

# OIE Collaborating Centres Reports Activities

## *Activities in 2018*

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<b>Title of collaborating centre:</b>	Emerging and Re-Emerging Zoonotic Diseases
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**ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories**

**ToR: To identify and maintain existing expertise, in particular within its region**

**1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by the OIE**

Disease control	
Title of activity	Scope
Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries (TZG)	The CDC One Health Office provided financial, technical, and in-kind support in the development of the TZG. The CDC External Experts serving as One Health Liaisons to the OIE and FAO contributed directly to the planning, writing and review of the TZG and Operational Tools proposal and TZG document while serving as a co-lead or member of multiple technical area working groups and provided feedback on the drafts. In addition, Director of the CDC One Health Office and other CDC subject matter experts served on multiple TZG technical area working groups and made significant contributions to the writing and development of the TZG. The CDC External Expert serving as the One Health Liaison to the OIE also represented the OIE on the TZG secretariat. The CDC One Health Office staff worked with the Liaison to the OIE in creating a draft TZG assessment survey. The CDC's One Health Office's Communication Specialist provided input on the graphics and figures and designed and developed one figure.
Support development of Operational Tools to support implementation of the guide, "Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries (TZG)" including tools for Joint Risk Assessment, Multisectoral, One Health Coordinating Mechanisms, and Surveillance and Information Sharing	The CDC One Health Office provided financial, technical, and in-kind support in the development of Operational Tools to support the implementation of the TZG. The Liaison to the OIE serves as a member of the Joint Risk Assessment Operational Tool and TZG secretariat. Two CDC staff participated in a "Train the Trainers" workshop for the Joint Risk Assessment Operational Tool. The Liaison to the FAO is the lead for the Surveillance and Information Sharing Operational Tool's development. The Director of the One Health Office serves on the Multisectoral Coordination Mechanism Technical Working Group.
Desk Review: One Health Materials, Processes and Activities (U.S. DoD/DTRA grant to the OIE)	The CDC Liaison to the OIE coordinated a Desk Review of available One Health tools that will support multiple OIE projects and publications, including the TZG, and partners including WHO, FAO, CDC, and DTRA. The CDC External Expert serving as One Health Liaison to the OIE coordinated the desk review effort as part of the U.S. DoD/DTRA TZG Operational Tools grant requirement. The Liaison researched the relevant materials, processes and activities as part of a Tripartite effort. Accordingly, she sought input from FAO and WHO colleagues along with USDA and CDC colleagues in preparing the final product. This desk review will be used by U.S. DoD/DTRA field officers in assisting OIE member countries in building One Health capacity. In addition, the desk has been used as a reference for example by Tripartite and other partners (e.g., USDA and University of Minnesota) in composing lists of available One Health resources for the TZG Surveillance and Information Sharing Operational Tool's development and in preparing the April 2019 OIE Scientific and Technical Review manuscript "Synergizing Tools for Capacity Assessment and One Health Operationalization".
Healthy Pets, Healthy People	CDC's One Health Office manages the Healthy Pets, Healthy People website. This website provides up-to-date information on zoonotic diseases related to pets, livestock, and wildlife, including outbreaks linked to animals and animal products. The website also provides resources for public health and animal health officials; educational materials on staying healthy around animals; guidelines for preventing zoonoses in infants, the immunocompromised, and in public settings such as petting zoos; and resources for pet owners on how to prepare pets for disasters. This website is used globally by >50 countries annually. <a href="https://www.cdc.gov/healthypets/index.html">https://www.cdc.gov/healthypets/index.html</a>

Influenza and Zoonoses Education for Youth in Agriculture in the United States	The U.S. Centers for Disease Control and Prevention's National Center for Emerging and Zoonotic Diseases and the National Center for Influenza and Respiratory Diseases has worked with the U.S. Department of Agriculture and the Council of State and Territorial Epidemiologists to promote a One Health collaboration between federal and state public health and animal health authorities and state youth agriculture groups through a program called Influenza and Zoonoses Education Among Youth in Agriculture. This innovative program educates youth about zoonotic diseases shared between animals and people, delivers disease prevention messages, and strengthens One Health networks among state human and animal health departments and agricultural communities across rural America. For more information and to access globally available prevention resources, please visit <a href="https://www.cdc.gov/onehealth/pdfs/youth-in-ag-508.pdf">https://www.cdc.gov/onehealth/pdfs/youth-in-ag-508.pdf</a> and <a href="https://www.cdc.gov/onehealth/domestic-activities/index.html">https://www.cdc.gov/onehealth/domestic-activities/index.html</a>
International Rabies Control and Prevention	CDC led development and publication of several tools that are now available to the international community, including a rabies elimination planning tool, a rabies vaccination planning tool, and a proposed framework for international agencies to successfully engage Ministries of Health or Agriculture to create sustainable rabies elimination programs.
