology laboratory. As a result, he was instructed “… to carry out work

on the organization of this center.”

In 1962, the first toxicological department in the country was opened at the

Institute, making it possible to adopt new approaches to managing acute poisoning.

Particular attention was paid to the then frequent acute poisonings with mercury, arsenic, and caustic agents. The work of this new department attracted great interest from intensive care physicians. As a result, in 1968, the N.V. Sklifosovsky RIA held the first All-Russian Conference on Clinical Toxicology.

As a result of the success of this meeting, the government decided to contribute

to the formation of clinical toxicology as a scientific and medical specialty and

distribute the experience of the Moscow Center on treating poisoning throughout

the country. This was supported by the USSR Ministry of Health (MoH).

Largely in connection with this, the Collegium of the MoH organized a formal

network of toxicology centers (TCs) in the Russian Soviet Federative Socialist

Republic (RSFSR) and the Kazakh Soviet Socialist Republic (SSR) (Collegium

of the USSR MoH, 1969).

**Expansion of clinical toxicology**

In 1964, a pediatric center was started at the Children’s City Hospital No. 13,

“N.F. Filatov,” in Moscow for the treatment of poisoning in children younger

than 15 years (now up to 18 years). Subsequently, in 1970, the Republican Center for the Treatment of Poisoning (RCTP) was created, organized at the

N.V. Sklifosovsky RIA (MoH of the Russian Federation (RSFSR) order No

70, 1970). The RCTP was tasked with the monitoring, prevention, and treatment

of acute poisoning and charged with organization, research, poisons information,

and educational functions. Associate Professor Evgeny A. Luzhnikov, Candidate of Medical Sciences and head of the toxicology department of the N.V. Sklifosovsky RIA, was appointed as the head of the RCTP. To perform these tasks, the following divisions were deployed within RCTP:

**1.** The main academic and research subdivision of the Center, which was first

led by Victor N. Dagaev, and then Vladimir N. Aleksandrovsky. This included three research groups to organize specialized care: (1) information and prevention of acute poisoning, (2) statistics, (3) training of medical specialists in clinical toxicology. Training was carried out by travelling to territorial centers nationwide to give seminars on poisoning treatment. In 1986, the Department of Clinical Toxicology, organized at the Central Institute of Advanced Training of Doctors in Moscow (now the Russian Medical Academy of Continuing Professional Education), began to train doctors in clinical toxicology. Professor E.A. Luzhnikov was founder and the first head of the Department of Clinical Toxicology until 2016. It now regularly trains first responders, anesthesiologists, emergency physicians, pediatricians, toxicologists, and nurses.

**2.** Clinical facilities: 25 beds within the intensive care unit; a 25-bed psychiatric department; the dialysis department for performing extracorporeal techniques; research department for assessing new treatment methods for poisoning.

**3.** The forensic chemical toxicological laboratory for urgent analysis in acute poisoning and biochemical studies during various types of treatment.

Among the legal documents supporting the changes in clinical toxicology, the three most important were the MoH order no. 1527 which required the implementation of artificial detoxification methods in acute poisoning through specialized hospital departments with facilities for hemadsorption and hemodialysis (MoH of the USSR No. 1527, 1986); an MoH letter (MoH of the USSR letter No. 02-14/118-4, 1987); and No. 02–14/61–14 (February 15, 1988), allowing the creation of such wards as part of the acute poisoning treatment units.

By 2000, poisoning services in the Russian Federation consisted of a network

of 44 TCs, each for a population of 500,000 or more. This was created in multidisciplinary and emergency hospitals in accordance with the 1980 MoH

order No. 475, resulting in a total of 1235 toxicological beds (MoH 475). Today, this network provides specialized assistance and advanced therapies to the population of 50% of the territory of the Russian Federation. Financing of TC and clinical departments is from the national compulsory medical insurance fund.

