Workshop Summary

Prioritizing Zoonotic Diseases for Multisectoral One Health Collaboration in Costa Rica

San José, Costa Rica

CDC

MINISTERIO DE SALUD

MINISTERIO DE AGRICULTURA Y GANADERÍA

MINISTERIO DE AMBIENTE Y ENERGÍA

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Photo 1. Central American squirrel monkey (*Saimiri oerstedii*), Quepos, Costa Rica.

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. Rio Celeste, a captivating turquoise river in Tenorio Volcano National Park, Costa Rica.

PARTICIPATING ORGANIZATIONS

- Ministry of Health (Ministerio de Salud, MS)
- Ministry of Health, Costa Rican Institute of Research and Teaching in Nutrition and Health (Ministerio de Salud—Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud, Inciensa)
- Ministry of Agriculture and Livestock (Ministerio de Agricultura y Ganadería, MAG)
- Ministry of Agriculture and Livestock, National Animal Health Service (Ministerio de Agricultura y Ganadería—Servicio Nacional de Salud Animal, SENASA)
- Ministry of Agriculture and Livestock, National Veterinary Services Laboratory (Ministerio de Agricultura y Ganadería—Laboratorio Nacional de Servicios Veterinarios, LANASEVE)
- Ministry of Environment and Energy (Ministerio de Ambiente y Energía, MINAE)
- Ministry of Environment and Energy, National System of Conservation Areas (Ministerio de Ambiente y Energía—Sistema Nacional de Áreas de Conservación, SINAC)
- Ministry of Environment and Energy, National Commission for Biodiversity Management (Ministerio de Ambiente y Energía—Comisión Nacional Gestión Biodiversidad, CONAGEBIO)
- Ministry of Environment and Energy, Environmental Quality Management Directorate (Ministerio de Ambiente y Energía—Dirección de Gestión de Calidad Ambiental, DIGECA)
- Costa Rican Social Security Fund (Caja Costarricense de Seguro Social, CCSS)
- Costa Rican Social Security Fund, Calderón Guardia Hospital (Caja Costarricense de Seguro Social—Hospital Calderón Guardia)
- Costa Rican Social Security Fund, National Children's Hospital (Caja Costarricense de Seguro Social—Hospital Nacional de Niños)
- University of Costa Rica, School of Biology (Universidad de Costa Rica—Escuela de Biología, UCR)
- National University, School of Veterinary Medicine, Laboratory of Zoonosis and Entomology, Population Medicine Program (Universidad Nacional—Escuela Medicina Veterinaria—Laboratorio de zoonosis y entomología, Programa medicina poblacional, UNA)
- National University, School of Veterinary Medicine, Small Species and Wildlife Hospital (Universidad Nacional—Escuela Medicina Veterinaria, Universidad Nacional—Hospital Especies Menores y Silvestres, HEMS)
- Restoration for Nature Conservation Foundation: Wildlife Rescue Center (Fundación Restauración para la Conservación de la Naturaleza: Centro de Rescate, Zooave)
- Pan American Health Organization (Organización Panamericana de la Salud, PAHO)
- Food and Agriculture Organization of the United Nations (Organización de las Naciones Unidas para la Alimentación y la Agricultura, FAO)
- Inter-American Institute for Cooperation on Agriculture (Instituto Interamericano de Cooperación para la Agricultura, IICA)

- Centers for Disease Control and Prevention—Central America (Centros para el Control y la Prevención de Enfermedades—Centro América , CDC-CAR)
- Centers for Disease Control and Prevention—One Health Office (Centros para el Control y la Prevención de Enfermedades—Oficina de Una Sola Salud, CDC-OHO)
- Executive Secretariat, Council of Ministers of Health of Central America and the Dominican Republic (Secretaría Ejecutiva—Consejo de Ministros de Salud de Centroamérica y República Dominicana, SECOMISCA)

EXECUTIVE SUMMARY

Photo 3. Participants from the One Health Zoonotic Disease Prioritization Workshop in Costa Rica.

The purpose of the One Health Zoonotic Disease Prioritization Workshop was to prioritize zoonotic diseases of greatest concern with equal input from representatives of human, animal (livestock and wildlife) and environmental health sectors and other relevant partners.

The specific workshop goals were to use a multisectoral, One Health approach to:

1. Prioritize zoonotic diseases of greatest concern for Costa Rica
2. Establish next steps and action plans to address the priority zoonotic diseases

During the workshop, the participants were provided a list of 25 zoonotic diseases of importance for the development of intersectoral actions for the country. Additionally, the participants defined the criteria for prioritization and determined questions and weights relevant to each criterion using a mixed methods approach, the One Health Zoonotic Disease Prioritization Process, developed by the U.S. Centers for Disease Control and Prevention (CDC) (Appendix A).

After the participants selected the priority zoonotic diseases, they developed the next steps and action plans to address the diseases using a One Health approach.

The priority zoonotic diseases for multisectoral, One Health collaboration for Costa Rica are listed in Table 1:

- Zoonotic influenza (Avian influenza, Swine influenza)
- Brucellosis
- Zoonotic tuberculosis
- Rabies
- New World Screwworm
- Salmonellosis
- Zoonotic viral encephalitis (Eastern Equine Encephalitis, Saint Louis Encephalitis, Venezuelan Equine Encephalitis, Western Equine Encephalitis, West Nile Virus)

This report summarizes the One Health Zoonotic Diseases Prioritization Process used to prioritize zoonotic diseases of greatest concern for Costa Rica, as well as next steps and action plans to jointly address these zoonotic diseases using a multisectoral, One Health approach, including human, animal, and environmental health ministries and other relevant partners.

