

Chapter IV: The Anti-plague System of Georgia

1. History of the Georgian Anti-plague System

The first officially documented mention of a plague outbreak in Georgia was in 1836, when the deadly disease struck the port city of Batumi on the Black Sea coast. Consequently plague outbreaks of varying intensity were recorded in Batumi in 1901, 1910, and 1920. The reason for the repeated occurrences of plague was believed to be the poor sanitary conditions prevalent in the city. The fact that the initial cases of plague were always discovered in proximity to the port facilities led Soviet epidemiologists to conclude that the plague was brought to Georgia by foreign naval vessels from Turkey and other Middle Eastern countries where unsatisfactory epidemiological conditions prevailed. Thus, in 1927, by decision of the People's Commissariat of Public Health (Russian acronym *Narkomzdrav*) of the Georgian Soviet Socialist Republic a specialized AP laboratory was set up at the Batumi port to carry out the quarantine monitoring of the ships coming from countries considered as risks with regard to plague. In 1934, the Batumi port AP laboratory joined the centralized AP system of the USSR as a department of especially dangerous infections.⁷⁹

In 1933, on the initiative of Professor G. Eliava, the Transcaucasian AP Center was created in Tbilisi under the Institute of Bacteriology. In 1937, the Transcaucasian AP Center became an independent organization and was renamed the Tbilisi AP monitoring station. The main function of this newly formed organization was to carry out epidemiological monitoring of the Tbilisi municipality and surrounding districts. In 1939, under the leadership of N. Abashidze, the functions of the Tbilisi AP monitoring station expanded as Georgian AP specialists began to study epidemiological outbreaks of unknown etiology and the epizootic monitoring of areas adjacent to the Turkish border. Due to the discovery of plague epizootics among Libyan jirds (*Meriones libycus erythrorus*) living on the Apsheron Peninsula in Azerbaijan in 1953, the Georgian AP system organized and dispatched the first epidemiological team to look for a natural plague focus in Eastern Georgia on the then administrative border with Azerbaijan. In 1956, the continuous plague epizootics in neighboring Armenia and Azerbaijan prompted the reorganization of the Tbilisi AP monitoring station into the Georgian Republic AP Station. In 1958, by the decision of the Soviet MOH, the Batumi port AP laboratory was upgraded into a field AP station and placed under administrative control of the Georgian Republic AP Station in Tbilisi. In 1979, another field AP station was established in Tsitelitskaro (now Dedoplistskaro) to conduct epidemiological monitoring of eastern Georgia. Hence, on the eve of the Soviet Union's dissolution, the Georgian AP system consisted of the Georgian Republic AP Station in Tbilisi, two field AP stations in Batumi and Tsitelitskaro, and four seasonal AP laboratories in Aspindza, Dmanisi, Jandara, and Ninotsminda.⁸⁰

2. Organizational Structure of Georgian Anti-plague System

After Georgia achieved independence in 1991, the Georgian AP system became subordinate to the Georgian MOH. In 1992, by order of the MOH (now the Ministry of Health, Labor and Social Affairs), the Department of Especially Dangerous Infections of the Republic Sanitary-Epidemiological Station was transferred to the Georgian Republic AP Station. Similarly, the epidemiological divisions of hospital and intestinal infections

of the Scientific-Research Institute of Medical Parasitology and Tropical Medicine were also transferred to the Georgian Republic AP Station, which was renamed the Scientific-Practical Center of Especially Dangerous Infections.⁸¹

