



Workshop Summary

Prioritizing Zoonotic Diseases for Multisectoral One Health Collaboration in Uzbekistan



Tashkent, Uzbekistan





Photo 1. Bactrian (*Camelus bactrianus*) in traditional colorful cape, Nomadic lifestyle in Central Asia, Uzbekistan.

DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Photo 2. Blue lake in the mountains of Uzbekistan with people on a raft.

PARTICIPATING ORGANIZATIONS

- Ministry of Health
 - Republican Center for Prevention of Plague, Quarantine and Extremely Dangerous Pathogens
 - Center of State Sanitary and Epidemiological Surveillance
 - Tashkent Medical Academy
 - Research Institute for Epidemiology, Microbiology and Infectious Diseases
 - Research Institute of Virology
 - Republican Center for State Sanitary and Epidemiological Surveillance
- State Veterinary Committee
 - Department of Animal Health Protection
 - State Center for Diagnosis of Animal Diseases and Food Safety
 - Laboratory of Scientific Research Institute of Veterinary (NIIV)
 - Republican Center for Diagnosis of Animal Diseases and Food Safety
- Ministry of Emergency Situations
 - Medical and Biological Department
 - Institute of Civil Defense
- State Committee for Ecology and Nature Protection
 - 2nd category of the Task Force for Tashkent
 - Regional bioinspection
- International Science and Technology Center
- United States Defense Threat Reeducation Agency (DTRA)
- United States Centers for Disease Control and Prevention (CDC)
- United States Agency for International Development
- World Bank



SUMMARY



Photo 1. Participants from the One Health Zoonotic Disease Prioritization Workshop in Uzbekistan.

The purpose of this 2-day One Health Zoonotic Disease Prioritization (OHZDP) workshop was to identify zoonotic diseases of greatest national concern for Uzbekistan using equal input from representatives of human, animal, and environmental health sectors. During the workshop, representatives finalized a list of zoonotic diseases relevant for Uzbekistan, defined criteria for prioritization, and determined questions and weights relevant to each criterion. Eight zoonotic diseases were identified as a priority by participants using the OHZDP tool, a semi-quantitative selection tool developed and coordinated by the U.S. Centers for Disease Control and Prevention (CDC) (Appendix A).^{1,2}

The prioritized zoonotic diseases for Uzbekistan are Crimean-Congo Hemorrhagic Fever, anthrax, rabies, brucellosis, zoonotic tuberculosis, plague, zoonotic influenzas, and echinococcosis (Table 1). The results of the OHZDP process and normalized weights for all zoonotic diseases discussed at the Uzbekistan OHZDP workshop are shown in Appendix B. This report summarizes the One Health process used to prioritize the top zoonotic diseases for Uzbekistan that will be jointly addressed using a multisectoral, One Health approach including human, animal, and environmental health ministries and other partners.

Table 1. Description of priority zoonotic diseases selected by voting members in Uzbekistan using a multisectoral process in the OHZDP workshop conducted in November 2018.