Photo 4. Farmers and their cart on a road in Costa Rica. *(Photo taken and authorized for use by Raimond Vargas Vega)*

Table 1. Description of priority zoonotic diseases selected by voting members in Costa Rica using a multisectoral process in the OHZDP workshop conducted in August 2024.

Zoonotic Disease	Agent	Human Disease Burden	Animal Disease Burden	Diagnosis, Treatment, and Prevention
Zoonotic influenza	Influenza A Virus (*Orthomyxovirus*), H1N1, H1N2, H3N2, H5, and H7	**Influenza A/ H1N1pdm09:** 2019: 86 cases and a rate of 1.7 x 100,000 people **Influenza A/H3N2:** 2019: 110 cases and a rate of 2.2 x 100,000 people 2022: 1,270 cases and a rate of 24.4 x 100,000 people **Influenza A/H5 and A/H7:** No case report	**Influenza H1N1, H1N2, H3N2:** 2022: No report 2023: No report 2024: No report **Influenza A Virus H5 and H7:** 2021: No report 2022: No report 2023: One outbreak 2024: No report	**Diagnosis in humans and domestic and wild animals:** Reverse transcription (RT)-Polymerase Chain Reaction (PCR), virus isolation, serology **Treatment in humans:** Antiviral available in the country **Prevention:** Annual vaccination for seasonal influenza Avoid contact with wild birds Good hygiene practices and use of personal protective equipment
Brucellosis	*Brucella spp.*	2020: One death 2021: 22 cases and a rate of 0.4 x 100,000 people 2022: 27 cases and a rate of 0.5 x 100,000 people 2023: 15 cases and a rate of 0.3 x 100,000 people	**Outbreaks per year in cattle:** 2020: 297 2021: 397 2022: 373 2023: 340	**Diagnosis in humans and domestic and wild animals:** Rose Bengal Test serology, ELISA (animals), and isolation **Treatment in humans:** Combined antibiotic therapy **Prevention:** Cattle vaccination Good practices of food manufacturing and hygiene and use of personal protective equipment
Zoonotic tuberculosis	*Mycobacterium bovis.*	2022: One case and a rate of 0.02 x 100,000 people	**Outbreaks per year in cattle:** 2020: 66 2021: 189 2022: 51 2023: 29	**Diagnosis in humans and domestic and wild animals:** Microscopy (humans), bacterial culture, tuberculin test (PPD), interferon-gamma release assay (IGRA), and PCR **Treatment in humans:** Combined antibiotic therapy **Prevention:** Vaccination in newborns and chemoprophylaxis for contacts of confirmed cases and at-risk groups with reactive PPD in humans Good practices of food manufacturing and hygiene and use of personal protective equipment

Zoonotic Disease	Agent	Human Disease Burden	Animal Disease Burden	Diagnosis, Treatment, and Prevention
Rabies	Rabies Virus (*Lyssavirus*)	2018: One death	**Outbreaks per year in domestic animals:** 2020: 13 2021: 5 2022: No report 2023: 5	**Diagnosis in humans and domestic and wild animals:** RT-PCR, serology, and direct immunofluorescence (DIF) **Treatment in humans:** Post-exposure vaccination **Prevention:** Pre-exposure vaccination in humans Vaccination in domestic and production animals Avoid contact with suspicious animals
New World Screwworm	*Cochliomyia hominivorax*	2024: 40 cases	**Outbreaks per year in domestic animals:** 2022: No reports 2023: 183 2024: 13,105	**Diagnosis in humans and domestic and wild animals:** Taxonomic identification through microscopy **Treatment:** Larvae elimination, support treatment as appropriate **Prevention:** Proper handling of wounds/ injuries Good hygiene practices and use of personal protective equipment Awareness and sensitization Maintain surveillance and control in the treatment of domestic and production animals
Salmonellosis	*Salmonella enterica*	2023: 250 cases and a rate of 4.8 x 100,000 people 2024: 171 cases and a rate of 3.2 per 100,000 people	**Outbreaks per year in domestic animals:** 2021: 1 Salmonella enteritidis. (egg)	**Diagnosis in humans:** Isolation, mass spectrophotometry, VITEK, DNA hybridization, serology, PCR, and genomics **Diagnosis in domestic and wild animals:** Isolation **Treatment in humans:** Electrolyte replenishment, rehydration, and support treatment as appropriate **Prevention:** Good practices of food manufacturing and hygiene and use of personal protective equipment No handling of wild animals or keeping them in captivity (as pets)

Zoonotic Disease	Agent	Human Disease Burden	Animal Disease Burden	Diagnosis, Treatment, and Prevention
Zoonotic Viral Encephalitis	*Venezuelan Equine Encephalitis, Western Equine Encephalitis and Madariaga Virus (Alphavirus), Saint Louis Encephalitis and West Nile Virus (Flavivirus)*	In 2016, a death due to Venezuelan Equine Encephalitis was reported In 2019, a death due to a West Nile Virus infection was reported. In 2010, 13 human cases of Eastern Equine Encephalitis were detected in Panama (Reference: Eastern Equine Encephalitis in Latin America | New England Journal of Medicine)	**Venezuelan Equine Encephalitis Outbreaks per year:** 2020: 6 2021: 3 2022: No reports 2023: 3 2024: 2 **Eastern Equine Encephalitis Outbreaks per year:** 2020: No outbreaks reported 2021: 1 2022: No reports 2023: 1 **Saint Louis Encephalitis:** A study conducting a serosurvey of non-human primates in Costa Rica identified that 11.6% of non-human primates sampled were seropositive for Saint Louis encephalitis virus (Reference: Serosurvey of Nonhuman Primates in Costa Rica at the Human–Wildlife Interface Reveals High Exposure to Flaviviruses)	**Diagnosis in humans and domestic and wild animals:** ELISA, PCR, and RT-PCR **Treatment:** Support treatment as appropriate **Prevention:** There is an equine vaccination available Vector control Avoid contact with wild animals

Source: Developed by the national team of facilitators, MS, Inciensa, SENASA, MINAE, INEC (2025).

