

## Chapter II: The Anti-plague System of Azerbaijan

### 1. History of Azerbaijan's Anti-plague System

In 1932, a plague outbreak occurred in central Azerbaijan that lasted approximately 43 days and claimed the lives of 35 residents in Gadrut city and the surrounding villages of Bulutan (Buruktan), Melik Zhanly, Shagakh, and Agulu, all located in a region that is currently on the territory of the secessionist Armenian-populated Nagorny-Karabakh enclave. The outbreak prompted Soviet authorities to establish a permanent AP system in the Azerbaijan SSR.<sup>35</sup> After the Gadrut plague outbreak was mitigated, the Council of People's Commissars (*Sovet Narodnykh Komissarov*) of Azerbaijan issued a resolution creating a specialized AP system in the republic, headquartered at the Republic Institute of Microbiology in Baku, the capital of Azerbaijan. During 1931-1935, seven AP observation outposts were established in districts bordering Iran, including in the cities of Astara, Lenkoran (Lenkaran), Bilasuvar, Karadonly, Gadrut, Khudafirin, and Julfa (Culfa). The establishment of these outposts was motivated by the perception that plague had entered Azerbaijan from Iran. In 1934, the Council of People's Commissars decided to transform the AP department of the Republic Institute of Microbiology into an independent institution named the Central AP Station of Azerbaijan and to relocate it to the Zyk village on the outskirts of Baku.<sup>36</sup> In 1963, the Central AP Station was relocated to a newly built compound in Baku. Throughout the Soviet period, the Azerbaijani AP system reported to the Main Directorate of Quarantine Diseases of the Soviet MOH, while its scientific curator was the Stavropol Scientific-Research AP Institute of the Caucasus and Transcaucasus (now the Stavropol Scientific-Research AP Institute).<sup>37</sup> In 1956, due to the increase in its monitoring and research activities, the Central AP Station of Azerbaijan was granted the status of institute. Even though the official title of the organization did not change throughout the Soviet period, twenty AP specialists earned their degrees in medical science at the Central AP Station of Azerbaijan. During 1956-1957, Azerbaijan's AP system expanded as new field AP stations were opened in Khachmaz (Xacmaz) (northeast), Mingechaur (Mingacevir) (central northwest), and Shamkir (Samkir) (west) in order to extend the epidemiological monitoring of territories endemic for plague and other dangerous infectious diseases. Subsequently, one more field AP station was built in Imishly (Imisli) (south central). Later, the AP observation outposts in Lenkoran (a major port city on the Caspian Sea coastline in the southern part of the country), Julfa (located in the Nakhichevan Autonomous Republic, an Azeri-populated landlocked exclave separated from Azerbaijan by the swath of Armenian territory), and Gadrut were enlarged to field AP stations.<sup>38</sup>

The Azerbaijani AP system also included a Railway AP Station (RAPS), which was established in 1951 in response to a plague outbreak that had occurred in 1949 on land controlled by the Azerbaijani railway system. Throughout the Soviet era the RAPS operated independently from the rest of the Azerbaijani AP system and reported to the Soviet Ministry of Communications, while its scientific curator was the Irkutsk Scientific-Research AP Institute. The main function of RAPS was to monitor land areas within 20 km of railroad tracks. In Azerbaijan, the length of railroad tracks was over 2,000 km (including 1,700 km that pass through areas endemic for plague). In its heyday, the RAPS had fifty-six employees, including eleven physicians. The RAPS would send

two epidemiological teams to monitor epizootics in the two natural plague foci along the railway tracks for the duration of six to seven months.<sup>39</sup>

## **2. Organizational Structure of Azerbaijan's Anti-plague System**

After the Soviet Union's dissolution, the Azerbaijani AP system was reorganized and as of 2004, it was comprised of nine facilities. These include the S. Imamaliyev Republic AP Station (formerly Central AP Station of Azerbaijan); six field AP stations in Imishly, Julfa, Khachmaz, Lenkoran, Mingeçaur, and Shamkir; and two seasonal AP laboratories in Tyrkyany (Apsheiron Peninsula) and Jeiran (Agstafa district, close to the border with Georgia). Figure 3 presents the current organizational structure of the Azerbaijani AP system.