As a result of the restructuring, in August 1996, all remaining epidemiological functions, including immunization, and the corresponding staff, were transferred from the Republic SES to the Scientific-Practical Center of Especially Dangerous Infections by order of the Georgian Ministry of Health, Labor and Social Affairs. The Scientific-Practical Center of Especially Dangerous Infections was renamed the National Center for Disease Control (NCDC), reflecting the fact that it consolidated the entire spectrum of epidemiological functions. By Presidential Order No. 55 “On the Establishment of the Legal Entity of Public Law–National Institute of Health and the Legal Entity of Public Law–L. Sakvarelidze National Center for Disease Control and Medical Statistics” dated February 21, 2003, the Center of Medical Statistics, which previously existed within the structure of the Georgian Ministry of Health, Labor and Social Affairs, merged with the NCDC. The NCDC was renamed again acquiring its current title—L. Sakvarelidze National Center for Disease Control and Medical Statistics (NCDCMS). Moreover, the aforementioned presidential order changed the legal status of the NCDCMS from a subject of private law, which it had acquired during the 1995-1996 reform of the healthcare system, to a subject of public law.⁸² This change indicated that the NCDCMS regained its status as a state-funded institution with substantial autonomy.⁸³

As of 2004, the organizational structure of the Georgian AP system, as is illustrated in Figure 4, consisted of the NCDCMS in Tbilisi, a field AP station in Batumi, and two seasonal AP laboratories in Aspindza and Ninotsminda. The Georgian AP had 220 employees, including 200 at NCDCMS, and 20 at the Batumi field AP station. The NCDCMS staff included 74 physicians, 26 other specialists (biologists, zoologists, parasitologists, etc.), 27 laboratory technicians, and 10 guards. Comparatively, in 1993 there were 313 employees in the Georgian AP system. In terms of the distribution of scientific degrees, the AP system had 2 doctors of medical sciences, 1 doctor of biological sciences, and 25 candidates of medical and biological sciences.⁸⁴ The organizational structure of the NCDCMS consisted of the following units:

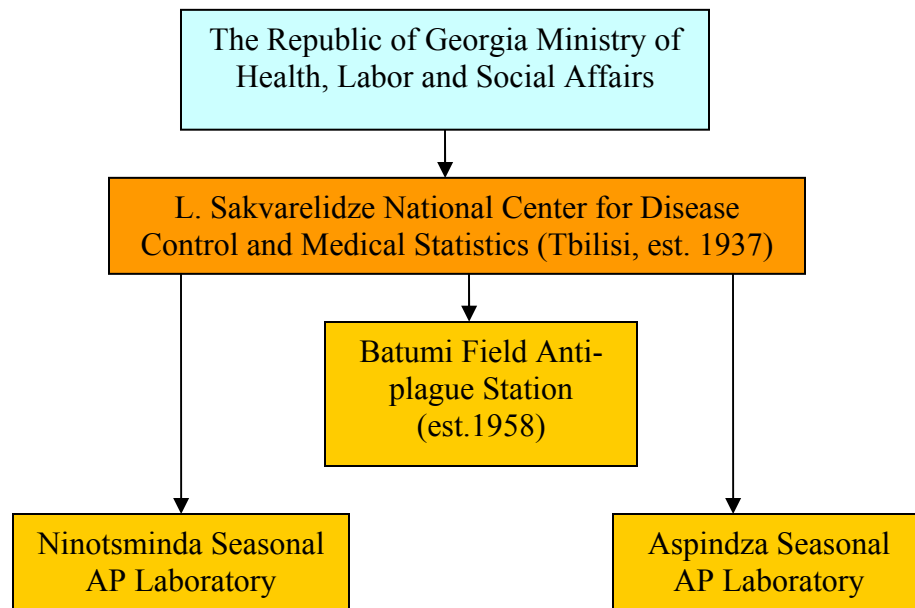
- Office of the Director of the NCDCMS
- Departments:
 - International Cooperation and Threat Reduction
 - Immunization and Logistics
 - Field Epidemiology
 - Surveillance of Vaccine-Preventable Diseases
 - Surveillance and Analysis
 - Health Promotion and Epidemiology of Chronic Diseases
 - Parasitic Diseases
 - Information Resources and Epidemiological Bulletin
 - Hospital Infections
 - Medical Entomology and Zoology
 - Organizational-Methodological
 - Information Technologies

Laboratories:

- Plague and Especially Dangerous Infectious Diseases
- Zoonotic and Anaerobic Diseases
- Cholera and Diarrheal Diseases
- Poliomyelitis and Enteroviral Diseases
- Viral and Rickettsial Diseases
- Molecular Epidemiology
- Cell Culture
- Respiratory Diseases