**National Service Development**

The 1970 order No. 70 also established 13 inter-regional TCs in large cities with a sufficient base to support management of acute poisoning (Vladivostok, Volgograd, Voronezh, Gorky [Nizhny Novgorod], Irkutsk, Leningrad [St. Petersburg], Novosibirsk, Omsk, Perm, Sverdlovsk [Yekaterinburg], Stavropol, Khabarovsk, and Chita). The MoH established the post of Chief Clinical Toxicologist, responsible for overseeing the activities of these TCs. This position was taken by the head of the RCTP: Evgeny A. Luzhnikov, who played an outstanding role in the formation of clinical toxicology as a new specialty in medicine and created a scientific school of clinical toxicologists. At the local level, the TC is administered by the head physician of the hospital where it is located.

Communication between centers is through the MoH’s Chief Clinical

Toxicologist. In addition, the TCs contact each other to discuss aspects of care

during scientific conferences and practical workshops. The RCTP takes the lead

in poisons prevention by liaisons with public health and epidemiology departments.

Actions include, for example, prohibition of the free sale of household chemicals containing highly toxic substances (e.g., dichloroethane, a component of plastic glues) or their removal from household products. The prevention of occupational poisoning in Russia is the responsibility of institutes of occupational pathology, not TCs.

The most important result of the RCTP’s work was MoH order No. 475 signed by Academician Boris V. Petrovsky who was interested in this development of a new branch of clinical medicine (MoH of the USSR order No. 475, 1980). This completed the first stage of the development of national toxicological services. It established clear regulations for the creation and operation of TCs not only in the Russian Federation, but throughout the USSR, with the introduction of a toxicologist post and approval of the principle of creating departments in cities with populations of 500,000 and above.

In the Soviet period, work in acute poisoning was also carried out by the All-

Union Center for the Treatment of Acute Poisoning, created by order No. 1598

(MoH of the USSR order No. 1598, 1985). The N.V. Sklifosovsky RIA has continued to expand and is currently a scientific department (headed by Mikhail M. Potskhveriya) with 73 beds, tripling in size since 1965, including (1) treatment of acute poisoning, (2) diagnostics, resuscitation, and intensive care including emergency detoxification, (3) poisoning recovery, (4) psychiatric beds, and (5) a chemical-toxicological laboratory.

**Poisons information**

In the early days, the N.V. Sklifosovsky RIA provided poisons information

and advisory support to health care professionals and the general population.

Initially, this work was the responsibility of the department’s clinicians—both

by telephone consultations and travel to the site of emergency toxicological situations as part of a specialized emergency team from the intensive care and

treatment departments of Moscow. For cities away from Moscow, air transport

was provided by the Public Health Service of the RSFSR.

**Research and Applied Toxicology Center of the Medical and**

**Biological Agency**

Following this early work at N.V. Sklifosovsky RIA, the MoH issued order

No. 319 (MoH RSFSR order No. 319, 1992). This institution was organized

by Viktor N. Dagaev who was appointed the Institute’s head. After 2011, the

Research and Applied Toxicology Center of the Medical and Biological Agency

(RTIAC), headed by Yuri Ostapenko (from 2015, Pavel Rozhkov) began to play

a larger role in addressing organizational and other aspects of clinical toxicology. RTIAC provides 24 h daily information (using chemical safety data sheets) and advice on acute chemical exposure to the general public and health professionals by a single national telephone number. It also provides information on the treatment on animal poisoning. Regional TCs can, if necessary, use online communication; an online interactive database has been specially developed for this purpose.

**Call volumes**

The RTIAC provides advice throughout the Russian Federation, but the majority

of calls come from Moscow, the Moscow Region, and neighboring territories of

Russia with 11.98 million inhabitants. In some large cities, toxicological information and advisory groups have been organized as part of poisoning treatment centers, covering 4.7 million people in the Sverdlovsk region, 4.3 million in Rostov on Don, and 3.38 million in Omsk. All of these informational and advisory groups work 24 h daily. Some patients are transferred from other locations as a result of telephone consultations. The number of calls to these groups per 100,000 population per year was RTIAC—97.95; Sverdlovsk—11.02; Rostov—8.64; and Omsk—3.38. Patients with poisoning are hospitalized in therapeutic TCs at the following rates: in Moscow and surrounding region per

100,000 population are: 125.6 at the N.V. Sklifosovsky RIA, 168.7 at Rostov

and 139.3 at Sverdlovsky.

