



International Editors

update

Emerging Infectious Diseases in Russia, 1990-1999

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Russia, the world's largest country, has a population of approximately 145 million and an area of 17,075 km², encompassing 7 geographic, 10 time, and 3 climatic zones (1). This diversity, along with socioeconomic changes in the 1990s, substantially influences the country's infectious disease rates. We discuss infectious disease data collected since 1990 because data for earlier years are not available from officially published sources.

The system of health and epidemic surveillance in Russia, which was organized in the 1920s, has been successful in eradicating some infectious diseases and decreasing the rate of others. When epidemiologists graduate from medical school, they are assigned to sanitary epidemiologic surveillance stations throughout Russia, in oblast (state), county, and city offices. Surveillance, disease reporting, sanitation inspections, and outbreak investigations are their main functions. In 1993, the Central Moscow office of regional sanitary epidemiologic surveillance

stations began publishing the monthly bulletin Population Health and Environment with collated data that are distributed within and outside Russia (www.fcgsen.ru). However, data collection is limited by inaccurate information from private clinics and diagnostic laboratories (especially those dealing with sexually transmitted diseases and HIV infection), which sometimes do not report all the results of their analyses and diagnoses.

Availability of medical statistics in hospitals and regional sanitary epidemiologic surveillance centers is still limited by shortage of personal computers, incompatible software, and slow communications, which affect the speed, reliability, and validity of data. In addition, diagnosis in polyclinics and hospitals, especially for gastrointestinal and respiratory infections, is usually based on clinical signs and symptoms rather than laboratory identification of the infectious agents or their markers. For example, data for rotaviral infections have been included in disease statistics since at least 1990, although no laboratory reagent kits have been purchased for testing for markers of these infections in most regions and no data were entered in regional reports. Another example is influenza: immunofluorescent diagnostics are performed selectively and only during outbreaks. When the number of positive samples reaches a certain level, an influenza epidemic is declared. Influenza is the diagnosis recorded in the medical charts of all patients with similar symptoms, and statistics are coded accordingly.

Russia does not yet participate in the European network for gastrointestinal diseases, the Enternet (2), although international cooperation in surveillance for such diseases as legionellosis, meningococcal infections, and malaria is improving. Increased surveillance and improved diagnostic kits could increase the reported incidence of certain diseases.

Selected Bacterial Diseases

Diphtheria

In the former Soviet Union, diphtheria was controlled through vaccination. The large

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International Update

increase in cases in the early 1990s was mainly due to low vaccination coverage because of a new policy, under which vaccination was not recommended for large segments of the population (3). This policy, which was introduced in the beginning of the 1990s, was rescinded in the mid-1990s. In addition, a widespread advertising campaign on television and other mass media about the adverse effects of vaccination caused widespread reluctance of the public to be vaccinated (3). As a result, by 1994, the disease rate had increased almost 30-fold. Since then, a mass vaccination campaign has been implemented in the most heavily affected regions, and by 1999 diphtheria rates had returned to the levels recorded in the early 1990s. Ministry of Health statistics (Table; 6,8) demonstrate a sharp decrease in diphtheria, which was achieved through an organized, voluntary immunization campaign on a scale unprecedented in post-Soviet Russia.

Tuberculosis (TB)

TB rates in Russia increased by 70% from 1990 to 1995, according to sanitary epidemiologic surveillance records (Table; 6,8). The disease rate in 1999 was 4.5% higher than in 1998 (4,6) (61.4/100,000 or 90,000 newly identified cases, 4,681

[5%] in children <14 years of age [6,7]). More than 25,000 persons die of TB each year (8). The highest rates are reported from Tuva, Buryatia, Khakassia, and the Tyumen, Jewish Autonomic, Perm, and Novosibirsk regions, with case rates of 266.4, 212.4, 146.8, 142.3, 137.6, 131.9, and 131 per 100,000, respectively (9). These data from the Ministry of Health likely do not reflect the disease rate among prisoners, who numbered approximately 974,000 in September 2000 (www.prison.org). The TB death rate, however, has remained stable or declined, with 16.7 per 100,000 in 1997 and 15.4 in 1998 (10).

According to the World Health Organization's definition (4), a case of TB is recorded if mycobacteria are identified directly by Ziehl-Neelsen microscopy. According to this method, the number of TB patients in Russia is approximately 20,000 (4). However, if mycobacteria are identified through culture, polymerase chain reaction, or other diagnostic methods, the estimated cumulative number of TB cases is 300,000. Additional categories of patients needing follow-up include 1 million recovered patients, 200,000 contacts of persons with newly identified cases, and 700,000 persons with positive tuberculin skin tests (4). Deterioration of living conditions in the past 10 years, including food

Table. Selected reportable diseases, Russian Federation, 1990-1999 and January-June 2000 (6,8)