- Museum of Live Microorganisms (Georgian National Pathogen Collection)
- Georgian National Vaccine Fund
- Nutrient Media Production and Sterilization Facility
- Training Center
- Vivarium.⁸⁵

Figure 4. Organizational Structure of the Georgian Anti-plague System



In 2003, the NCDCMS offered very low pay to its employees, which made it difficult for it to retain qualified cadres and recruit new specialists. For example, physicians earned 90 Georgian Lari (GEL), the equivalent of \$45 a month, heads of laboratories and departments earned 140 GEL (\$70) a month, and the auxiliary personnel only 60 GEL (\$30) a month. In addition, there were recurrent problems with delayed payment of salaries due to state budget shortages. At the time of the CNS staff visit in May 2003, for instance, the NCDCMS staff salary was six months in arrears. However, a substantial number of NCDCMS personnel survived by being able to access funds from international scientific grants (see below).⁸⁶

3. Public Health Activities of the Georgian Anti-plague System

The nationwide public healthcare reform and ensuing restructuring broadened the public health functions carried out by the Georgian AP system. While in the past the primary area of responsibility was circumscribed to the prophylaxis and control over especially dangerous infectious diseases, including plague, anthrax, tularemia, and cholera, now the NCDCMS is responsible for implementing epidemiological measures against the wide array of diseases deemed significant from the public healthcare point of view, including diphtheria, malaria, and poliomyelitis, as well as intestinal, respiratory, and hospital infections. The NCDCMS serves as the national clearinghouse for epidemiological data because the existing public health regulations require all public healthcare organizations and institutions in Georgia to submit reports of occurrences of infectious diseases to the NCDCMS. These reports must be submitted on a regular and timely basis and include monthly accounts of sanitary conditions. In turn, the NCDCMS collates and analyzes the data and produces the epidemiological bulletins, which show the dynamics of different diseases and include epidemiologic forecasts of future developments. Another new function of the NCDCMS is the management of the nationwide immunization programs. The NCDCMS also carries out large-scale epidemiological studies of infectious and non-infectious diseases in the population. The NCDCMS is actively engaged in educational outreach efforts aimed at improving the overall level of public health by raising public awareness with regard to harmful effects of drug use, unprotected sex, smoking, and alcoholism.⁸⁷

As of May 2003, the Department of Public Health of the Georgian Ministry of Health, Labor and Social Affairs, financed and coordinated fourteen state prophylactic programs, including four that were managed and implemented by the NCDCMS. The state prophylactic programs in the areas of epidemiological monitoring, control, and prophylaxis of infectious diseases and promotion of healthy lifestyle are the priorities of the NCDCMS. Hence, the NCDCMS is responsible for the implementation of the following four state prophylactic programs:

Program of Epidemiological Monitoring and Control of Especially Dangerous Infections and Coordination of Prophylaxis of Other Contagious Diseases

This program is aimed at preventing the spread of infectious diseases. The objectives of the program include: (1) strengthening the system of epidemiological monitoring and early warning; (2) establishing the etiology of outbreaks and their control; (3) creating national reference laboratories with external quality control; (4) implementing standard definitions for cases of infectious diseases; and (5) rendering methodological and practical assistance to public healthcare institutions and organizations. The program is responsible for the following measures: (1) epizootiological and epidemiological monitoring of natural foci of plague and tularemia and discovering the natural circulation of other especially dangerous infections; (2) constant monitoring of the epidemiological situation and illness rates, epidemiological analysis and forecasting, and publication of a monthly epidemiological bulletin; (3) supporting the operations of the reference laboratories; (4) maintaining the national collection of microorganisms; (5) monitoring resistance to antibiotics; and (6) the monitoring of hospital infections.⁸⁸