Monkeypox in Cameroon, Nigeria, and the Democratic Republic of the Congo	During 2018, CDC staff provided assistance for the response against the monkeypox outbreak in Nigeria by providing consultation and enhancing capacity for outbreak response, patient management, laboratory diagnostics and ecological investigations. Continued the support of epidemiological and ecologic investigations in the Democratic Republic of the Congo and Cameroon.
Anthrax prevention and control in Bangladesh, Cameroon, Ethiopia, Namibia, and Uganda	In addition to in-country response assistance for multiple outbreaks of anthrax in Namibia and Uganda, CDC's Bacterial Special Pathogens Branch counseled the aforementioned nation partners on lab network and prevention plans and gave technical assistance and training in surveillance, laboratory biosafety/biosecurity, and effective diagnostic methods.
Border health technical assistance to prevent spread of zoonotic diseases in Uganda	In September 2018, CDC veterinarians went to Uganda at the request of the CDC Uganda country office and Ugandan Ministry of Health to evaluate border health capacity to prevent spread of zoonotic diseases through animal movement, domestic and wildlife. Information was gathered on relevant surveillance activities, the National One Health Platform in Uganda, and cross-border communication. CDC consulted with a number of agencies and NGOs, including the Ministry of Health, Ministry of Agriculture, and WHO Food and Agriculture Organization, along with other in-country partners and stakeholders, on animal surveillance for zoonoses, animal movement and border health, and one health. A summary and list of recommendations across all platforms and timeframes were provided to Ugandan government officials that address priorities identified in the Joint External Evaluation. This was unique for CDC in that the focus was on animal movement that accompanies human movement across borders and how they are interrelated from a public health and economic perspective under the larger umbrella of the Global Health Security Agenda.
Global Disease Detection Centers - Outbreak investigations supported	<p>GDD Centers provide direct support for outbreak responses, which require more resources and laboratory diagnostics expertise than what is available at the host ministry of health or within the region. Activities can include direct field response, laboratory diagnostics support, and movement of people and/or supplies to support responses for disease outbreaks.</p> <p>In 2018, GDD Centers in Bangladesh, Guatemala, Kazakhstan, India, and Kenya (include one Ebola response involving DRC, Uganda, Rwanda) responded to 26 zoonotic disease outbreak investigations that included anthrax (3), chikungunya (3), dengue (3), Ebola (2), leptospirosis (4), Nipah encephalitis (8), rabies (1), and scrub typhus (1). Twenty-two (85%) of the outbreaks investigated received laboratory support, and in 15 (68%) of the outbreaks that received laboratory support, the cause was identified.</p>
Continued Increase in Human Salmonella Infections Linked to Contact with Live Poultry and Partnerships for Prevention in the United States	Epidemiologic, laboratory, and traceback findings linked several outbreaks of human Salmonella infections to contact with chicks, ducklings, and other live poultry from multiple hatcheries. In 2018, over 300 illnesses were reported from several states in the United States. This was a decrease in illnesses from 2017. CDC's Outbreak Response and Prevention Branch is actively working with industry partners to develop new strategies to address this significant public health concern. For more information, please visit: <a href="https://www.cdc.gov/salmonella/backyard-flocks-06-18/index.html">https://www.cdc.gov/salmonella/backyard-flocks-06-18/index.html</a>
Multidrug-resistant Salmonella Heidelberg Infections Linked to Contact with Cattle in the United States	An outbreak of multidrug-resistant Salmonella Heidelberg infections linked to contact with cattle resulted in a third year of illnesses and continued to highlight the need to proactively communicate with people who work with livestock to prevent illnesses. The majority of ill people reported contact with dairy calves or other cattle in the week before their illness started. Some people noted their infection began after their dairy calves were sick or died. Additionally, CDC is actively monitoring for illnesses that may not be linked to contact with live animals but rather consumption of beef products. For more information, please visit: <a href="https://www.cdc.gov/salmonella/heidelberg-11-16/index.html">https://www.cdc.gov/salmonella/heidelberg-11-16/index.html</a>