**Information sources**

For general inquiries TC employees obtain data on the toxicity of drugs and

chemicals from the Russian Register of potentially hazardous chemical and biological substances as well as various reference books and monographs, including standard western texts such as: “Ellenhorn’s Medical Toxicology,”

“Goldfrank’s Toxicologic Emergencies,” and the IPCS INCHEM website. In addition, a special computerized information retrieval toxicological system “POISON,” developed by the staff of the N.V. Sklifosovsky RIA under the leadership of Viktor N. Dagayev, is used to provide advice to health professionals and the public (Litvinov et al., 1996). This system contains data on 1040 drugs and chemical and biological substances, set out as computerized toxicology monographs (Poison Information Monograph - PIM), and is funded from the federal budget.

**Case records**

A national poisons telephone consultation record card is used, developed following the template recommended in the “Guidelines for Poison Control,”

(IPCS, WHO, Geneva 1997) and approved by the MoH. The recording of patient information is then entered into a computer database of telephone consultations.

Following the admission of a patient to the hospital, an MoH-approved

hospital patient form is used.

**Local TCs**

One of the main functions of RTIAC is the coordination of TCs throughout the country, as well as monitoring poisoning epidemiology, analyzing and disseminating this information, and preparing instruction manuals. In severe

cases of poisoning regional TCs may consult the RTIAC by phone or online,

and a joint consultation is held including leading specialists of the medical TC

of the N.V. Sklifosovsky RIA, as well as with the Chief Clinical Toxicologist

of the MoH. Local administration of TCs is carried out by the chief physician

of the hospital in which the TC operates, based on MoH order No. 925n (MoH of Russia order No. 925n, 2012) and No. 152 of February 21, 2005, of the MoH. The basis for these documents is Federal Law No. 323 FZ (Federal Law No. 323 FZ, 2011).

**Research**

The accumulated experience of the N.V. Sklifosovsky RIA led to a systematic

approach to improving the treatment of acute and subacute poisoning, using

both specific and nonspecific decontamination treatments and rehabilitation.

Studies included complex detoxification approaches studying novel (e.g., magnetic, ultraviolet, and laser) therapies of blood to extract or alter the chemical structures of circulating toxins (Goldin et al., 2004). An important contribution to the development of intestinal detoxification methods was made by basic research carried out jointly with clinicians in the experimental laboratory of the Institute, headed by Professor Galperin.

The use of the new treatment algorithms was accompanied by a sharp decrease

in mortality among the most severely poisoned patients. Institute staff also studied new forms of acute poisoning with substances used in production and in everyday life and the possibility of rehabilitation of toxicological patients.

This success was facilitated by the introduction of modern methods of analysis

(i.e., chromatographic, immune, mass spectrometric) to the N.V. Sklifosovsky

RIA. It also performed urgent analyses 24 h daily for the poisoning center and

other hospitals in Moscow to assist in the diagnosis of acute poisoning.

This research served as the basis of publications in Russian (Ostapenko et al., 2001a,b). The first Russian National Guide to Clinical Toxicology “Medical Toxicology” (2012), editor E.A. Luzhnikov, with input from the country’s leading specialists from St. Petersburg (Professor Georgy A. Livanov) and Yekaterinburg (Professor Valentin G. Sentsov), gave advice on topics including

emergency in situ diagnosis and care, and the treatment of acute poisoning. The

National Emergency Medical Care Manual (2017) was created by specialists

from St. Petersburg, edited by Sergei F. Bagnenko, Academician of the toxicological section of the Russian Academy of Sciences.