Due to the hostilities between Azerbaijan and Armenia, which broke out over the predominantly Armenian enclave of Nagorny-Karabakh in late 1991, the Azerbaijani government lost control over the enclave, which included the Gadrut field AP station, to the separatist forces of the self-proclaimed Nagorny-Karabakh Republic (NKR). Currently, neither the Azerbaijani nor the Armenian governments have de facto jurisdiction over the Gadrut field AP station.<sup>40</sup>

In 1993, the RAPS came under the authority of the Ministry of Communications of Azerbaijan. As of March 2004, RAPS employed thirty-seven people, including six physicians. However, RAPS can be considered defunct as an AP organization since it survived only by fulfilling commercial laboratory analyses orders for AIDS and cholera.<sup>41</sup>

Over the years, the Republic AP Station was accorded an increasingly important role in Azerbaijan's health care system as it absorbed structural elements of other organizations along with their personnel. In 1992, the Republic AP Station assumed epidemiological control responsibilities of the Republic SES with regard to all quarantine and especially dangerous infectious diseases other than plague, including tularemia, anthrax, brucellosis, and rabies. In addition, the Azerbaijani AP system was charged with administering epidemiological measures to prevent importation of hemorrhagic and yellow fevers. In 1998, the Republic AP Station incorporated the laboratory components of the SES system specializing in general bacteriology, immunology, and study of viruses. As of 2004, the organizational structure of the Republic AP Station consisted of three main units: the Laboratory Department, the Epidemiological Department, and the Zooparasitological Department.

Laboratory Department:

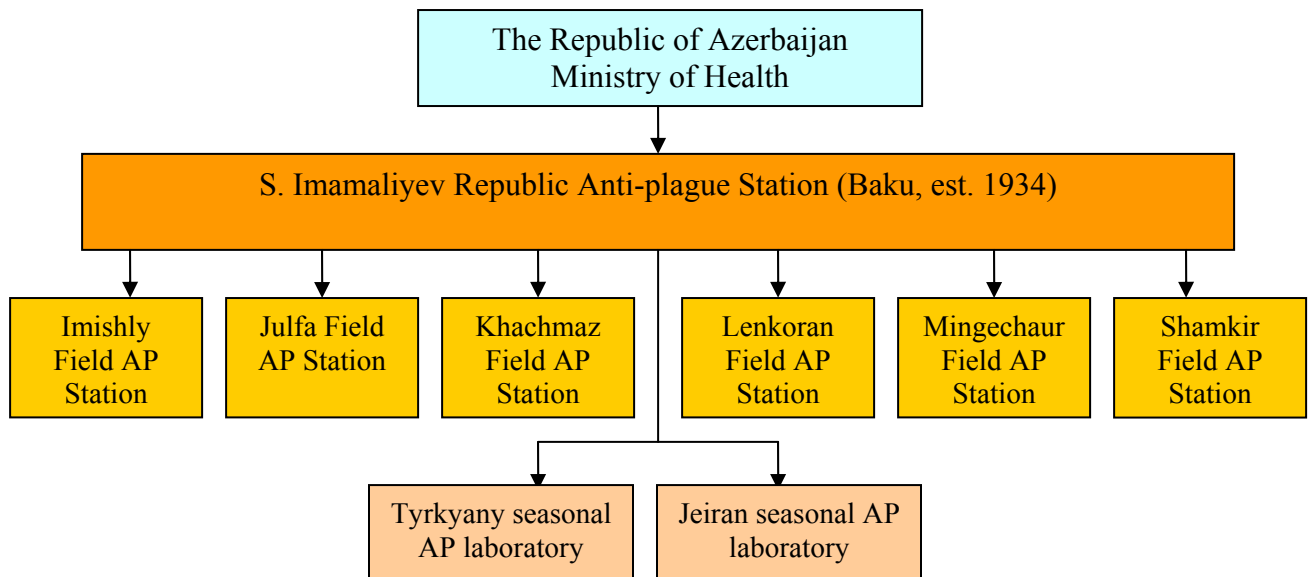
- Laboratory of Plague and Tularemia Diagnostics
- Cholera Laboratory
- Laboratory of Zoonotic Infectious Diseases (including anthrax and brucellosis)
- Laboratory of General Bacteriology
- Laboratory of Microbiological Anthropology
- Laboratory of Immunology
- Laboratory of Viruses
- Experimental Laboratory