Photo 5. A roadside market with fruits and vegetables in Costa Rica.

INTRODUCTION

The Republic of Costa Rica is located in Central America; it borders Nicaragua to the North, Panama to the Southeast, the Caribbean Sea (Atlantic Ocean) to the East, and the Pacific Ocean and Coco Island to the West, at 87°E and 5°30'N. It has a total land surface of 51,100 km^2, a territorial sea of 598,682 km^2, and a total of 520,880 hectares of protected marine surface. The border with Nicaragua stretches for 300km, and the border with Panama, 363km. (Mideplan, 2017)

The national territory is divided into seven provinces: San José, Alajuela, Cartago, Heredia, Guanacaste, Puntarenas, and Limón. In turn, the provinces are divided into 84 cantons and 492 districts.

By 2022, Costa Rica's estimated population was 5,044,197, with San José being the capital and the most populated province, followed by Alajuela. A quarter of the population was located mainly in San José, with 352,381 people (7.0%), followed by Alajuela with 322,143 (6.4%), Desamparados with 223,226 (4.4%), San Carlos with 198,742 (3.9%), and Cartago with 165,417 (3.3%). (INEC, 2022)

The country's topography is characterized by a mountain range that crosses the country from northeast to southeast, along with a small stretch of valleys and prairies. By being in the neotropical region, Costa Rica has a tropical climate with few temperature fluctuations, maintaining two seasons: dry and rainy.

Costa Rica's biodiversity can be attributed to the variety of ecosystems in the country. The tropical jungles, deciduous forests, Atlantic and Pacific coasts, cloudy forests, and mangroves are seen throughout the 19,730 square miles of Costa Rica's land.

Possessing only 0.16% of the planet's ocean's surface, Costa Rica has 6,778 marine species (3.5% of marine species reported globally), of which 96 are endemic and protected mostly by Coco Island National Park (Whertman and Cortés, 2008).

According to data provided by the computing platform for the management of national knowledge and information about biodiversity (BIODATACR), there are more than 250 mammal species, more than 920 bird species, 210 amphibian species, 250 reptile species, 2,000 marine and continental species, more than 9,800 plant species, more than 1,500 lichen species, more than 3,000 fungi species, and more than 69,000 insect species. (CONAGEBIO, 2025)

Photo 6. Coffee pickers come from all around to gather crops at harvest time in the province of Alajuela, Costa Rica,

All of this has categorized Costa Rica as one of the 25 megadiverse countries, home to approximately 6% of the world's known species and a great variety of ecosystems. Its biodiversity is necessary for economic and social development and the maintenance of ecological processes, like climate regulation, erosion prevention, food and water supply, and tourism. The natural capital of Costa Rica was estimated at no less than USD 15 billion a year, or 23% of the gross domestic product (GDP) in 2019. (MINAE, OCDE, 2023)

Costa Rica is one of the countries with the highest percentage of territory with some category of protection. It currently has 149 areas with a different management category, which consists of 28.13% of the national territory. This percentage is distributed among the following categories: national parks (12.48%), biological reserves (0.44%), national refuges (4.59%), forest reserves (4.21%), protected zones (3.03%), wetlands, which include mangroves, (0.72%), and other categories, which include absolute natural reserves, national monuments and natural monuments (0.17%.) (SINAC, 2025)

Photo 7. Male plumed basilisk (*Basiliscus plumifrons*) sitting on a stump, Costa Rica.

Costa Rica has 44 biological corridors, which represent about 33% of the continental territory. These spaces provide connectivity between protected wilderness areas, as well as ecosystems and natural or modified habitats to guarantee the maintenance of biodiversity and ecological processes (National Program of Biological Corridors of Costa Rica.)

Costa Rica's healthy and diverse ecosystems help regulate diseases. Costa Rican biodiversity acts as a natural barrier that reduces the spread of pathogens. Some animal species, like frogs, toads, bats, and snakes can help control the population of species that spread diseases (insects, rodents, etc.) Furthermore, genetic diversity in species contributes to their resistance to new diseases.

Biodiversity is critical as a response to diseases because numerous drugs are derived from biochemical compounds from plants, fungi and animals. Biodiversity loss is a factor that favors climate change, which can also influence the spread of diseases.

Currently, the development of infrastructure, urbanization, tourism, agriculture, fisheries, untreated sewage contamination, and climate change are putting pressure on our biodiversity, causing a health decline in people and food animals. (MINAE, OCDE, 2023)

Regarding the agricultural sector, Costa Rica has a dual structure, with an export market that is very dynamic and has been developed along with less productive traditional crops, which are consumed mainly by the domestic market. The export market, based in traditional crops (coffee and banana) and non-traditional crops (pineapple and palm), has achieved significant growth. Farm products for export are produced mainly by large and medium growers, while traditional products (basic grains, fruits, and vegetables) for domestic consumption (and even self-consumption) are produced by small growers with very little integration in value chains. (Ministry of Agriculture, Fisheries and Food, Spain, 2021)

By 2023, the gross value of farming supply added 3,990,145 million colons, where agriculture activities were the main contributor, followed by livestock activities, and lastly, forestry, hunting, fisheries, and aquaculture, and all support activities and services for the farming sector. (MAG, 2024)

Within the livestock activities, the main contributor to the national economy was the breeding of cattle, and swine and poultry production.