Zoonotic Disease	Agent	Human Disease Burden	Animal Disease Burden	Availability of Diagnostics, Treatment, and Prevention
Crimean-Congo Hemorrhagic Fever (CCHF)	Virus	The disease is also known to be endemic in the region. ³ Outbreaks of CCHF are a public health threat since the disease has a high case fatality ratio of 10–40% in humans. ⁴	Regional seroepidemiologic studies show greater seroprevalence in mammals, especially ruminants. ⁵ The virus is asymptomatic in animals. ⁶	No safe or effective human vaccine is currently available. ⁷ Ribavirin has been found to have some benefit for the treatment of CCHF in patients, however treatment remains primarily supportive. ⁸
Anthrax (<i>Bacillus anthracis</i>)	Bacteria	Anthrax infections appear to be ongoing in Uzbekistan and surrounding countries. ⁹	Outbreaks in livestock occur frequently within the region. ⁹	An effective animal vaccine and treatment for humans (antibiotics) exist. ⁷
Rabies	Virus	An estimated 12 people die from rabies each year in Uzbekistan. However, no official data is available, as rabies is not currently a notifiable disease. ¹⁰	Rabies is most likely enzootic in Uzbekistan. The main vector is the domestic dog and while no data is available for wildlife or other domestic animals, it is likely occurring in those species as well. ¹⁰	An effective animal vaccine exists and human vaccines are available, but expensive. Post-exposure prophylaxis is available but there is no treatment for disease. ¹¹
Brucellosis (<i>Brucella spp.</i>)	Bacteria	Brucellosis affects around 18 cases per million people within Uzbekistan. ¹²	Out of tested livestock, 0.002% tested positive for <i>Brucella</i> . Nonetheless, brucellosis-infected farms continue to be identified within allegedly brucellosis-free regions of Uzbekistan. ¹³	Vaccination for brucellosis in animals exists in Uzbekistan. The Ministry of Health is currently developing a new brucellosis vaccination. ¹⁴ Brucellosis treatment exists in country for both humans and animals. ¹⁴
Zoonotic tuberculosis (<i>Mycobacterium bovis</i>)	Bacteria	In the late 1980s, isolates from patients with tuberculosis showed that between 10.6% and 18.3% of cases were caused by <i>M. bovis</i> , with higher percentages in areas with more cattle production. ¹⁵	Data on zoonotic tuberculosis in cattle are limited but the last known regional epicenter of disease occurred in Turkmenistan in 1992. ¹⁵	A vaccine and treatment are available for humans, but not animals. ^{16, 17}
Plague (<i>Yersinia pestis</i>)	Bacteria	Sporadic cases of plague occur almost every year throughout the Central Asian region. ¹⁸ WHO reports an 18% mortality rate among reported human cases worldwide between 2010–2015. ¹⁹	Enzootic rodent plague is endemic in northwestern area of the country. ²⁰	Control measures focus on prevention of flea bites and control of rodents. ²⁰

Zoonotic Disease	Agent	Human Disease Burden	Animal Disease Burden	Availability of Diagnostics, Treatment, and Prevention
<i>Zoonotic influenza (avian and swine)</i>	Virus	There have not been any H5N1 avian influenza cases reported to WHO from Uzbekistan since 2003. ²¹	The World Bank reported in 2007 that Uzbekistan had not yet had an outbreak of highly pathogenic avian influenza but neighboring countries have reported cases. ²²	Vaccines for avian influenza virus are available for both animals and humans ²³ . Treatment for humans includes supportive care and antiviral agents. ²⁴
<i>Echinococcosis</i>	Parasite	Seropositivity studies for Uzbekistan estimate prevalence at 0.7% of population, with an estimated 167,300 people showing seropositivity. ²⁵	In one study, it was determined that around 8% of village dogs and around 20% of farm dogs were infected. ²⁵	Prevention measures include anthelmintic prophylaxis for both humans and animals and improved food inspection and slaughterhouse hygiene. A sheep vaccine may be available at some point in the near future. ²⁶



Photo 2. Sheep at the Afrasiyab historical excavation site in Samarkand, Uzbekistan.

INTRODUCTION AND BACKGROUND

Zoonotic diseases are diseases that are spread between animals and people. Most known human infectious diseases and about three-quarters of newly emerging infections originate from animals. Uzbekistan is a landlocked country located in Central Asia, north of Turkmenistan, and south of Kazakhstan (41 00 N, 64 00 E), with a total population of 29,748,859 as of July 2017.²⁷ The total area of the country is approximately 447,400 sq. km, with 425,400 sq. km of land and 22,000 sq. km of water.²⁷ Approximately 64% of the population of Uzbekistan lives in rural areas, and 36% live in urban areas.²⁸ The climate is mostly desert and semiarid grasslands but is home to many protected areas of nature reserves, where a variety of ecosystems with diverse flora and fauna are preserved.²⁹ These protected areas are important in the conservation of biodiversity of the country. Uzbekistan is home to around 14,900 invertebrate species and 714 species of vertebrates. The diversity of flora in the area is complex due to the diversity of physiographic conditions and different biogeographic zones. Approximately 4300 species of the embryophytes plant alone are said to be found in the country.³⁰ Common animals in the deserts and plains include rodents, foxes, wolves, gazelles, and antelopes. In the mountains, boars, roe deer, bears, wolves, Siberian goats, and lynx can be found.²⁸ Common livestock for production in Uzbekistan are cattle and sheep.²⁸



The agriculture sector contributes 18.5% of Uzbekistan’s GDP and 26% of the workforce. Approximately 63% of Uzbekistan’s land is agricultural land, with nearly 52% being used for permanent pastures.²⁷ Although livestock are a major part of Uzbekistan’s agricultural sector, much of the economy is reliant on cotton production, as Uzbekistan is the world’s fifth largest cotton exporter.²⁷ Exports also include pelts from Karakul sheep²⁸ and energy products, such as natural gas and petroleum.