Zooparasitological Department:

- Division of the Fight Against Hosts and Vectors of Plague and Tularemia
- Vivarium

As of March 2004, the Azerbaijani AP system had 357 employees, including 123 physicians, 116 laboratory technicians and disinfectors, and 118 auxiliary personnel. With regard to personnel turnover, there have been no noticeable decreases since 1992. It is worth noting, however, that due to practices that are common in former Soviet states, assessing the total number of employees is not an easy task. Indeed, facility managers customarily inflate the number of staff members in order to provide existing staff with sufficient funding. More precisely, the same employee might be occupying several positions simultaneously to receive additional monthly income. The average monthly salary of an AP specialist was the equivalent of \$50-60 in March 2004, while the starting salary for a physician with no experience was about \$36, laboratory technicians earned \$20, and junior medical personnel earned \$15.<sup>42</sup> The low salary levels explain why the Azerbaijani AP system has been experiencing difficulties in attracting young physicians. In 2004, for instance, the Republic AP Station requested that the MOH of Azerbaijan provide it with fourteen physicians—two for the Republic AP Station and the rest for the field AP stations. It is not clear if this request was ever satisfied. The administration of the Republic AP Station admits that the difficult working conditions at the field AP stations make it impossible to attract qualified physicians to work there. As a result, most of the field AP stations are severely understaffed with regard to physicians.

**Figure 3. Organizational Structure of Azerbaijan’s Anti-plague System**



### 3. Public Health Activities of Azerbaijan's Anti-plague System

#### *Epidemiological Monitoring of Natural Foci of Plague and Other Diseases*

Azerbaijani AP specialists estimate that plague is endemic to 30,000 sq. km (or approximately 35 percent) of Azerbaijan's 86,500 sq. km territory. The Azerbaijani AP system discovered the first natural plague focus in Azerbaijan in 1953. There are now three known natural plague foci in Azerbaijan—the Transcaucasian Foothill-Plain, the Transcaucasian Mountainous, and Nakhichevan foci. The largest and the most epidemiologically active is the Foothill-Plain focus, extending from the Apsheron Peninsula to the border with Georgia. The Transcaucasian Mountainous focus covers the mountainous central parts of Azerbaijan, which are currently occupied by NKR separatists. The Nakhichevan focus is located on the territory of the Azeri-populated Nakhichevan Autonomous Republic along the Aras River, which marks the border with Iran. The main natural host for *Y. pestis* in the plains of Azerbaijan is the red-tailed gerbil.<sup>43</sup> Scientists have found that the *Y. pestis* strains isolated in the Transcaucasian Foothill-Plain focus are more virulent than those that are isolated in the Transcaucasian Mountainous focus.

The last plague epizootic was recorded in the Transcaucasian Foothill-Plain focus in 1985-1987. Since then, the epizootic situation has remained by and large stable. However, since 2001, there has been a noticeable increase in the rodent population on the territory of the focus (in certain areas up to 100-150 rodents per hectare), which might lead to a quick spread of plague infection, if an epizootic outbreak does occur.<sup>44</sup> In Soviet times, the Central AP Station used to dispatch four epidemiological teams annually to study natural plague foci. Two were sent to the Foothill-Plain focus in spring and fall, one to the Transcaucasian Mountainous focus, and one either to the natural plague foci adjacent to the field AP station in Lenkoran or Khachmaz.