<p>Multidrug-resistant <i>Campylobacter</i> Infections Linked to Contact with Pet Store Puppies in the United States (<a href="https://www.cdc.gov/campylobacter/outbreaks/puppies-9-17/index.html">https://www.cdc.gov/campylobacter/outbreaks/puppies-9-17/index.html</a>)</p>	<p>CDC, several states, and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service investigated a multistate outbreak of multidrug-resistant <i>Campylobacter</i> infections. Epidemiologic and laboratory evidence indicated that contact with puppies sold through retail pet stores were a likely source of this outbreak. A total of 113 people from 17 states with laboratory-confirmed infections or symptoms consistent with <i>Campylobacter</i> infection were linked to this outbreak. Of 103 people with available information, 23 (22%) were hospitalized. No deaths were reported. Whole genome sequencing (WGS) showed that isolates from people infected with <i>Campylobacter</i> were closely related genetically. <i>Campylobacter</i> bacteria isolated from clinical samples from people sickened in this outbreak were resistant to commonly recommended, first-line antibiotics. Using WGS, CDC identified multiple antimicrobial resistance genes and mutations in most isolates from 38 ill people and 10 puppies in this outbreak. This finding matched results from standard antibiotic susceptibility testing methods used by CDC's National Antimicrobial Resistance Monitoring System laboratory on isolates from five ill people and seven puppies in this outbreak. The 12 isolates tested by standard methods were resistant to azithromycin, ciprofloxacin, clindamycin, erythromycin, nalidixic acid, telithromycin, and tetracycline. In addition, 10 were resistant to gentamicin, and 2 were resistant to florfenicol.</p>
<p>Multistate <i>Salmonella</i> Illness Outbreak Infections Linked to Contact with Pet Guinea Pigs in the United States</p>	<p>CDC, several states, and the U.S. Department of Agriculture Animal and Plant Health Inspection Service are investigating a multistate outbreak of <i>Salmonella</i> Enteritidis infections. CDC began investigating in December 2017 when CDC PulseNet identified a cluster of three <i>Salmonella</i> Enteritidis infections that whole genome sequencing showed were closely related genetically. A review of the CDC PulseNet database identified six more closely related illnesses dating back to 2015. These illnesses were added to the outbreak case count. Nine people infected with the outbreak strain of <i>Salmonella</i> Enteritidis have been reported from eight states. One person was hospitalized, and no deaths were reported. Epidemiologic and laboratory evidence indicates that contact with pet guinea pigs is the likely source of this multistate outbreak. For more information, please visit: <a href="https://www.cdc.gov/salmonella/guinea-pigs-03-18/index.html">https://www.cdc.gov/salmonella/guinea-pigs-03-18/index.html</a></p>
<p>Zoonotic Influenza Disease Control Activities</p>	<p>The mission of the CDC Influenza Division is to improve global control and prevention of seasonal and novel influenza and to improve influenza pandemic preparedness and response. In collaboration with domestic and global partners, the Influenza Division accomplishes this mission by building surveillance and response capacity, monitoring and assessing influenza viruses and illness, improving vaccines and other interventions, and applying research to provide science-based enhancement of prevention and control policies and programs. Examples of 2018 activities and projects to improve domestic and global zoonotic influenza disease control include the following.</p> <ul style="list-style-type: none"> <li>• Monitor and report human cases of novel influenza viruses and outbreaks of animal influenza viruses in the United States.</li> <li>• Through the Influenza Risk Assessment Tool, assess the potential pandemic risk posed by influenza A viruses that currently circulate in animals but not in humans.</li> <li>• Assess virus evolution and global emergence patterns of zoonotic influenza viruses, to improve potential mitigation efforts for pandemic preparedness and response.</li> </ul>