Disease	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Diphtheria*	0.98	1.53	2.65	10.25	26.9	24.1	9.2	2.76	0.98	0.6	0.23
Tuberculosis ^a	51,000	45,000	43,000	54,000	66,000	72,000	78,000	81,000	86,000	90,000	48,000
TB-all* ^b	34.2	34	35.8	42.9	48	57.9	67.5	74	76	na	na
TB-MoH data ^c	34.3	30.5	29.4	36.5	45.1	48.7	52.8	55.1	58.5	61.4	32.4
TB death rate	7.9	8.1	9.3	12.6	14.6	15.4	17	16.7	15.4	na	na
Syphilis*	5.4	7.3	12.6	32.3	82.3	172.1	254.2	266.8	226.1	179.3	81.3
Shigella*	130.4	146.6	127.3	102.4	149.9	184.2	82	57.1	78	148.4	40.1
Hepatitis A*	204.3	165.5	117.9	109.3	111.2	122.6	86.9	50.1	33.8	30.6	15.9
Hepatitis B*	21.9	17.9	18.2	22.2	27	35.2	35.8	36.5	35.8	43.3	21.7
Hepatitis C*	na	na	na	na	3.2	6.8	8.4	9.1	11.6	19.3	10.9
Measles*	12.4	13.8	12.6	50.1	20	5.2	5.4	2	4.7	5.0	2.8
Mumps*	39.2	24.6	23.6	30.1	28.1	36.1	47	69.2	97.8	48.2	19.9
Rubella*	192.6	141	na	127	245.7	186.2	115.5	121.1	304	407	247.3
Tick-borne encephalitis*	3.7	3.5	4.3	5.3	4	4	6.5	4.4	5	6.7	0.9
Influenza*	3,719	4,823	6,097	3,721	2,339	3,870	2,450	5,060	2,516	4,059	5,117
HIV, new cases	95	66	72	99	146	169	1,433	3,853	3,709	10,900	na
HIV rates*	0.06	0.04	0.05	0.07	0.1	0.11	0.97	2.6	2.5	15.9	11.4
Omsk HF ^d	29	41	7	19	11	5	2	na	7	na	na

*Rates/100,000 population.

^aNew cases (6).

^bTB-all includes data from civilian hospitals, army clinics, prison hospitals, and medical units of other ministries (8).

^cTB-MOH data are from civilian hospitals controlled by the Ministry of Health.

^dNovosibirsk region only

HF = hemorrhagic fever; na = not available; MoH = Ministry of Health

shortages, poverty, and severe overcrowding in prisons, is associated with increasing TB rates. Another important factor is the spread of mycobacterial strains resistant to antibiotics, especially strains resistant to multiple drugs. Uncontrolled administration of antibiotics (e.g., in prisons) promotes emergence of resistant strains. Russia has a high rate of strains resistant to a single drug (5,10), which may lead to an increase in the number of strains resistant to multiple drugs.

Sexually Transmitted Diseases

One- to twofold annual increases in syphilis incidence were recorded by the early 1990s, with a 50-fold increase in 1997 compared with 1990 (Table); however, the rate of increase has slowed since 1996 and even decreased from 1997 to 1999 (7). These data may underestimate the incidence, as patients treated in private clinics are not fully reported in official statistics. The decrease in gonorrhea incidence, which began in 1995 and continued until 1998, when the rate of gonorrhea became half that of syphilis, may be also attributed to underreporting of these data by private clinics, which received official permission from the Ministry of Public Health to treat gonorrhea. In 1997, the regions with the highest rates of syphilis were Tuva, Khakassia, and Sakhalin, with 1,381, 1,314, and 1,217 cases per 100,000, respectively (7).

Brucellosis

In the 1990s, 300 to 700 cases of brucellosis occurred each year. No apparent long-term trends were observed.

Anthrax

Although many natural foci are located in Russia, the number of anthrax cases per year during the past 10 years has never exceeded 100 (e.g., 37 in 1998, 45 in 1999) (4).

Acute Bacterial Intestinal Infections

In 1998, dysentery rates were 37% higher than in 1997; 114,800 cases were reported, including 66,000 in children. Shigellosis (Table) shows no long-term trends. In 1998, 398,600 cases of acute intestinal infections of unknown etiology were reported, including 231,700 in children. The ratio of intestinal infections with identified and unidentified causes remains unchanged since 1990, indicating

lack of progress in developing and adapting new diagnostic tools.

Other Infectious Diseases

In 1998, an increase was reported in cases of zoonotic diseases such as typhus, which increased by 10%; borreliosis (Lyme disease), which increased by 25%; and tularemia, for which a twofold increase was reported. No long-term trends were noted. A cholera outbreak was officially recorded in Russia in 1998 in Dagestan (8 cases, 17 carriers), and three isolated cases were reported elsewhere. Twenty cases of epidemic typhus and 33 cases of Brill-Zinsser disease were reported.