The close interaction between humans, animals, and the environment, as well as the increase of commercial activity and mobilization of people, animals, and their products and byproducts, and intensive agriculture practices, promote the loss of biodiversity and habitat destruction. The increase of human populations, the lack of urban planning, and climate change have accelerated zoonosis dissemination. (OPS, 2023)

Zoonotic diseases are infectious diseases naturally transmissible from animals to humans and include a high percentage of the new and existing diseases in humans. 61% of diseases in humans are zoonotic or of zoonotic origin. (OPS, 2023)

Considering what has been mentioned above, it is necessary to develop an approach within the framework of One Health that considers the causes that interact and are responsible for the intersectoral problems in human, animal, and environmental health. It is essential to work together to find strategies and solutions to control these problems.

Photo 8. Sunrise at the base of the Arenal Volcano in Costa Rica.

Photo 9. A beautiful panorama of the tropical rainforest in Costa Rica.

Zoonotic diseases that occur in large numbers can impact society in three main ways. They:

- Threaten the health of animals (domestic, production, and wild animals), resulting in illness, loss of productivity, and death, which affect ecosystem services critical for people's lives.
- Threaten the livelihood of the population that depends on livestock as a primary source of income, and ecological services like pollination, and access to drinking water, among others.
- 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.

To best address zoonotic diseases, a multisectoral, One Health approach is needed. One Health means a collaborative, multisectoral, and transdisciplinary approach—working at the local, regional, national, and global level—with the goal of achieving optimal health outcomes, recognizing the interconnection between people, animals, and their shared environment.

To begin to address zoonotic disease challenges in Costa Rica, a One Health Zoonotic Disease Prioritization Workshop was held August 26–28, 2024, at the DoubleTree by Hilton Hotel Cariari, located in San Antonio de Belén. The purpose of this workshop was to prioritize zoonotic diseases of greatest concern using a multisectoral, One Health approach, with equal input from representatives of human, animal (livestock and wildlife), and environmental health sectors and other relevant partners.

The specific workshop goals were to use a multisectoral, One Health approach to:

1. Prioritize zoonotic diseases of greatest concern for Costa Rica
2. Establish next steps and action plans to address the priority zoonotic diseases

To build in-country capacity to conduct future One Health Zoonotic Disease Prioritization workshops, nine local partners from relevant One Health sectors and partners were trained by CDC on the One Health Zoonotic Disease Prioritization Process:

- Ministry of Health
- Costa Rican Institute of Research and Teaching in Nutrition and Health
- Ministry of Agriculture and Livestock
- Ministry of Environment and Energy

WORKSHOP METHODS

The One Health Zoonotic Disease Prioritization Process uses a mixed methods process were 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 spread between humans and animals and was of concern for Costa Rica. Zoonotic diseases on human or animal reportable disease list were included on the initial list. Voting members agreed upon a list of 25 zoonotic diseases for prioritization through the OHZDP process (Appendix C).

During the workshop, the participants developed five criteria to rank the 25 zoonotic diseases (See Table 2). Once the five criteria were developed, one categorical question was determined for each criterion through group discussion. The questions were created to best measure each criterion. All questions had ordinal, binomial, and multinomial answers. The ordinal nature is necessary for the scoring process and each answer choice was given a score determined by the participants. Voting members then individually ranked their preferences for the relative importance of each criterion. Each individual voting member's ranking was then entered into the One Health Zoonotic Disease Prioritization Tool by a facilitator and a group weight for each criterion was calculated.

Workshop facilitators and participants answered each question for each zoonotic disease using data identified through an extensive literature search, as well as information from the World Health Organization (WHO), the World Organisation for Animal Health (WOAH), and other relevant websites. If no information for a particular zoonotic disease was available for Costa Rica, global data or data from the region was used. More than 100 publications were collected with disease-specific information on transmission, severity, pandemic and endemic potential, economic impact, prevention and control, and environmental impact for the country, region, and world. These references were compiled and shared with workshop participants.

After scoring all zoonotic diseases, decision tree analysis was used to determine the ranked zoonotic diseases 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 C for a complete listing 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 seven zoonotic diseases (Table 1). After deciding on the priority zoonotic diseases, the participants established the next steps and action plans to address the priority zoonotic diseases.

Photo 10. The red-eyed tree frog (*Agalychnis callidryas*) is common to the forests of Costa Rica.

CRITERIA AND QUESTIONS DEVELOPED

The criteria for ranking zoonotic diseases selected by the voting members in Costa Rica are listed in order of importance. A description of how the questions assessed the criteria are listed below. For the full questions and answers, see Appendix D.

Table 2. Criteria For Prioritization and Weighting of Zoonotic Diseases in Costa Rica, August 2024.