After the breakup of the Soviet Union, the Azerbaijani AP system significantly reduced epidemiological monitoring of the natural plague foci due to the lack of government funding. According to the management of the Republic AP Station, as of March 2004, the Azerbaijani AP system managed to carry out epizootic surveillance of only between 20 and 30 percent of the territory endemic for plague.<sup>45</sup> The last time the Republic AP Station dispatched a fully equipped epidemiological team to study natural plague foci was in 1997. As of 2004, the Republic AP Station dispatched only zoological teams.<sup>46</sup> These teams collect rodents in the field and bring them back for examination by AP specialists, either at the Republic AP Station in Baku or the field AP stations. In the meantime, the seasonal AP laboratories have fallen into disrepair and can no longer be used.

The Central AP Station of Azerbaijan became responsible for the prophylactic measures against cholera after an epidemic struck the Autonomous Republic of Karakalpakstan in Uzbekistan in 1965. Thus, since 1970 this task has become integral to the overall mission of the Azerbaijani AP service. In May 2004, the Azerbaijani AP system was planning to conduct a comprehensive bacteriological study of sewage waters across the country to detect the presence of *V. cholerae* bacteria. For this purpose, the collection of water samples from 600 control points was planned during May-November.<sup>47</sup> Whenever the regional and district SES stations recover *V. cholerae*, they forward them to the Republic AP Station for confirmation and strain identification.

### *Commercial Contracts*

In 2003, limited epizootiological monitoring was made possible by a contract signed between British Petroleum (BP) and the Azerbaijani AP system. BP is a major stakeholder in the Baku-Tbilisi-Ceyhan (BTC) pipeline, which crosses Azerbaijan from east to west. BP sponsored an epizootic study of the natural plague foci located along the BTC oil export pipeline. The length of the Azerbaijani sector of the BTC pipeline is 442 km and its route lies across the Transcaucasian Foothill-Plain natural plague focus. In addition, there are also areas that are endemic for anthrax located along the route of the BTC pipeline. Under the BP-sponsored epizootiological study of natural plague foci, the Republic AP Station and its subordinated field AP stations carried out epizootic monitoring of 12,000 sq. km of territory for fifty days. Under the terms of the agreement with BP, the Azerbaijani AP system received a new UAZ all-terrain vehicle and enough funding to pay each of the six-member epidemiological team \$10 per diem, which was in addition to their regular salaries. In the course of the field work, the Azerbaijani AP specialists examined more than 1,495 rodents and 8,376 fleas, but did not recover any *Y. pestis* microbes.<sup>48</sup> It is noteworthy that at BP's request, the 2003 epizootiological monitoring was documented in a film showing every stage of the epizootic study—from collection of natural plague hosts in the field to their laboratory examination at the AP facilities. In 2005, the Republic AP Station signed an agreement with BP, providing for regular epizootiological monitoring of natural plague foci located along the BTC pipeline.<sup>49</sup>

The Republic AP Station was able to slightly improve its financial standing through other commercial activities. For instance, the Laboratory of Zoonotic Infectious Diseases and Laboratory of General Bacteriology earns steady revenue by fulfilling commercial orders to perform standard sanitary-epidemiological analyses on food samples to detect bacteria commonly found in food products, such as *Brucella* species, *Salmonella* species, and *Escherichia coli*. For carrying out various orders for the Republic SES, the Republic AP Station receives diagnostic reagents, which are essential for any laboratory activities and a benefit to all structural components of the Azerbaijani AP system.

### *Vaccination and Outreach*

The Azerbaijani AP system carries out limited vaccination of certain groups of people who are at an increased risk of contracting dangerous infectious diseases due to their professional occupations or place of residence. The Republic AP Station is also actively engaged in educational outreach activities. It offers training on prophylaxis of especially dangerous infectious diseases to border guards, customs officials, and representatives of different airlines and commercial maritime transportation agencies.<sup>50</sup> The Medical Institute of Azerbaijan periodically offers courses on especially dangerous infectious diseases, which are taught at the Republic AP Station. Such courses have been offered on three occasions since 1991.