Zoonotic diseases that occur in large numbers could impact Uzbekistan’s society in the following ways:

- Threaten the health of animals, resulting in illness, loss of productivity, and death, and thus affect the livelihood of a large segment of the population dependent on livestock as a major source of income.
- Threaten national economic stability through loss of tourism, trade bans, and quarantine.
- Threaten the health of people with the ability to cause a large number of illnesses and deaths, which is associated with significant social instability and economic losses.

In 2001, Uzbekistan joined the Food and Agriculture Organization (FAO) and signed a Host Country Agreement in 2014. This partnership with FAO covers a wide range of areas including, but not limited to, livestock production and disease control.³¹

The government of Uzbekistan is developing a 5-year national One Health Organizational Framework and Strategic Plan. Primary goals of the plan include strengthening multisectoral, One Health collaboration between the relevant ministries as well as with national, and international partners; improved prevention, control, and timely detection of zoonotic diseases; and advancing education and awareness among the population of zoonotic disease risk as well as opportunities for disease prevention using a One Health approach.

WORKSHOP METHODS

The One Health Zoonotic Disease Prioritization (OHZDP) Process uses a mixed methods prioritization process developed by CDC’s One Health Office. The methods have been previously described in detail (Appendix A). Workshop organizers began to prepare and plan for this workshop several months in advance. During the workshop, participants first reviewed the initial zoonotic disease list for prioritization. A zoonotic disease was selected if it was known to be spread between humans and animals and was of concern for Uzbekistan. Zoonotic diseases on human or animal reportable disease lists were included on the initial list. Voting members agreed upon a list of 43 zoonotic diseases for prioritization through the OHZDP Process, shown in Table 2.

During the workshop, participants developed five criteria for ranking the 43 zoonotic diseases. Once the five criteria were developed, one categorical question was developed for each criterion through group discussion. Once the five criteria were developed, one categorical question was developed for each criterion through group discussion (Appendix C). The questions were created to best measure each criterion. All questions had ordinal, binomial, or multinomial answers. The ordinal nature is necessary for the scoring process.

If information for a particular zoonotic disease was not available for Uzbekistan, global data or data from the region were used. Articles were collected with zoonotic disease-specific information on transmission, severity, pandemic and epidemic potential, economic impact, prevention and control, and environmental impact for the country, region, and world. These references were compiled and shared with all workshop participants.

After scoring all zoonotic diseases, decision tree analysis was used to determine the ranked zoonotic disease list. Each weighted criterion was applied across each question’s answers for each zoonotic disease. The scores for all five questions for each zoonotic disease were summed. The largest raw score

was then normalized giving that zoonotic disease a normalized score of 1. See Appendix D for a complete listing of raw and normalized scores for all zoonotic diseases that were considered for prioritization.

The zoonotic diseases with their raw and normalized scores were presented to the participants for discussion. Workshop participants then used the ranked OHZDP list to discuss and decide on a final priority list of eight zoonotic diseases (Table 1). After the participants decided on the final priority zoonotic disease list, participants developed next steps and action plans to address the priority zoonotic diseases.



Photo 3. Chimgan Mountains, Uzbekistan.

Criteria Selected for Ranking Zoonotic Diseases

The criteria for ranking zoonotic diseases selected by the voting members in Uzbekistan are listed in order of importance below (Appendix C).

1. Severity of Disease

The first ranked criterion was severity of disease. Diseases with a case fatality rate (CFR) greater than or equal to 1% among the general population in both animals and humans received the highest score of 3. Diseases with a CFR greater than or equal to 1% among the general population in only humans received a score of 2. Diseases with a CFR greater than or equal to 1% among the general population in only animals received a score of 1. If a disease did not have a CFR greater than or equal to 1% among the general population in either humans or animals, it received a score of 0.

If an animal is slaughtered due to disease, this was not considered as the disease resulting in death.