Resistance to Antibiotics

Antibiotic resistance has increased in Russia since antibiotics became available without prescription. In addition, a high concentration of TB patients in prisons, combined with a massive shortage of drugs in prison clinics, results in frequent self-treatment. This self-treatment leads to inappropriate selection of drugs and results in incomplete treatment, thus encouraging the emergence of drug-resistant strains. A detailed study of this situation by the Russian Academy of Medical Sciences and Academy of Sciences has just begun.

Selected Viral Diseases

Hepatitis

Rates of hepatitis A decreased during the 1990s, but rates of hepatitis B and hepatitis C increased steadily (Table). Reasons may be a sharp increase in intravenous drug use, lack of hygiene, and high-risk sexual behavior. Half the patients with acute hepatitis B and hepatitis C are 11 to 30 years of age (11). Mass vaccination of children against hepatitis B and support for the development of a vaccine for hepatitis C are needed to control these diseases.

Poliomyelitis

Poliomyelitis increased during the war in Chechnya (152 cases there in 1995) probably because of unavailability of vaccine in Chechnya during the conflict. Only six cases of acute paralysis were recorded in 1998, none of which were caused by a wild-strain virus, as shown by laboratory diagnostics (7). National immunization efforts against polio are continuing.

International Update

Measles, Mumps, and Rubella (MMR)

Measles rates have decreased considerably during the last 4 years through additional vaccination of teenagers and children at sites of mass outbreaks during 1992-94 (Table). Mumps, however, increased almost threefold from 1990 to 1998. The vaccine may have degraded during delivery or storage under inadequate conditions. In addition, funds were insufficient for mumps vaccination programs, and financial support was lacking in some regions for a second vaccination at age 6 years. In 1997, a second vaccination was recommended in the national vaccination schedule, with support from federal funds. Rates of rubella remain high, sometimes increasing to epidemic levels. Russia was one of the few European countries that did not include rubella in the schedule of mandatory, state-funded vaccines before 1997. The cost of support for disabled children born to unvaccinated mothers is much higher than the cost of vaccination; therefore, rubella vaccine should be added to the national vaccination schedule, ideally in the form of MMR.

Tick-borne encephalitis

Tick-borne encephalitis, a severe zoonotic disease, is occasionally fatal (Table). The agent is a flavivirus transmitted through tick bites. Cases vary from 5,000 to 10,000 per year. Some regional administrations fund local vaccination programs for children and adults at high risk. Adults can pay for the vaccination in most disease-endemic regions (Krasnoyarsk, Novosibirsk, Tomsk, Irkutsk, Omsk, and Kemerovo).

Omsk hemorrhagic fever

Omsk hemorrhagic fever is a zoonosis caused by a flavivirus; the infection is transmitted by muskrats during trapping. During the past 10 years, this disease has been reported only from Novosibirsk Region (Province) (Table). Of the seven cases reported in 1998, one was fatal and three were severe.

Hemorrhagic Fever with Renal Syndrome

Hemorrhagic fever with renal syndrome, caused by a representative of the Bunyaviridae family, has many foci in Russia. The number of cases ranged from 2,774 in 1990 to more than 20,000 in 1997. A large outbreak in 1997 was attributed to a surge in the population of rodents, the natural carriers of the agent. The disease rate

returned to an average annual level of approximately 5,000 cases by 1998.

Rabies

In Russia, the case rate of rabies in humans remains constant (7 to 16 annual cases over the past 10 years). All cases seem to be associated with ignorance of postexposure prophylaxis as a protective measure. In 1998, animal rabies in Novosibirsk increased sharply in both domestic dogs and wild animals. The population was informed about the epidemic and the availability of vaccination if needed, and no human cases were reported despite an increase in the number of animal bites.

Influenza

The rate of influenza has been stable every year except for peaks in 1992 and 1997 (Table). In Russia, this disease is diagnosed mainly by clinical symptoms, often without laboratory confirmation; the data represent a background of 22 million to 23 million cases of acute respiratory infection with unknown etiology reported each year.

HIV Infection

The number of HIV-infected persons increased from 95 in 1990 to 3,709 in 1998, virtually doubling each year from 1993 to 1998 (Table). The number of HIV-infected patients reached 15,569 by September 1999 (12) and a report in the November 17, 2000, issue of *Izvestia* stated that the number of officially registered HIV-positive persons had increased to 69,120. These official statistics on HIV may reflect only 10% to 20% of the actual number of carriers (12). A recent study of the Irkutsk prison population identified more than 1,400 HIV-infected prisoners (pers. commun., office of public health, Irkutsk Region), although only 30 cases had previously been reported from the entire region.

Conclusions

Three groups of diseases cause most concern in Russia, as well as elsewhere: TB, viral parenteral hepatitis, and HIV infection. Public measures for their control in Russia are insufficient, mainly because of lack of funding for treatment, vaccine prophylaxis, and health education. Immunization of children against hepatitis B is indicated. The development and introduction of additional diagnostic tools for

markers of intestinal and respiratory infection and additional vaccination against mumps and rubella are needed. However, it is unlikely that existing public health funding will allow additional improvements in the near future.

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