<p>Operationalizing One Health in the Arctic</p>	<p>CDC's Arctic Investigations Program (AIP) in Anchorage, Alaska has led and participated in One Health activities related to the health of Arctic populations, zoonotic diseases and developing relationships with stakeholders in Alaska and internationally. The AIP Director has a co-lead role in the Arctic Council's One Health initiative. Begun under the US Chairmanship in 2015, "Operationalizing One Health in the Arctic" was a joint effort of the US Department of State and CDC. Activities are ongoing through the Arctic Council, under Finland's chairmanship (2017-19).</p>
<p>Alaska One Health Workgroup</p>	<p>AIP has co-led a quarterly Alaska One Health Workgroup meeting and webinar with the Alaska Native Tribal Health Consortium since 2013. Participants include federal, state, tribal, university and local stakeholders. Meetings focus on situational awareness using reports from Local Environmental Observer network and agency updates. Scientific presentations and hot topics are covered. Ongoing themes include unusual mortality events in wildlife, zoonotic disease emergence, environmental toxin accumulation and food security. The events are announced through the IARPC collaborations website: <a href="http://www.iarpcollaborations.org">www.iarpcollaborations.org</a> The archive of webinars can be found here <a href="http://www.leonetnetwork.org/en/leo/hubpage/ALASKA?show=one-health-group">http://www.leonetnetwork.org/en/leo/hubpage/ALASKA?show=one-health-group</a></p>

Interagency Arctic Research Policy Committee	AIP's Director represents CDC on the Interagency Arctic Research Policy Committee, an US government committee charged with coordinating and carrying out the US Arctic Research Plan. The most recent plan features a specific One Health objective (1.1) and performance elements (1.1.1 -1.1.5); all require interagency collaboration and most engage CDC subject matter experts related to zoonotic diseases or Alaska Native health concerns. The 2017 -2021 US Arctic Research Plan and implementation progress can be found here: <a href="https://www.iarpccollaborations.org/plan/index.html">https://www.iarpccollaborations.org/plan/index.html</a>
Interdisciplinary workgroups on "One Health in a Changing Arctic"	Following a May 2017 meeting on "One Health in a Changing Arctic" at the University of Alaska, Fairbanks (UAF), three interdisciplinary workgroups were created with representatives from the US, Finland and Norway. These working groups (Food Security, Community-based Observations, Education) are developing circumpolar collaborations and demonstration projects. The Food Security group is completing a literature review focused on the Arctic and is focused on zoonotic agents and biotoxins and their implications for risks to food security for Arctic residents. CDC AIP staff are involved in the workgroup.
<b>Epidemiology, surveillance, risk assessment, modelling</b>	
<b>Title of activity</b>	<b>Scope</b>
Viral hemorrhagic fever surveillance in Uganda	Continue to support preparedness, rapid response and relevant diagnostic assays for viral hemorrhagic fevers like Ebola and Marburg viruses. The expanded program included providing training for case recognition and management for health professionals, providing reagents and training for diagnostic testing, and completing renovation of the VHF diagnostic laboratory at Uganda Virus Research Institute.
Hantavirus surveillance in United States	Maintain surveillance of all cases of hantavirus infections in the US. Provide consultation to State Health Departments, physicians, and the general public. CDC also coordinates sample shipments, diagnostics, and result dissemination.
Bat trapping and testing in Sierra Leone	Capture wild bat species in Eastern Sierra Leone to test for evidence of going or previous filovirus infection. Trainings with local partners in proper field and laboratory diagnostic techniques are ongoing.