Since Soviet times, there has been a decline in epizootic surveillance and epidemiological monitoring of natural plague foci. There are two natural plague foci in Georgia—the Transcaucasian Plain-Foothill and South Caucasus Mountainous. Their combined area occupies about 10 percent of Georgia's territory. The main natural plague host in the Transcaucasian Plain-Foothill focus is the Libyan jird, while the main plague vectors are its fleas (most commonly *Xenopsylla conformis*, *Ceratophyllus laeviceps*, *Rhadinopsylla ukrainica*, and *Stenoponia tripectinata*). In the South Caucasus Mountainous plague focus the main natural plague host is the common vole (*Microtus arvalis*), and its ectoparasites (*Ceratophyllus caspius* and *Ctenophthalmus teres*) are the main vectors. The Transcaucasian Plain-Foothill focus incorporates parts of the Dedoplistskaro, Signakhi, Gardabani, and Marneuli districts, while the South Caucasus Mountainous focus encompasses the Javakheti Plateau, Ninotsminda, Dmanisi, Akhalkalaki, and parts of Tsalka districts. Both foci are located in the southern part of Georgia, the latter larger (5,000 sq. km) than the former (2,100 sq. km).⁸⁹

At its apex in Soviet times, the Georgian AP system dispatched fully equipped epidemiological teams to monitor the natural foci of plague and tularemia from the seasonal AP laboratories for up to two months during the epizootically active seasons. At that time, epidemiological teams consisted of laboratory and field groups. The field group was comprised of a zoologist, a parasitologist, an exterminator, and seasonal workers. Its primary objectives included studying the epizootic factors (distribution of the rodent population on the territory of the focus, its composition, etc.), collecting field samples of plague hosts and vectors, and delivering them to the seasonal AP laboratory. The laboratory group, comprised of a physician-bacteriologist and laboratory assistants, carried out complex laboratory analysis of the collected field materials.⁹⁰

After the Soviet Union's dissolution, the considerable decrease in state funding forced the NCDCMS to cut back on epidemiological monitoring. Severe financial crises led to the closure of the Dedoplistskaro field AP station in accordance with a MOH order on April 1, 1999. The NCDCMS transferred the Jandara seasonal AP laboratory to the Georgian border guards for temporary use, while the Dmanisi seasonal AP laboratory ceased to function.⁹¹ As a result, as of May 2003, apart from the NCDCMS, only the Batumi field AP station and two seasonal AP laboratories in Ninotsminda and Aspindza continued to operate. Here it should be noted that staff of the NCDCMS admitted that squatters occupy both seasonal AP laboratories, which allegedly does not interfere with seasonal field studies. The local public prosecutor lives at the Ninotsminda seasonal AP laboratory, while a police officer and his family occupies the building of the Aspindza seasonal AP laboratory.⁹²

Compared to the Soviet period, the NCDCMS had to scale down the scope of epidemiological monitoring. The NCDCMS dispatches an epidemiological team to study plague and tularemia foci in Southern Georgia (Ninotsminda district primarily) and a zoological-entomological team to study rodent reservoirs in Eastern Georgia (Dedoplistskaro and Gardabani districts), whereas the Batumi field AP station studies plague and tularemia foci in Western Georgia and in the Aspindza, Akhaltsikhe, and Adigeni districts. In 2003, for instance, the NCDCMS and Batumi field AP station sent two epidemiological teams to the South Caucasus Mountainous plague focus—to Ninotsminda and Aspindza districts respectively—to monitor the populations of hosts and vectors for up to one month. The NCDCMS also dispatched specialists to study

natural tularemia foci for 5-10 days. Nonetheless, the NCDCMS administration admits that the limited scope of the epidemiological monitoring of natural foci of especially dangerous infections may result in an undetected epizootic, which may, in turn, lead to an outbreak especially in densely populated areas. Due to the shortage of relevant vaccines, the NCDCMS can no longer conduct limited vaccinations of groups of people who are at greater risk of contracting especially dangerous infectious diseases due to their professional occupation or place of residence. Consequently, the risk of an outbreak becomes even more likely.⁹³

During 2003-2006, the construction of the Baku-Tbilisi-Ceyhan (BTC) main oil export pipeline allowed the Georgian and Azerbaijani AP systems to carry out short-term commercial epizootiological surveys of areas along the pipeline route. The NCDCMS and S. Imamaliyev Republic AP Station (Baku, Azerbaijan) received contract work from the main BTC stockholder, BP.