Rank	Criteria	Weight	Questions
1	Disease Severity	0.31	What is the disease's fatality rate?
2	Transmission potential, incidence	0.25	In the past 5 years, are there registered cases in: • People • Wild animals • Domestic animals
3	Surveillance, prevention, and control	0.18	Is there surveillance, prevention, and control capacity for this zoonotic disease?
4	Socioeconomic impact	0.17	What socioeconomic aspects are affected by the zoonotic disease? • People's health • Domestic animals' health • Wild animals' health • Productive activities • Commercial activities • The ecosystem • Local communities • Indigenous people
5	Environmental impact	0.09	How many of the following environmental factors favor the presence of the disease? • Climate change • Change in use of land • Use of agrochemicals, chemicals, and medicines • Interactions between species • Defaunation • Pollution

LIST OF PRIORITY ZOONOTIC DISEASES FOR COSTA RICA

The seven priority zoonotic diseases for the multisectoral, One Health collaboration in Costa Rica are (Table 1):

- Zoonotic influenza (avian influenza, swine influenza)
- Brucellosis
- Zoonotic tuberculosis
- Rabies
- New World Screwworm
- Salmonellosis
- Zoonotic viral encephalitis (Eastern Equine Encephalitis, Saint Louis Encephalitis, Venezuelan Equine Encephalitis, Western Equine Encephalitis, West Nile Virus)

NEXT STEPS AND ACTION PLANS

After finalizing the list of priority zoonotic diseases, workshop participants discussed next steps and action plans to address the diseases using a multisectoral, One Health approach. A summary of the recommendations organized by thematic area follows below:

One Health Coordination

Goal: Strengthen the inter-institutional coordination mechanisms to meet the health challenges under the One Health approach.

Next Steps	Indicator	Responsible Sector
Define the actors involved in the coordination process	Number of actors involved in the process by each institution	Ministry of Health (MS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Costa Rican Social Security Fund (CCSS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Establish specific working groups	Percentage of representatives from human, animal, and environmental sectors who participate in the working groups	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Review and update the regulatory framework	Number of regulatory instruments reviewed Number of regulatory instruments updated Number of regulatory instruments approved	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Analyze and schedule collaborative actions centered around the ecology of the diseases of wild and domestic animals and their linkage to human health and biodiversity conservation	Number of working groups that integrate collaborative actions centered around the ecology of the diseases of wild and domestic animals and their linkage to human health and biodiversity conservation	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Timeline	April 2025	

Surveillance Capacity

Goal: Strengthen the surveillance system of priority zoonotic diseases through a One Health approach.

Next Steps	Indicator	Responsible Sector
Identify existing surveillance regulations and develop the missing regulations related to priority zoonotic diseases in all three sectors	Regulations were identified (Yes/No) in each sector Regulations were developed (Yes/No) in each sector	Ministry of Health (MS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Costa Rican Social Security Fund (CCSS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Update protocols using the One Health approach for prioritized zoonotic diseases	Regulations were updated (Yes/No) in each sector	MS, Inciensa, CCSS, MAG-SENASA, MINAE

Next Steps	Indicator	Responsible Sector
Identify missing protocols for their development using the One Health approach for prioritized zoonotic diseases	Missing protocols were identified (Yes/No) in each sector Missing protocols were developed (Yes/No) in each sector	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Identify the information systems of the three sectors to assess their interoperability	Information systems were identified (Yes/No) in all three sectors	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Timeline	April 2025	

Laboratory Capacity

Goal: Determine the laboratories' capacity for diagnosing prioritized zoonotic diseases.

Next Steps	Indicator	Responsible Sector
Determine the mechanisms that ensure the quality of results from the diagnostic methods available for the prioritized zoonotic diseases	Number of mechanisms to guarantee the quality of the diagnosis methods available for zoonotic diseases in each of the Ministry of Health (MS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), and Ministry of Environment and Energy—National System of Conservation Areas (MINAE-SINAC) sectors	Ministry of Health (MS)—Health Surveillance Directorate (DVS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Determine the gaps in the capabilities of the laboratories available for the prioritized zoonotic diseases across the three sectors	Number of gaps identified in laboratory capacity for the diagnosis of zoonotic diseases in each of the MS, MAG-SENASA, and MINAE-SINAC sectors	MS (DVS), INCIENSA, MAG-SENASA, MINAE
Promote management to offset the gaps in the capabilities of the laboratories available for the prioritized zoonotic diseases across the three sectors	Number of management actions taken to offset the gaps in the capabilities of the laboratories available for the prioritized zoonotic diseases in each of the MS, MAG-SENASA, and MINAE-SINAC sectors	MS (DVS), INCIENSA, MAG-SENASA, MINAE
Identify the official laboratories across the three sectors of the human-animal-environmental interface	Number of official laboratories in each of the MS, MAG-SENASA, MINAE-SINAC sectors	MS (DVS)-INCIENSA, MAG-SENASA, MINAE
Identify in the capabilities of the laboratories available in the human-animal-environmental for the prioritized zoonotic diseases	Number of diagnosis methods available for zoonotic diseases in each of the MS, MAG-SENASA, and MINAE-SINAC sectors	MS (DVS)-INCIENSA, MAG-SENASA, MINAE
Timeline	April 2025	

Outbreak Response

Goal: Strengthen the capacities for timely response to control outbreaks of the prioritized zoonotic diseases across the three sectors.