Brucellosis Prevalence in Bangladesh, Ethiopia, and Jordan	<ul style="list-style-type: none"> <li>•Bangladesh: technical assistance and consulted on data analysis for a linked animal and human brucellosis prevalence study conducted by International Centre for Diarrhoeal Disease Research, Bangladesh (icddr, b) in a high-dairy producing area. Provided technical assistance for a transboundary study investigating sero-surveillance of brucellosis among cattle crossing the border into Bangladesh from Myanmar.</li> <li>•Ethiopia: Data and sample collection for a linked livestock household sero- surveillance study in three representative agriculture systems was completed in 2017 and laboratory testing is in progress. Laboratory staff were provided mentoring on serology and molecular diagnostic methods and supplies were provided with a goal of determining circulating Brucella species in humans and animals.</li> <li>•Jordan: Launched a seroprevalence study for brucellosis in humans and animals. Conducted with Government of Jordan, developed a protocol and SOPs, and held training with veterinary laboratorians for field diagnostics.</li> </ul>
Leptospirosis surveillance in Colombia	Conducted active leptospirosis surveillance at multiple hospitals in Bogota. Also conducting a leptospirosis rapid diagnostic test validation and comparison study using national leptospirosis surveillance samples from the past 3-4 years.

<p>Rabies in Haiti and Viet Nam</p>	<ul style="list-style-type: none"> <li>•Haiti: CDC provided financial and technical assistance to the Haitian Ministry of Agriculture to conduct nearly 5,000 animal and human rabies case investigations, which resulted in the detection of 45 laboratory-confirmed rabid animals and 175 clinically-confirmed rabid animals. Surveillance personnel conducted educational programs which reached over 50,000 school children. CDC conducted one site visit in which 18 rabies surveillance staff were trained on appropriate response and sampling protocols.</li>   <li>•Viet Nam: CDC provided financial and technical assistance to the Vietnam Department of Animal Health to conduct nearly 800 animal rabies case investigations, which resulted in the detection of 66 laboratory-confirmed rabid animals and 161 clinically-confirmed rabid animals.</li> </ul>
<p>Prevalence of mcr-harboring Salmonella and Escherichia coli in Food Products, Food-Producing Animals, and their Environments in the Dominican Republic</p>	<p>Researchers are collecting samples from food, food animals, and the environment in the Dominican Republic and test for mcr (resistance) genes, which can confer resistance against colistin, a critically important antibiotic. Researchers are examining the factors that contribute to the spread of these genes in the Dominican Republic to inform public health recommendations.</p>
<p>Campylobacter Burden Testing in Dogs</p>	<p>Researchers are determining the burden of Campylobacter in dogs by sampling commercial breeding colonies and collecting information on antibiotic use to help better understand risks associated with the emergence of multidrug-resistant Campylobacter.</p>
<p>Mitigating Zoonotic Transmission of Salmonella Heidelberg in the Dairy Calf Production Chain</p>	<p>Researchers are assessing the effectiveness of cleaning and disinfection methods to prevent the transmission of Salmonella Heidelberg through the dairy calf production chain. Researchers are developing and disseminating educational materials on cleaning and disinfection to livestock markets and veal calf production facilities to reduce the spread of Salmonella Heidelberg.</p>
<p>Antimicrobial Stewardship Education for Calf Producers</p>	<p>Researchers are partnering with the veal industry to survey producers and assess the impact of a farm antimicrobial stewardship plan on treatment with antibiotics on veal and dairy farms. The study is also measuring changes in the presence and diversity of antimicrobial resistant genes in the environment before and after implementation of the stewardship plan.</p>
<p>Rocky Mountain Spotted Fever</p>	<p>Enhanced efforts from subject matter experts at CDC to improve surveillance and understanding of epidemiology of ongoing Rocky Mountain spotted fever(RMSF) outbreak in the two northern states most impacted by the disease, Baja</p> <p>California and Sonora. Engagement includes Memorandums of Understanding</p> <p>with the Medical, Veterinary, and State Health Departments, in-country</p> <p>consultation, technical assistance in development and execution of research,</p> <p>clinical education and health promotion campaigns, and diagnostic support.</p>