Immunization Program

In the early 1990s, vaccination rates plummeted in Georgia due to the fact the Russia stopped supplying vaccines and there were no alternative vaccine suppliers. Only with substantial international humanitarian assistance from the U.S. Agency for International Development (USAID) and United Nations International Children's Emergency Fund (UNICEF) was the prior level of routine vaccinations restored nationwide. As the organization responsible for managing the national immunization programs, the NCDCMS houses the Georgian National Vaccine Fund, built with financial assistance from UNICEF. All vaccines necessary for the implementation of the national immunization calendar are stored at the Vaccine Fund. The NCDCMS receives vaccines free of charge as part of the humanitarian assistance program of UNICEF and the Global Alliance for Vaccines and Immunization (GAVI). In order to successfully implement the national immunization campaigns, the NCDCMS maintains contractual relationships with about 700 immunization providers across Georgia. The NCDCMS pays each immunization provider to vaccinate residents in its respective locale. As of May 2003, due to delays in the transfer of state funds from the Department of Public Health of the Georgian Ministry of Health, Labor and Social Affairs, the NCDCMS owed 900,000 GEL (approximately \$450,000) to local immunization providers for already performed vaccinations.⁹⁴ In order to broaden the immunization of children, the NCDCMS organized special mobile brigades in seven regions of Georgia. These mobile brigades perform prophylactic vaccinations in the remote mountainous areas, where the medical service infrastructure is virtually absent.⁹⁵

Program on Control and Prophylaxis of Malaria

The socio-economic developments of recent years, including the influx of internally displaced persons from the conflict in Abkhazia, the rise in poverty and unemployment rates, and accompanying increase in population migration negatively affected the epidemiological situation with regard to malaria. The steady increase in malaria cases is bolstered by transmission of this disease from abroad. For example, during 1970-1995 there were 147 recorded cases of malaria in Georgia; these originated from 24 foreign countries (13 from Africa and 9 from Asia). It must be noted that 68.6 percent of the population of Georgia resides on the territory, where the likelihood of

malaria outbreak is high. The main vectors are mosquitoes belonging to the *Anopheles* species. The epidemiologically active season lasts 150 days. The anti-epidemiological measures carried out by the NCDCMS under the aegis of the state anti-malarial campaign include timely detection of cases and their intensive treatment, seasonal and inter-seasonal chemical prophylaxis of mosquito reservoirs. The NCDCMS Department of Parasitic Diseases is responsible for carrying out the state anti-malarial campaign. The employees of the Department of Parasitic Diseases actively collaborate with the WHO Regional Office for Europe within the context of the Roll Back Malaria program to educate the Georgian parasitologists, entomologists, and epidemiologists about best practices with regard to eliminating malaria in Georgia.⁹⁶

Healthy Lifestyle Program

In 1998, the working group entitled “Public Health Support and Prophylaxis of Non-Infectious Diseases” was organized by the NCDCMS to pursue the following objectives: (1) creation of a basis for the system of epidemiological monitoring of non-infectious diseases; (2) implementation of measures to control diseases that have a negative impact on social health; (3) anti-tobacco campaigns; (4) prophylaxis of heart disease, AIDS, alcoholism, and drug use; (5) prevention of traumatic injuries; and (6) family planning. For the most part, the objectives entail thorough studies of the status of population’s health in general. With this purpose the NCDCMS began intensive international cooperation with the U.S. Centers for Disease Control and Prevention (CDC), WHO, and UNICEF. The cooperation with CDC has been particularly useful as the NCDCMS employees learned modern methods of epidemiological studies. With financial support from the United Nations Population Fund (UNFPA), UNICEF, USAID, the United Nations High Commissioner for Refugees (UNHCR) and CDC, the NCDCMS carried out reproductive health surveys of Georgian women in 2000 and 2005. During 2000-2001 with funds from the USAID and Save the Children (Georgia Field Office), the NCDCMS conducted the study of the nutritional status of children under five in six of Georgia’s regions. Finally, NCDCMS developed close relationships with the American International Health Alliance (AIHA) in the area of programs aimed at promoting healthy lifestyles.⁹⁷