Next Steps	Indicator	Responsible Sector
Identify the needs to timely respond to prioritized zoonotic diseases outbreaks	Needs were identified (Yes/No) in each sector	Ministry of Health (MS)—Health Surveillance Directorate (DVS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Identify existing regulations for a timely outbreak response and develop missing regulations for prioritized zoonotic diseases across three sectors	Regulations were identified (Yes/No) in each sector. Regulations were developed (Yes/No) in each sector.	MS (DVS)-Inciensa, MAG-SENASA, MINAE
Update protocols for outbreak management and create the missing protocols using the One Health approach for prioritized zoonotic diseases.	Protocols were identified (Yes/No) in each sector. Protocols were developed (Yes/No) in each sector.	MS (DVS)-Inciensa, MAG-SENASA, MINAE
Urge management to offset gaps in outbreak management for prioritized zoonotic diseases across three sectors	Number of management actions taken to offset gaps in outbreak management for prioritized zoonotic diseases in each one of the Ministry of Health (MS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), and Ministry of Environment and Energy—National System of Conservation Areas (MINAE-SINAC) sectors	MS (DVS)-Inciensa, MAG-SENASA, MINAE
Timeline	April 2025	

Preparedness and Planning

Goal: Establish the preparedness and planning mechanisms to manage prioritized zoonotic diseases across One Health sectors.

Next Steps	Indicator	Responsible Sector
Identify funding sources and strategic partners for implementation and sustainability of plans	Funding sources and strategic partners identified	Ministry of Health (MS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Costa Rican Social Security Fund (CCSS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Diagnose established preparedness and planning action plans across sectors under the concept of One Health	Diagnosis of action plans done	MS, Inciensa, CCSS, MAG-SENASA, MINAE

Next Steps	Indicator	Responsible Sector
Establish intersectoral lines of communication at all levels (national, regional, local) to manage each of the prioritized zoonotic diseases across One Health sectors	Intersectoral lines of communication at all levels established	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Identify the key actors to manage each of the prioritized zoonotic diseases across One Health sectors	Key actors identified	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Develop or update national preparedness and planning action plans for the prioritized zoonotic diseases across One Health sectors	Preparedness and planning action plans developed Preparedness and planning action plans updated	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Timeline	April 2025	

Prevention and Control

Goal: Strengthen the prevention and control capacities to manage the One Health prioritized zoonotic diseases.

Next Steps	Indicator	Responsible Sector
Establish prevention and control measures in the surveillance protocol for prioritized zoonotic diseases under the One Health approach	Prevention and control measures for human health included in surveillance protocols Prevention and control measures for animal health included in surveillance protocols Prevention and control measures for environmental health included in surveillance protocols	Ministry of Health (MS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Costa Rican Social Security Fund (CCSS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Identify funding sources and strategic partners for the implementation of prevention and control measures for prioritized zoonotic diseases under the One Health approach	Funding sources identified Strategic partners identified	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Create an integrated information system for the intersectoral approach to prioritized zoonotic diseases under the One Health approach	Integrated information system to manage on an intersectoral level created	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Timeline	April 2025	

Workforce Capacity

Goal: Ensure the availability of trained human resources for the management of prioritized zoonotic diseases within the One Health framework.

Next Steps	Indicator	Responsible Sector
Conduct a diagnosis of the established capacities of human resources across all sectors under the concept of One Health	Diagnosis completed	Ministry of Health (MS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Costa Rican Social Security Fund (CCSS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Develop training programs aimed at officials from the three sectors in order to create skills, abilities, and capacity to prevent, detect, notify, control, monitor, and act against threats under the One Health approach	Training programs completed	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Identify funding sources and strategic partners for the implementation of the established human resource capacities across all sectors under the One Health concept	Funding sources identified	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Timeline	6 months first review.	

Risk Communication and Community Education

Goal: Develop a risk communication strategy aimed at the parties that may be affected under the One Health approach.

Next Steps	Indicator	Responsible Sector
Establish an inter-institutional communication mechanism for risk communication and community education	An interinstitutional communication mechanism has been established	Ministry of Health (MS), Costa Rican Institute of Research and Teaching in Nutrition and Health (Inciensa), Costa Rican Social Security Fund (CCSS), Ministry of Agriculture and Livestock—National Animal Health Service (MAG-SENASA), Ministry of Environment and Energy (MINAE)
Communicate the risk of zoonotic diseases	An annual publication of the status of the prioritized zoonotic diseases	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Create informative and educational materials on zoonotic diseases	Informative and educational materials created and shared	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Develop One Health educational and continuing education materials for diverse audiences	Informative and educational materials created and shared	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Communicate health alerts for zoonotic diseases	Number of alerts communicated	MS, Inciensa, CCSS, MAG-SENASA, MINAE
Timeline	April 2025	

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/one-health/php/prioritization/index.html

ONE HEALTH ZOONOTIC 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

- 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
- 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

https://www.cdc.gov/one-health/php/prioritization/index.html

APPENDIX B: One Health Zoonotic Disease Prioritization Workshop Participants, August 2024

Core Planning Team

Name	Organization	Title/Position
María José Lafuente González	MS	Manager of Zoonotic Diseases/Animal Health
Pamela Domínguez Saavedra	MS	Epidemiology Doctor
Amed La Roche Loaiza	MS	Health Surveillance, Regional Directorate of Brunca
Ariana Beatriz Barboza Giusti	Inciensa	National Center of Reference in Entomology
Diana Victoria Chinchilla Montero	Inciensa	National Center of Reference in Bacteriology
Angie Michelle Sánchez Núñez	MINAE—SINAC	Wildlife Coordinator
Shirley Ramírez Carvajal	MINAE—CONAGEBIO	Monitoring Unit Coordinator, National Biodiversity Strategy
Cindy Brenes Villalta	MAG-SENASA	Chair of the Sub-cantonal Office of Venecia
Kathia Vargas Rodríguez	MAG-SENASA	Chair of the Cantonal Office of Talamanca
Douglas Javier Blanco Alvarado	MAG-SENASA	Chair of the Cantonal Office of Orotina
Azalea Espinoza	SECOMISCA	National Global Health Technician
Karla Quinteros	SECOMISCA	One Health Coordinator
Sergio Guzmán	SECOMISCA	One Health Regional Consultant
Edgar Bailey Leonardo	CDC, Central America	Epidemiologist