<p>Zoonotic Influenza Activity in the United States</p>	<p>CDC collects, compiles and analyzes information on influenza activity year round in the U.S. The U.S. influenza surveillance system is a collaborative effort between the Influenza Division and its many partners in state, local, and territorial health departments, public health and clinical laboratories, health care providers, clinics, and emergency departments. CDC receives and genetically and antigenically characterizes hundreds of influenza viruses to understand influenza disease, inform influenza vaccine strain selection in collaboration with partners, guide public health and clinical recommendations and conduct risk assessments on animal influenza A viruses to understand their zoonotic/pandemic potential. Key 2018 domestic zoonotic influenza activities included:</p> <ul style="list-style-type: none"> <li>• Provided information to the public and technical support to states for outbreaks of North American wild bird lineage LPAI H7N1, LPAI H7N3, and LPAI H5N2</li> <li>• Provide information to the public and technical support to states for human infections of variant influenza viruses</li> <li>• Released a new graphic novel called “The Junior Disease Detectives: Operation Outbreak” and educational material for K-12 teachers, which is intended to raise youth awareness of the potential human health risks associated with variant influenza virus infections</li> <li>• Worked with the Council of State and Territorial Epidemiologists and select states on the Public Health Youth Agriculture Education partnership program</li> </ul>
<p>Zoonotic Influenza Activity in Multiple Countries</p>	<p>CDC Influenza Division’s International Program objectives are to 1)optimize surveillance of seasonal influenza viruses, 2)monitor atypical viruses, investigate outbreaks, and contribute to the risk assessments, 3)address critical gaps in knowledge about influenza prevention and control that can directly guide policy, and 4)facilitate the development of prevention and control programs. The Influenza Division provided expert consult to the OIE-FAO Network of expertise on animal influenza (OFFLU) and technical support to more than 80 countries and tracked outbreaks in more than 20 countries, including OIE Member Countries. Examples of zoonotic influenza projects include</p> <ul style="list-style-type: none"> <li>• Enhanced human and environmental surveillance for avian influenza A(H7N9) virus in Guangxi, China</li> <li>• Assessed the emergence of novel avian influenza viruses in Vietnam</li> <li>• Pilot integration of approved point-of-need molecular diagnostic RT-PCR technologies to improve surveillance in Lao PDR</li> <li>• Enhanced Thailand’s laboratory capacity to prepare and respond to pandemic influenza and viral emerging diseases and education of health personnel on influenza <ul style="list-style-type: none"> <li>• Surveillance for human infections with avian influenza A viruses among live bird market workers and household members in Bangladesh, India, and Vietnam</li> <li>• Animal-human interface of influenza transmission in tropical ecosystems in Guatemala</li> </ul> </li> <li>• Expanded respiratory disease surveillance in Kenya through detection and response to respiratory events</li> </ul>
<p>Global Disease Detection centers’ surveillance activities for zoonotic and vector-borne diseases in multiple countries</p>	<ul style="list-style-type: none"> <li>• Bangladesh: Hospital-based Nipah Virus and Japanese encephalitis in Faridpur, Rajshahi, and Rangpur districts, estimated population of 30,000,000</li> <li>• Guatemala: Population-based ViCo (dengue, chikungunya, etc.) in four sites in Coatepeque, Quetzaltenango, and Santa Rosa, estimated population is 1,000,000; Population-based leptospirosis in dogs in Coatepeque; Facility-based toxoplasmosis in Coatepeque; and Non-human animal entomologic surveillance for Aedes Aegypti (dengue, chikungunya, and Zika) in Coatepeque <ul style="list-style-type: none"> <li>• India: Facility-based Acute Encephalitis Syndrome (Japanese encephalitis virus, Orientia tsutsugamushi, dengue virus, and others) in 23 facilities, and Acute Febrile Illness (Kyasanur Forest disease, Zika, malaria, dengue, scrub typhus, leptospirosis, and other pathogens) in 25 facilities; Event-based anthrax in eight sites, and mastitis among cattle (AMR pathogens affecting cows and humans). Total estimated population is 45,000,000.</li> </ul> </li> <li>• Kenya: Event-based Kenyan livestock wildlife syndromic surveillance in Nakuru, Makueni County. Total estimated population is 100,000</li> <li>• Thailand: Population-based pregnancy outcomes after acute Zika virus infection in 15 hospitals in Bueng Kan and Mukdahan provinces, estimated population 765,000; Emerging zoonoses in agricultural communities (avian influenza, rabies, leptospirosis, brucellosis, anthrax, trichinosis), Srisaket provinces; and live bird market for avian influenza in Bangkok</li> </ul>

Global AMR Challenge	CDC launched a yearlong, global AMR Challenge garnering One Health commitments from stakeholders around the globe to take action to slow the spread of antimicrobial resistance in the following areas: tracking and data, infection prevention and control, sanitation and the environment, antibiotic use -including access, and vaccines, diagnostics and therapeutics. For more information on the AMR Challenge and how other organizations have committed to date, please visit the AMR Challenge website ( <a href="https://www.cdc.gov/drugresistance/intl-activities/amr-challenge.html">https://www.cdc.gov/drugresistance/intl-activities/amr-challenge.html</a> ).