## **4. International Activities That Involve the Azerbaijani Anti-plague System**

The Republic AP Station is sporadically engaged in cooperation with international health organizations. As of March 2004, for instance, the Laboratory of Immunology was working under a United Nation's program aimed at assessing population's immunity

against various commonly spread infectious diseases. It bears noting that the Laboratory of Immunology has acquired the status of national reference laboratory. Some limited equipment upgrades at the Republic AP Station were the result of assistance programs from the World Health Organization (WHO). In 2003 the World Bank sponsored a seminar on especially dangerous infectious diseases, organized by the Republic AP Station.<sup>51</sup>

In June 2005, the Azerbaijan Cabinet of Ministers and the U.S. Department of Defense signed the framework biological threat reduction agreement under the CTR Program, which will support projects to affect significant improvements of physical security at Azerbaijan's central pathogen collection and the enhancement of biosecurity and biosafety with regard to the pathogens causing dangerous infectious diseases in general.<sup>52</sup> In particular, the U.S. will provide funds to implement physical security upgrades of Azerbaijan's pathogen collection and to prevent pathogen theft that could lead to bioterrorism. In exchange for the assistance, Azerbaijan agreed to provide cultures of pathogens that cause especially dangerous infectious diseases to the U.S.<sup>53</sup> Under the provisions of the agreement, the U.S. and Azerbaijani sides also plan to develop modern diagnostic and detection equipment for the early detection of outbreaks of dangerous diseases. In addition, the Azerbaijani scientists will receive training at U.S. laboratories.<sup>54</sup>

An agreement for the transfer of pathogens from Azerbaijan to the U.S. was concluded in the course of an official visit by U.S. Senators Richard Lugar and Barack Obama on August 31, 2005.<sup>55</sup> As a result, on September 2, 2005, 124 samples of 62 strains of *Y. pestis*, *B. anthracis*, *V. cholerae*, and other dangerous infectious disease agents were transported by U.S. military aircraft from Baku to the U.S. Armed Forces Institute of Pathology in Washington, D.C. The strains had been collected over many years from a variety of environmental, human, and animal sources in Azerbaijan. In accordance with the U.S.-Azerbaijani biological threat reduction agreement, the American and Azerbaijani researchers will jointly study the transferred strains.

## **5. Analysis of the Azerbaijani Anti-plague System's Weaknesses and Proliferation Potential**

Although built in 1963, as were most of the AP facilities in Azerbaijan, the Republic AP Station has been repeatedly renovated by its employees since the appointment of the new director in 1997. The ventilation system is in order and the perimeter fence was rebuilt around the station with funds from the neighboring private clinic and spa. The Republic AP Station has central heating and it is also supplied with hot water year round.

Conditions at the field AP stations, on the other hand, are truly appalling. They experience electricity shortages on a regular basis, and none of them is equipped with back-up generators. The building of the Lenkoran field AP station, constructed in 1908, was in such bad shape that its wooden floor collapsed during the CNS staff visit to the facility in March 2004.<sup>56</sup> The premises of Imishly, Mingechaur and Lenkoran field AP stations are illegally occupied by Azeri refugees from Nagorny-Karabakh, who live in the isolation wards, vivariums, and other buildings.

There have been no major equipment upgrades in the Azerbaijani AP system since 1992, so most of the existing laboratory equipment is obsolete and in constant need of repair. The continued use of the antiquated laboratory equipment increases the chances

of accidents involving pathogens of dangerous infectious diseases, which could create a public health hazard in the event of an accidental release into environment.

As far as we have been able to discern, there were no BW-related activities in Azerbaijan, so there is no expertise in the country of proliferation concern.

Based on the preceding discussion, the implementation of the following recommendations would significantly improve the effectiveness of disease surveillance by the Azerbaijani AP system and considerably reduce risks to biosafety:

- Improve physical protection of the pathogen collection at the Republic AP Station;
- Renovate dilapidating field AP stations and remove squatters from those field AP stations that are currently illegally occupied;
- Provide funds for biosafety/biosecurity training of select Azerbaijani AP cadres at the Almaty AP institute or other appropriate foreign institutions;
- Provide modern laboratory equipment to the Republic AP Station and field AP stations.