2. Epidemic/Pandemic Potential

The second ranked criterion was the potential for the disease to cause an epidemic or pandemic. Diseases in which cases occurred in Uzbekistan in the last 10 years in both humans and animals received a score of 3. Diseases in which cases occurred in Uzbekistan in the last 10 years in only humans received a score of 2. Diseases in which cases occurred in Uzbekistan in the last 10 years in only animals received a score of 1. Diseases in which no cases occurred in Uzbekistan in the last 10 years in either humans or animals received a score of 0.

3. Epidemiologic Surveillance

The third ranked criterion was the ability to have different forms of epidemiologic surveillance. Epidemiologic surveillance was referred to as laboratory diagnostics, prevention measures (vaccine availability, treatment, disinfection [clean up, culling/ slaughtering, or quarantine]), and interagency

notifications of disease in humans or animals. Diseases that had all three components (laboratory diagnostics, prevention measures, and inter-agency notifications) in either humans or animals received a score of 3.

Diseases that had any two of the three components in either humans or animals received a score of 2. Diseases that had any one of the three components in either humans or animals received a score of 1. Diseases that had none of the three components in either humans or animals received a score of 0.

4. Economic, Environmental, and Social Consequences

The fourth ranked criterion was economic, environmental, and social consequences. Diseases that result in quarantine for humans and animals received the highest score of 3. Diseases that result in quarantine for animals only received a score of 2. Diseases that result in quarantine for humans only received a score of 1. Diseases that do not result in quarantine for humans or animals received a score of 0.

Uzbekistan ministerial officials used the List of Quarantine and Extremely Dangerous Pathogens in Uzbekistan for this question.

5. Bioterrorism

The fifth ranked criterion was the potential for the disease to be used as a bioterrorism agent. Diseases that can potentially be used as a bioterrorism agent received the highest score of 1. Diseases that do not have the potential to be used as a bioterrorism agent received a score of 0.

Uzbekistan ministerial officials used a country-specific especially dangerous pathogens list for this question.

PLANS AND RECOMMENDATIONS

General Recommendations

After finalizing the list of priority zoonotic diseases, workshop participants discussed recommendations and further actions that could be taken to address the diseases. This was done in a 2-stage process. To begin, participants were asked to make general recommendations for how to approach the priority diseases without considering the constraints of their respective institutions. A summary of the most prominent recommendations organized by theme follows.

- **One Health Coordination Mechanisms (leadership, technical level)**

One Health is currently coordinated through the Cabinet of Ministers and by the Ministry of Health. The following are recommendations to strengthen collaboration of One Health at the national level:

- Finalize a One Health strategic plan between all relevant ministries
- Aim to hold quarterly, multisectoral, One Health meetings
 - Meetings should occur at both the leadership level and technical levels
 - Technical level meetings across sectors focused on specific priority zoonotic diseases can be explored
- Identify a One Health contact person, at the leadership level, from each ministry to serve as a focal point for the ministry
- Continue collaboration between stakeholders to address priority zoonotic diseases
- Identify additional ministries to include in future multisectoral, One Health activities

- **Surveillance**

- Continue improving and evaluating national surveillance for priority zoonotic diseases
- Increase data sharing for priority zoonotic diseases across sectors
- Increase surveillance efforts to monitor the movement of livestock to improve epidemiologic investigations
- Identify resources and sector specific roles and responsibilities for wildlife disease surveillance, including die-off events
- Establish surveillance across sectors for zoonotic tuberculosis (*M. bovis*)

- **Laboratory capacity**

- Improve laboratory capacity to diagnose priority zoonotic diseases
- Identify resources needed to expand laboratory diagnostics for priority zoonotic diseases
- Strengthen regional laboratory capacity for the priority zoonotic diseases
- Continue data sharing of laboratory findings for the priority zoonotic diseases across sectors

- **Preparedness and Outbreak Response**

- Improve regional and district level access to veterinary preventative services, including vaccination, vector control, biosecurity measures, etc.
- Expand tick control in the environment to reduce the risk of zoonotic diseases
- Expand tick control for livestock to reduce the risk of zoonotic diseases
- Expand current emergency management of CCHF outbreak investigations to include environmental response
- Discuss plans for wildlife and stray dog vaccination campaigns to prevent and control rabies
- Establish a mechanism to be able to jointly access and use protective equipment across all sectors involved in One Health
- Expand readiness for priority zoonotic diseases
- Explore options for sectors to conduct joint investigations for the priority zoonotic diseases
- Pursue national plan for brucellosis elimination