4. International Activities That Involve the Georgian Anti-plague System

In September 1995, USAID together with the Georgian Ministry of Health, Labor and Social Affairs unveiled the “Project for Development of Public Healthcare Sector.” The CDC and the Agency for Healthcare Research and Quality (both of which are parts of the U.S. Department of Health and Human Services) implemented the project. One of the main elements of the project was the radical reform of the state SES and the creation of the two departments within the Ministry of Health, Labor and Social Affairs—the Department of Public Health and the Department of Sanitary Monitoring (now Department of Sanitary Inspection). The latter controls compliance with state sanitary-hygienic norms and regulations. The main functions of the former are as follows: (1) epidemiological monitoring of infectious and non-infectious diseases and control (organization and implementation of relevant measures) of socially important diseases, as well as monitoring, analysis and forecast of the epidemiological situation; (2) implementation of prophylactic measures; and (3) promotion of a healthy lifestyle. In

addition, the legal status of all public health organizations and institutions in Georgia, including that of the Scientific-Practical Center of Especially Dangerous Infections, changed when the NCDCMS became subject of private law, which implied that they were financially independent entities, cutoff from state budget financing. In other words, the Georgian government provides targeted funds to public health organizations to implement only specific state healthcare programs and therefore the relationships between the public health organizations and the Ministry of Health, Labor and Social Affairs are based on contractual agreements.⁹⁸

The watershed event that enabled the NCDCMS to begin building contacts with the international scientific community was the International Training and Research in Emerging Infectious Diseases (ITREID) program administered jointly by the John E. Fogarty International Center for Advanced Study in Health Sciences and the National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health (NIH). Through the ITREID program, the NCDCMS was paired with a U.S. partner organization, the University of Maryland at Baltimore, and this led to collaborative research projects that spanned 1997-2002. This fruitful collaboration allowed the NCDCMS employees to acquire new skills and to adopt modern methods of molecular epidemiology in daily work.

Another substantial source of assistance in terms of training and limited equipment upgrades has been the AIHA. In 2001 a training center was built with AIHA funds at the NCDCMS that can accommodate 40 people in its main classroom. The training center is well suited for seminars and briefings as it is equipped with computers, projectors, and even equipment for simultaneous interpretation. The establishment of working relationships with the WHO led to contacts with the WHO Collaborative Centre for Virus Reference and Research in Lyon, France. As a result of the participation of the employees from the NCDCMS Laboratory of Poliomyelitis and Enteroviral Diseases in the WHO laboratory network on poliomyelitis and diphtheria, NCDCMS received five Class II biosafety cabinets. In fact, the combination of foreign assistance from different sources led to the creation of the Laboratory of Molecular Epidemiology, which is staffed by specialists who underwent training at U.S. universities at various times. Finally, the NCDCMS won five research grants from the Biotechnology Engagement Program (BTEP) of the U.S. Department of Health and Human Services, which put it in touch with the ISTC, Lawrence Livermore National Laboratory, Walter Reed Army Institute of Research and other leading scientific centers of the world. All of the above collaborations contributed to the limited equipment upgrades, improved quality control in the daily laboratory work, and augmented the NCDCMS' capacity to detect and react to an infectious outbreak in a timely and efficient manner.⁹⁹

5. Analysis of the Georgia's Anti-plague System's Weaknesses and Proliferation Potential

Since the time of the CNS visit in May 2003, significant physical security upgrades of the NCDCMS building and the complete refurbishment of the Batumi field AP station have been introduced under the auspices of Threat Agent Detection and Response (TADR) project as part of the CTR Program, which is administered by the U.S. Defense Threat Reduction Agency (DTRA). These physical security upgrades have largely addressed the majority of proliferation concerns, which the CNS staff noted

during the visit to the NCDCMS and Batumi field AP station in May 2003. In particular, iron doors equipped with digital punch-in locks and magnetic card readers were installed at all laboratories throughout the NCDCMS, including the Museum of Live Microorganisms.¹⁰⁰ With support from the TADR project, the epidemiological laboratories at the NCDCMS were outfitted with state-of-the-art laboratory equipment, which fully meets international biosecurity, biosafety and environmental protection standards.