The development and widespread introduction of new medical technologies,

created on a sound theoretical base, facilitated improvements in the diagnosis

and treatment of acute poisoning. This was also promoted by the formation of

the new, enlarged E.A. Luzhnikov Scientific School in Clinical Toxicology in

Moscow. This school had the priority of scientific research to create an independent toxicological service in Russia for the overall improvement of treatments at the regional level. The scientific ideas of Academician E.A. Luzhnikov continue to be developed by his closest students employed in the N.V. Sklifosovsky RIA as well as colleagues in Yekaterinburg.

Much scientific and organizational work was also carried out by the leading

Russian territorial TCs (Ostapenko et al., 2005, 2011). New information on the

diagnosis and treatment of acute poisoning with cardiotoxic drugs was obtained

in Yekaterinburg under the guidance of Professor V.G. Sentsov. The epidemiology and organization of toxicological services, as well as prevention of acute poisoning, are other topics now being addressed. In St. Petersburg, Professor Georgy A. Livanov headed research on new approaches to poisoning-induced respiratory disorders, methods of artificial detoxification, acute poisoning syndromes and the organization of the outpatient toxicological service (Berezina et al., 2017). In addition, the study of multiple poisoning and its epidemiology is currently ongoing.

**Training and standards**

To train specialists in the field of clinical toxicology and conduct scientific research within the Russian system of postgraduate education, departments have

also been created for teaching clinical toxicology at leading universities. There

are two departments in Moscow (Professor Yuri S. Goldfarb, Professor Salavat

H. Sarmanaev), and in St. Petersburg (Professor Viktor V. Shilov), Yekaterinburg (Professor Valentin G. Sentsov), Ufa (Professor Zakia S. Teregulova), Khabarovsk (Associate Professor Alexander Yu. Shchupak), and Khanty-Mansiysk (Associate Professor Boris B. Yatsinyuk).

Physicians with a basic medical education and a higher diploma work in TC’s with clinical toxicologists or anesthesiologists in treatment centers. The requirements are the same for physicians working in a treatment center and those working in a poisoning information center. A specialist certificate is obtained after graduating from a medical school. It requires ICU training and 504 academic hours in toxicology. There is mandatory re-accreditation every 5 years.

Specialists providing poisoning information and the treatment of poisoning are

trained in line with MoH order No. 707n (MoH order No. 707n, 2015). Once

trained, no further special authorization is required to work in a poison information center. All regulatory documents on toxicology were prepared on the basis of Federal Law No. 323 FZ (Federal Law No. 323 FZ, 2011).

**Conclusion**

In Russia, toxicological assistance from TCs in large cities has been available

to the population for over 50 years. The organization of TCs was initially carried

out by the efforts of the RCTP with assistance provided by local health authorities, as well as the MoH in the form of formal orders and information

letters. TCs were organized as part of general hospitals, which made it possible

to perform emergency care for resuscitation and treatment, including intensive

care, diagnostic investigations, and laboratory studies.

Informational services were subsequently organized by the Scientific and

Practical Toxicological Center of the Federal Medical Biological Agency of

Russia (RTIAC). These services are intended to provide standard advice on poisoning throughout the Russian Federation. RTIAC is funded from the federal

budget. In addition to information and advisory functions, it coordinates the activities of poison information centers and departments throughout the country,

monitors poisons epidemiology, collects and disseminates information, and prepares information monographs. In recent years, a formal regulatory framework for the country’s toxicological service has also been formed. Employees of the RTIAC and TC at the N.V. Sklifosovsky RIA in Moscow have had a leading role in these changes.

The main toxicological institution in the Russian Federation has studied and applied modern methods of the diagnosis and treatment of poisoning and completed a large amount of research in the field of enteral detoxification. The

introduction of modern technologies for the treatment of acute poisoning and

the preparation of regulatory documents has made it possible to standardize the

working and organization of toxicological departments.

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