- **Workforce**

- Increase availability of veterinary workforce at regional and district levels to prevent and control priority zoonotic diseases
- Conduct joint, One Health trainings across sectors
- Establish and strengthen a wildlife veterinary workforce within the State Committee of Ecology and Nature Protection

- **Education and Outreach**

- Expand educational materials regarding the transmission of the priority zoonotic diseases
- Improve communication with the general public around zoonotic disease risks from animal contact
- Increase public awareness regarding the prevention and control of the priority zoonotic diseases
- Align dog-related outreach activities for echinococcosis with rabies prevention efforts

- **Research**

- Conduct research on the prevalence or risk of the priority zoonotic diseases within the country
- Further understand antimicrobial resistance mechanisms and prevention for the priority zoonotic diseases

- **Funding**

- Identify funding needs to support activities for the prioritized zoonotic diseases
- Identify funding needs for protective equipment and control tools for the priority zoonotic diseases
- Explore options for compensating livestock owners in the face of an outbreak that causes extensive losses or culling
- Identify resources available for vaccinating wildlife and stray animals for rabies



Photo 4. Camels in front of the yurt camp in Kyzylkum Desert.

Specific Next Steps

Finally, each government ministry involved in the OHZDP workshop and the collaborating agencies who observed the process were given an opportunity to make suggestions for specific next steps that ministries could take to improve the multisectoral development of laboratory capacity, surveillance, joint outbreak response activities, and prevention and control strategies. A summary of the next steps suggested by each sector follows.

- **Ministry of Health**

- Coordinate quarterly interagency One Health meetings and ensure representation from leadership and technical staff from all participating sectors
- Develop and expand educational materials for priority zoonoses in collaboration with other sectors
- Identify a One Health focal point at the leadership level
- Strengthen surveillance systems for CCHF by utilizing information from existing surveillance systems or laboratory diagnostics from other sectors
- Continue involvement in the finalization of the One Health organizational framework and strategic plan

- **State Veterinary Committee**

- Identify a One Health focal point at the leadership level
- Develop and expand educational materials for priority zoonoses in collaboration with other sectors
 - Utilize existing rabies educational materials as a model for outreach efforts for other priority zoonoses, such as echinococcosis
- Conduct outreach activities for priority zoonotic diseases
- Expand tick control for livestock to reduce the risk of zoonotic diseases
- Improve public access to veterinary preventative services at regional and district levels
- Support regional and district level veterinary workforce development
- Continue involvement in the finalization of the One Health organizational framework and strategic plan

- **Ministry of Emergency Situations**

- Identify a One Health focal point at the leadership level
- Develop and expand educational materials for priority zoonotic diseases in collaboration with other sectors
- Establish mechanisms to allow for joint access and use of protective equipment across all sectors involved in One Health
- Continue involvement in the finalization of the One Health organizational framework and strategic plan

- **State Committee on Ecology and Nature Protection**

- Identify a One Health focal point at the leadership level
- Develop and expand educational materials for priority zoonotic diseases in collaboration with other sectors



Photo 5. Woman milks a horse to provide nutrition for her family in Bishkek, Uzbekistan.



Photo 6. Charvak Lake surrounded by Tien Shan mountain from above, Uzbekistan.

APPENDIX A: Overview of the One Health Zoonotic Disease Prioritization Process

U.S. Centers for Disease Control and Prevention: Overview of the One Health Zoonotic Disease Prioritization Workshop <https://www.cdc.gov/onehealth/what-we-do/zoonotic-disease-prioritization/>

ONE HEALTH ZONOTIC DISEASE PRIORITIZATION PROCESS OVERVIEW

Goals of the One Health Zoonotic Disease Prioritization Process

- ▶ To use a multisectoral, One Health approach to
 1. Prioritize zoonotic diseases of greatest concern
 2. Develop next steps and action plans to address the priority zoonotic diseases in collaboration with One Health partners

OHZDP Workshop Process

BEFORE THE WORKSHOP

➔ **Prepare and Plan for the Workshop**

- Contact the CDC One Health Office at least 3 months before scheduling a workshop.
- Identify Core Planning Team and obtain financial resources to accommodate for workshop logistics, venue, materials, travel, and translation.
- Identify workshop participants (facilitators, voting members, advisors) from human, animal, and environmental health sectors and other related partners.
- Generate an initial list of zoonotic diseases to be considered for prioritization using reportable disease lists, literature, and input from all represented One Health sectors.
- Conduct a literature review on the initial list of zoonotic diseases by reviewing publications, reports, grey literature, etc.