In the context of the TADR project, the NCDCMS houses an Epidemiological Monitoring Station (EMS) of the second level in the TADR project hierarchy. As envisioned by the TADR project, the EMS at the NCDCMS will rapidly diagnose any given dangerous infectious disease and provide data and pathogen strains to the Central Reference Laboratory, which is currently under construction in Alekseyevka on the outskirts of Tbilisi.¹⁰¹ The TADR project in Georgia is in its final stages of completion as three out of four of its elements are already operational. These are the second level EMS stations in Tbilisi (on the NCDCMS premises), Kutaisi, and Batumi (on the premises of the Batumi field AP station). The construction of the aforementioned Central Reference Laboratory in the Alekseyevka suburb of Tbilisi will be complete in 2009.¹⁰² In addition, according to different estimates, the U.S. government intends to spend somewhere between \$65 to \$150 million in the next five to six years on building, equipping and maintaining these facilities in Georgia.¹⁰³

However, until the Central Reference Laboratory becomes operational, the Museum of Live Microorganisms remains on the top floor of the seven-story NCDCMS building, which poses certain public health risks considering that Georgia is in a seismically active region, where devastating earthquakes occur with some regularity. Thus, the collapse of the NCDCMS building in case of an earthquake of considerable proportions may result in the accidental release of dangerous infectious diseases with grave consequences for the adjacent residential neighborhood.

With the exception of several incidents of petty theft of scrap metal from the territory of the Batumi field AP station prior to 2003, and the unsuccessful theft of the laboratory equipment from the EMS station compound in Kutaisi in December 2005, thus far there have been no proliferation-significant episodes involving the Georgian AP system.¹⁰⁴ With regard to the Kutaisi incident, it should be noted that at the time of the theft the EMS station was under construction and the aforementioned laboratory equipment was still in containers stored at the site for subsequent installation. According to the NCDCMS administration representative, the local law enforcement operatives quickly identified the culprits and the stolen laboratory equipment was returned intact to the EMS station compound.¹⁰⁵

As was already mentioned in the first report on the AP system, the Georgian Republic AP Station, the Soviet predecessor of the NCDCMS, was included in the Soviet Union's 1987 CBM declaration primarily due to the fact that it had been involved in the special scientific efforts focused on developing means against viral pathogens, which were originally intended to prevent possible acts of bioterrorism during the 1980 Moscow Olympics.¹⁰⁶ This implies that a certain proportion of the Georgian AP workforce may have retained BW-related expertise from the Soviet times when it was trained at the AP institutes in Russia or was engaged in the Problem 5 research projects. The CNS staff was unable to determine the precise number of people who may possess such knowledge in

the Georgian AP system, but it is safe to assume that their number is dramatically shrinking as majority are nearing retirement age. In addition, it is difficult, if not impossible, to assess the proliferation potential of each individual without conducting extensive person-to-person interviews and/or distributing relevant questionnaires to elicit the required feedback. Moreover, after retirement the personal ties with the former employer are often severed, which further complicates the tracking of individual scientists. If the problem of residual Soviet-era BW expertise among some of the former Georgian AP employees is considered in the context of porous borders, uncontrolled territories (Abkhazia and South Ossetia), organized crime and corruption, then the possibility of illicit transfer of BW knowledge to rogue states or international terrorist organizations certainly cannot be ruled out. Nonetheless, it is important to bear in mind that, as indicated by the recent admission of Vice Admiral Robert Murrett, director of the National Geospatial Intelligence Agency, monitoring people with BW expertise represents a formidable challenge requiring vigorous information sharing and coordination of activities among multiple intelligence agencies.¹⁰⁷ If this is true for such powerful country as the U.S., then what degree of attention to this complex subject can be realistically expected from the Georgian government that is preoccupied with meeting basic economic development priorities and restoring territorial integrity of the country?