Trained National Facilitators

Name	Organization	Title/Position
María José Lafuente González	MS	Manager of Zoonotic Diseases/Animal Health
Pamela Domínguez Saavedra	MS	Epidemiology Doctor
Amed La Roche Loaiza	MS	Health Surveillance, Regional Directorate of Brunca
Ariana Beatriz Barboza Giusti	Inciensa	National Center of Reference in Entomology
Cindy Brenes Villalta	MAG-SENASA	Chair of the Sub-cantonal Office of Venecia
Kathia Vargas Rodríguez	MAG-SENASA	Chair of the Cantonal Office of Talamanca
Douglas Javier Blanco Alvarado	MAG-SENASA	Chair of the Cantonal Office of Orotina
Angie Michelle Sánchez Núñez	MINAE—SINAC	Wildlife Coordinator
Shirley Ramírez Carvajal	MINAE—CONAGEBIO	Monitoring Unit Coordinator, National Biodiversity Strategy

External Facilitators

Name	Organization	Title/Position
Azalea Espinoza Aguirre	SECOMISCA	National Global Health Technician
Karla Marysol Quinteros Martínez	SECOMISCA	One Health Coordinator
Sergio Vinicio Guzmán Romero	SECOMISCA	One Health Regional Consultant

Name	Organization	Title/Position
Tania Lizbeth Rodríguez Callejas	SECOMISCA	Technical Assistance
Edgar Bailey Leonardo	CDC, Central America	Epidemiologist
Marinés Reyes	CDC, Central America	Program Coordinator
Jenna Ciszewski	CDC, Central America	Program Coordinator

Voting Members

Name	Organization	Title/Position
Roberto Castro Córdoba	MS	Acting Director of the Directorate of Health Surveillance
Xiomara Badilla Vargas	CCSS	Chair of the Epidemiology Subdivision
Sharon Porras Hidalgo	Inciensa	Laboratory Based Surveillance Director
David Chavarría Morales/ Yeimy Cedeño Solís	MINAE—SINAC	Executive Director
Shirley Soto Montero	MINAE—DIGECA	Director
Ángela González Grau	MINAE—CONAGEBIO	Executive Director
Alexis Sandí Muñoz	SENASA	Chair of the Epidemiology Department
Flor Barquero Vargas	SENASA	Deputy Director
Olivet Cruz Vásquez	SENASA	Director of Animal Product Safety

Advisors

Name	Organization	Title/Position
Lennya Centeno Víctor	MS	Medical Advisor, Office of the Vice-minister of Health
Diana Chinchilla Montero	Inciensa—CNRB	Microbiologist
Claudio Soto Garita	Inciensa—CNRV	Microbiologist
Carlos Mata Somarribas	Inciensa – CNRP	Microbiologist
Marcela Hernández De Mezerville	National Children's Hospital, CCSS	Pediatrician and Infectious Disease Specialist
Jorge Chaverri Murillo	Calderón Guardia Hospital, CCSS	Infectious Disease Specialist
Gabriela Hernández Mora	SENASA – LANASEVE	Microbiology Unit
Heilyn Fernández Carvajal	SENASA	Department of Records, Drug Directorate
Dulce Lobaina Abiaguez	SENASA	Department of Records, Quarantine Directorate
Bernal León Rodríguez	SENASA – LANASEVE	Unit Lead of the Biosecurity Laboratory
Ronaldo Chaves Ledezma	SENASA	Epidemiology / Bird Health National Program
Bernardo Calvo Rodríguez	SENASA	Regional Director of the Huetar Caribbean Region
Laura Brenes Chaves	MINAE—SINAC	Department of Conservation and Sustainable Use of Biodiversity
Christiam Álvarez Vega	MINAE—DIGECA	Official of the Sustainable Production and Consumption Unit

Name	Organization	Title/Position
Gaby Dolz Wiedner	UNA, Laboratory of Zoonosis and Entomology, Population Medicine Program, EMV-UNA	Veterinarian, Professor and Researcher
Mauricio Jiménez Soto	Small Species and Wildlife Hospital-UNA	Veterinarian, Director
Andrea Chaves Ramírez	School of Biology, UNA	Disease Ecologist
Isabel Hagnauer Barrantes	Tropical Wildlife Rescue Center, Zoave	Regent, Veterinarian

Observers

Name	Organization	Title/Position
Alfonso Tenorio Gnecco	PAHO	Representative
Ana María Jiménez Solís	PAHO	National Consultant, Costa Rica, Communicable Diseases
Sacha Trelles Zárate	IICA	Technical Coordinator Representing Costa Rica
Monserrat Vargas Solorzano	OIRSA	Representative
Andrea Padilla Arce	FAO	Representative
Luis Alberto Matamoros Cortés	SENASA	General Director
Natalia Chaves Céspedes	Office of the Minister, Communication Unit, MS	Office of the Chief
Daniela Ramírez Najar	Office of the Minister, MS	Public Relations
Roger Murillo Ávila	Office of the Minister, MS	Journalist and Audiovisual Producer
María Carranza	Inciensa	Representative

Special Guests

Name	Organization	Title/Position
Mary Munive Angermüller	MS	Vice President of the Republic and Minister
Franz Tattenbach Capra	MINAE	Minister
Fernando Vargas	MAG	Vice Minister

Photo 11. Farms and pastures in the foreground and the city of Turrialba in the Turrialba Valley in Costa Rica.