DURING THE WORKSHOP

➔ **Develop Criteria**

- 5 criteria will be used to prioritize the list of zoonotic diseases; criteria are locally appropriate and address the needs of each unique location.

➔ **Develop Questions**

- 1 categorical question will be developed to measure each criteria.

➔ **Rank Criteria**

- Each voting member will rank criteria in their preferred order, allowing each sector to address their sector's priorities and needs. Individual rankings are combined to produce a combined ranked list of criteria.

➔ **Prioritize Zoonotic Diseases**

- Score each zoonotic disease by answering the categorical questions for each weighted criterion and entering this data into the OHZDP Tool.
- The ranked zoonotic disease list from the OHZDP Tool is used to facilitate discussion among the participants to finalize the priority zoonotic disease list.

➔ **Discuss Next Steps and Action Plans for Multisectoral, One Health Engagement**

- Discuss next steps and action plans for identifying areas for One Health engagement for prevention and control of the prioritized zoonotic diseases.



AFTER THE WORKSHOP

- Stakeholders advocate and implement recommended next steps and action plans to implement a One Health approach for the priority zoonotic diseases.

OHZDP Workshop Outcomes

<ul style="list-style-type: none"> • A list of priority zoonotic diseases of greatest concern agreed upon by all represented One Health sectors • Recommendations for next steps and action plans for multisectoral, One Health engagement to address the priority zoonotic diseases 	<ul style="list-style-type: none"> • Understanding of the roles and responsibilities of all represented One Health sectors • The creation or strengthening of multisectoral, One Health coordination mechanisms and networks • A report highlighting the outcomes of the workshop to help advocate for One Health priorities
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www.cdc.gov/onehealth/global-activities/prioritization.html

APPENDIX B: One Health Zoonotic Disease Prioritization Workshop Participants for Uzbekistan

Voting Members

Name	Organization	Title/Position
Mukhiddin Ruzimurodov	State Veterinary Committee	Head of Laboratory of Scientific Research Institute of Veterinary (NIIV)
Ozoda Shairpova	State Veterinary Committee	Head of virology laboratory, Republican Center for Animal Health and Food Safety
Tulkinzhon Yulchiev	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of the Andijan Region
Shukhrat Umarov	Ministry of Health	Deputy Director, Republican Center for the Prevention of Plague, Quarantine and Highly Dangerous Infections
Ravil Muzaffarov	Ministry of Health	Head of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Kashkadarya Region
Ibrohum Mamatkulov	Ministry of Health	Principal Investigator, Research Institute of Epidemiology, Microbiology, and Infectious Diseases (RIEMID)
Firdavs Amonov	Ministry of Emergency Situation	Head of the Medical and Biological Department of the Kashkadarya Region
Mukhitdin Tinibekov	Ministry of Emergency Situation	Senior Lecturer at the Institute of Civil Defense
Abdisami Akhmatov	Ministry of Emergency Situation	Head of Medical and Biological Department
Zafarali Burkhoiy	State Committee for Ecology and Nature Protection	Inspector of the 2nd category of the Task Force for Tashkent, Regional Inspectorate for Tashkent and Syrdarya regions
Sevara Fatoeva	State Committee for Ecology and Nature Protection	Inspector of the 2nd category of the Task Force for Tashkent, Regional Inspectorate for Tashkent and Syrdarya regions
Dilmurod Ruziboev	State Committee for Ecology and Nature Protection	Head of regional bioinspection in Samarkand, Jizzakh and Navoi regions

Observers

Name	Organization	Title/Position
Gulnara Abdukhalilova	Ministry of Health	Head of AMR Center, Research Institute of Epidemiology, Microbiology and Infectious Diseases
Nilufar Vakhobova	Ministry of Health	Head of Laboratory, Republican Center for the Prevention of Plague, Quarantine and Especially Dangerous Infections
Vokhidzhon Abduvokhidov	Ministry of Health	Epidemiologist, Department of Especially Dangerous Infections, Republican Center for State Sanitary Epidemiological Surveillance
Maribjon Muradov	Ministry of Health	Head of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Andijan Region