APPENDIX C: Final Results of the One Health Zoonotic Disease Prioritization Tool in Costa Rica

Rank#	Zoonotic Disease Name	Etiologic Agent	Gross Final Score	Standardised Final Ranking
1	Rickettsiosis	*Rickettsia spp.*	1.084	1.000
2	**Eastern equine encephalitis**	**Madariaga virus *(Alphavirus)***	**1.079**	**0.995**
3	**Zoonotic avian influenza**	**Influenza A virus (*Orthomyxovirus*)**	**1.042**	**0.961**
4	**Rabies**	**Rabies virus *(Lyssavirus)***	**1.041**	**0.960**
5	**Brucellosis**	***Brucella* spp.**	**1.029**	**0.949**
6	**Saint Louis encephalitis**	**Saint Louis encephalitis virus *(Flavivirus)***	**1.001**	**0.923**
7	Anthrax	*Bacillus anthracis*	0.968	0.893
8	**West Nile virus**	**West Nile virus (*Flavivirus*)**	0.922	0.851
9	**Venezuelan equine encephalitis**	**Venezuelan equine encephalitis virus (*Alphavirus*)**	0.922	0.851
10	Leptospirosis	*Leptospira spp.*	0.891	0.822
11	Bovine spongiform encephalopathy	*Creutzeldt-Jacob*	0.853	0.787
12	**Western equine encephalitis**	**Western equine encephalitis virus (*Alphavirus*)**	0.839	0.774
13	Coronavirus	Coronavirus of zoonotic origin	0.815	0.752
14	**Zoonotic tuberculosis**	***Mycobacterium bovis***	0.813	0.750
15	Chagas eisease	*Trypanosoma cruzi*	0.811	0.748
16	Listeriosis	*Listeria monocytogenes*	0.801	0.739
17	**Salmonellosis**	***Salmonella enterica***	0.789	0.728
18	**New World Screwworm**	***Cochliomyia hominivorax***	0.782	0.721
19	Toxoplasmosis	*Toxoplasma gondii*	0.741	0.684
20	*Hantavirus*	Virus of the genus *Orthobunyavirus*	0.728	0.672
21	*Escherichia coli*	*Escherichia coli O157:H7*	0.722	0.666
22	**Zoonotic swine influenza**	**H1N1, H1N2, H3N2**	0.707	0.6
23	Campylobacteriosis	*Campylobacter* spp.	0.654	0.603
24	Giardiasis	*Giardia lamblia*	0.625	0.577
25	Leishmaniasis	*Leishmania* spp.	0.625	0.577

APPENDIX D: Criteria, Criteria Weights, and Questions Developed in Costa Rica

1. **Socioeconomic impact (Criterion consideration = 0.17)**

   Question: What socioeconomic aspects are affected by the zoonotic disease?

   - **People's health**
   - **Domestic animals' health**
   - **Wild animals' health**
   - **Productive activities**
   - **Commercial activities**
   - **The ecosystem**
   - **Local communities**
   - **Indigenous people**

   Answer:

   - ☐ It affects 7 to 8 aspects (4)
   - ☐ It affects 4 to 6 aspects (3)
   - ☐ It affects 1 to 3 aspects (2)
   - ☐ It doesn't affect an aspect (1)

2. **Environmental impact (Criterion consideration = 0.09)**

   Question: How many of the following environmental factors favor the presence of the disease?

   - **Climate change**
   - **Change in use of land**
   - **Use of agrochemicals, chemicals, and drugs**
   - **Interactions between species**
   - **Defaunation**
   - **Pollution**

   Answer:

   - ☐ 5 to 6 factors (4)
   - ☐ 3 to 4 factors (3)
   - ☐ 1 to 2 factors (2)
   - ☐ No factors favor the presence of the disease (1)

3. Transmission potential, incidence (Criterion consideration = 0.25)

Question: In the last 5 years, there are registered cases in:

- **People**
- **Wild animals**
- **Domestic animals**

Answer:

- ☐ Meets 3 criteria (4)
- ☐ Meets 2 criteria (3)
- ☐ Meets 1 criterion (2)
- ☐ There are no reported cases in any species (1)

4. Disease severity (Criterion consideration = 0.31)

Question: What is the disease's fatality rate?

Answer:

- ☐ High in humans and high in animals (5)
- ☐ Medium in humans and high in animals or vice versa (4)
- ☐ Medium in humans and medium in animals, high in humans and low in animals or vice versa (3)
- ☐ Low in humans and medium in animals or vice versa (2)
- ☐ Low in animals and low in humans (1)

5. Surveillance, prevention, and control (Criterion consideration = 0.18)

Question: Is there surveillance, prevention, and control capacity for this zoonotic disease?

Answer:

- ☐ It does not comply with any (4)
- ☐ It complies with 1 to 3 points (3)
- ☐ It complies with 4 to 6 points (2)
- ☐ It complies with 7 to 9 points (1)

The scenario was:

- *The sectors are human health, animal health, and environmental health.*
- *All three capacities are evaluated for each sector.*
- *Environmental health includes wild animals.*

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Photo 12. A ripe cacao pod (*Theobroma cacao*) that has been freshly cut open, revealing the white, pulp-covered cocoa beans nestled inside, common in tropical cacao-producing regions like Costa Rica.

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