Name	Organization	Title/Position
Zamira Sariboyeva	Ministry of Health	Head of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Jizzak Province
Zuloriya Mamayusopova	Ministry of Health	Head of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Samarkand Region
Kholboy Khurramov	Ministry of Health	Physician Epidemiologist of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Surkhandarya region
Albina Musaeva	Ministry of Health	Head of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Tashkent city
Umir Mirzaev	Ministry of Health	Head of the Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Tashkent region
Dilnoza Nuritdinova	Ministry of Health	Epidemiologist, Department of Especially Dangerous Infections, Center for State Sanitary Epidemiological Surveillance, Fergana region
Sanam Khudaybergenova	State Veterinary Committee	Head of International Cooperation
Yashin Rajabov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of the Bukhara Region
Aliakbar Malikov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Department of the Jizzakh region
Muslim Kurbonov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Department of the Kashkadarya region
Makset Sagizbaev	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Committee of the Republic of Karakalpakstan
Abriy Gaimov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of the Navoi region
Shavkat Abdurahmonov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of Namangan Region
Khamdam Umarov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of Samarkand Region
Sherali Rakhmonov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Department of the Syrdarya region
Khairulla Shakhiev	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Department of the Surkhandarya Region

Name	Organization	Title/Position
Irmat Tursunov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of Tashkent
Sultankhodja Sharipov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Administration of the Tashkent Region
Ilhomzhon Isakov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Department of the Fergana region
Khamidulla Kuriyazov	State Veterinary Committee	Head of the Department of Animal Health Protection of the Veterinary Department of the Kharezm region
Alijon Sobirov	Ministry of Emergency Situations	Head of Medical and Biological Department of Namangan Region
Bekchan Bekchanov	Ministry of Emergency Situations	Head of Medical and Biological Department of the Khorezm region
Ian McNeal	Defense Threat Reduction Agency	Country Manager, Uzbekistan
Anna Dyachenko	Defense Threat Reduction Agency	Project Management Assistant, Uzbekistan
Alisher Ishanov	United States Agency for International Development	Health Project Management Specialist
Ikbolon Ahadjonov	World Bank	Social and Human Development Consultant
Holly Miles	U.S. Embassy—Uzbekistan	Environment, Science, Technology, and Health (ESTH) Officer
Aiyngul Frith	International Science and Technology Center	Senior Program Manager (BTEP)
Shakhinya Karamatova	United States Centers for Disease Control and Prevention—Uzbekistan	Technical Lead
Makhmudkhan Sharapov	United States Centers for Disease Control and Prevention—Uzbekistan	Epidemiologist
Aybek Khodiev	United States Centers for Disease Control and Prevention—Uzbekistan	Public Health Specialist
Leyla Koroli	United States Centers for Disease Control and Prevention—Uzbekistan	Public Health Administrative Specialist

Facilitators

Name	Organization	Title/Position
Gulnara Khudaykulova	Ministry of Health, Tashkent Medical Academy	OHZDP Facilitator; Associate Professor of the Department of Infectious and Pediatric Infectious Diseases,
Alisher Akhadov	State Veterinary Committee	OHZDP Facilitator; Chief Specialist in Food Safety and Diagnostics
Nazira Karshieva	Ministry of Health, Republican Center for State Sanitary Epidemiological Surveillance	OHZDP Facilitator; Epidemiologist, Department of especially dangerous infections, Republican Center for State Sanitary Epidemiological Surveillance
Grace Goryoka	U.S. Centers for Disease Control and Prevention, One Health Office	OHZDP Facilitator; Health Scientist
Kate Varela	U.S. Centers for Disease Control and Prevention, One Health Office	OHZDP Facilitator; Veterinary Medical Officer
Radhika Gharpure	U.S. Centers for Disease Control and Prevention	OHZDP Facilitator; Epidemic Intelligence Service Officer
Victoria Seffren	U.S. Centers for Disease Control and Prevention, Division of Global Health Protection	OHZDP Facilitator; Epidemiology Fellow

Workshop Organizers

Name	Organization	Title/Position
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Photo 7. Sunny summer scene in the hills with flock of sheep and goat in the Uzbekistan mountains.

APPENDIX C: Criteria, questions and numerical weights for the criteria selected for ranking zoonotic diseases in Uzbekistan

1. Severity of Disease (criteria weight = 0.3058)

Question: To what extent does the disease result in death (CFR >1%) among the general population?

Answer:

- CFR \geq 1% in both humans and animals (3)
- CFR \geq 1% only in humans (2)
- CFR \geq 1% only in animals (1)
- CFR <1% in both humans and animals (0)

If an animal is slaughtered due to disease, this was not considered as the disease resulting in death.

2. Epidemic/Pandemic Potential (criteria weight = 0.2295)

Question: Were there cases of the disease in Uzbekistan in the last 10 years?

Answer:

- In Both (3)
- In Only Humans (2)
- In Only Animals (1)
- Neither Humans Nor Animals (0)

Priority should be given to data from Uzbekistan, otherwise regional/global data can be taken. Lethality defined with treatment in Uzbekistan. If the disease or diagnosis does not exist, we use regional/global data.

3. Epidemiologic Surveillance (criteria weight = 0.1962)

Question: Is there any combination of the following available for Human or Animal sectors: Laboratory Diagnostics, Prevention Measures (vaccines, treatments, disinfections (clean up, culling/slaughtering, or quarantine)), or Inter-Agency Notifications?

Answer:

- All (3)
- 2 of 3 (2)
- 1 of 3 (1)
- None (0)

4. Economic, Environmental, and Social Consequences (criteria weight = 0.1364)

Question: Does the disease result in quarantine for Animals or Humans?

Answer:

- Humans and animals (3)
- Only animals (2)
- Only humans (1)
- None (0)

Uzbekistan ministerial officials utilized List of Quarantine and Extremely Dangerous Pathogens in Uzbekistan for this question.

5. Bioterrorism (criteria weight = 0.1322)

Question: Can this zoonotic disease potentially be used as a bioterrorism agent?

Answer:

- Yes (1)
- No (0)

Uzbekistan ministerial officials utilized a list of the especially dangerous pathogens for this question.



Photo 8. Lake Charvak or Chorvoq is a water reservoir in Chimgan region, Tian Shan or Tengri Tagh mountain range near Taskent city in Uzbekistan

APPENDIX D: Final Ranked Zoonotic Disease List for Uzbekistan from the One Health Zoonotic Prioritization Tool

Rank#	Zoonotic Disease	Raw Score	Normalized Final Score
1	Anthrax	0.878056066	1
2	Brucellosis	0.852594117	0.971001909
3	Leptospirosis	0.822392145	0.936605505
4	Zoonotic Tuberculosis	0.822392145	0.936605505
5	Rabies	0.822392145	0.936605505
6	Plague	0.770549986	0.877563535
7	Avian Influenza	0.770549986	0.877563535
8	Listeriosis	0.745908807	0.849500204
9	Echinococcosis	0.731470954	0.83305723
10	Crimean-Congo Hemorrhagic Fever	0.730650183	0.832122471
11	Botulism	0.721739849	0.821974674
12	Tularemia	0.634168199	0.722241123
13	Q-fever	0.623144103	0.709686006
14	Mpox	0.614233769	0.69953821
15	Melioidosis	0.568773173	0.647764072
16	Swine Influenza	0.547481536	0.623515464
17	Bovine Spongiform Encephalopathy	0.527547105	0.600812551
18	Salmonellosis	0.516556283	0.58829533
19	Leishmaniasis	0.487647303	0.555371487
20	Pasteurellosis	0.465534895	0.530188119
21	Clostridium chauvoei	0.465534895	0.530188119
22	Fasciolosis	0.425635092	0.484747055
23	Ascariidosis	0.360240066	0.410270004
24	Pseudotuberculosis	0.349151754	0.397641754
25	Campylobacteriosis	0.334680627	0.381160884
26	Cysticercosis	0.334680627	0.381160884
27	Yersiniosis	0.283756728	0.323164703
28	Hymenolepiasis	0.283756728	0.323164703
29	Trichocephalosis	0.283756728	0.323164703
30	Psittacosis	0.221711243	0.252502376
31	Scrapie	0.167340313	0.190580442
32	Lyme Disease	0.130790052	0.148954101
33	Strongyloidosis	0.130790052	0.148954101

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Photo 9. Rays of rising sun permeate through ruins of ancient Ayaz Kala fortress in Kyzylkum desert, Uzbekistan.

<http://www.cdc.gov/onehealth>