<b>Training, capacity building</b>	
<b>Title of activity</b>	<b>Scope</b>
OIE Scientific and Technical Review, Vol. 38 (1), April 2019: "Successes and remaining challenges within the One Health framework"	Two experts from the CDC One Health Office are serving as coordinator and editor for the upcoming OIE Scientific and Technical review issue titled "Successes and remaining challenges within the One Health framework" which covers numerous topics on emerging and reemerging zoonotic diseases and related One Health issues. These CDC experts worked closely with OIE's Publications Unit to identify specific topics and authors, develop manuscripts, and edit the content for this issue. Multiple CDC subject matter experts are also serving as co-authors for several manuscripts in this issue.
One Health Zoonotic Disease Prioritization (OHZDP) Workshops in multiple countries	<p>Experts from CDC's One Health Office work with partners to conduct One Health Zoonotic Disease Prioritization (OHZDP) workshops to use a multisectoral approach to prioritize zoonotic diseases of greatest public health concern that should be jointly addressed by human, animal, and environmental health sectors and other partners.</p> <p>The OHZDP Workshop is a voluntary and collaborative process that allows countries or regions to identify their most urgent zoonotic disease threats; more efficiently build capacity to address priority zoonoses in people and animals; make plans to use a One Health approach to better prevent and control the newly prioritized diseases; engage with partners to target resources effectively to address the priority zoonotic diseases; and, develop and strengthen One Health, multisectoral coordination mechanisms.</p> <p>In 2018, three national workshops were conducted in Ghana, Mozambique, Uzbekistan, and a regional workshop was conducted for 15 countries in the Economic Community of West African States. Zoonotic diseases commonly prioritized include rabies, viral hemorrhagic fevers such as Ebola virus and Rift Valley fever, zoonotic influenza, anthrax, and brucellosis. Additional details can be found at: <a href="https://www.cdc.gov/onehealth/global-activities/prioritization.html">https://www.cdc.gov/onehealth/global-activities/prioritization.html</a></p>
One Health Zoonotic Disease Prioritization Tool Trainings in multiple countries	CDC's One Health Office conducted four trainings on the One Health Zoonotic Disease Prioritization tool for representatives from three countries. During these trainings, CDC facilitator trainers trained 37 facilitators from Ghana, Mozambique, Uzbekistan, and the United States.
Infectious Disease Prioritization for the United States Southern Border Region	CDC's United States-Mexico Unit and the One Health Office hosted an infectious disease prioritization workshop for the U.S. southern border region in San Diego, California September 27-28, 2018. The goal of the workshop was to determine which endemic and emerging diseases in the US-border region should be prioritized for prevention activities, and determine how workshop participants can jointly address them. CDC's One Health Zoonotic Disease Prioritization (OHZDP) tool was used to prioritize the following list of infectious diseases, including several zoonoses, agreed upon by the federal and state human health officials: Tuberculosis; Aedes mosquito-transmitted arboviral diseases (dengue, chikungunya, Zika); Enteric diseases (Salmonella, listeriosis, vibriosis, and brucellosis); Rickettsioses (e.g. Rocky Mountain Spotted Fever, murine typhus). A final report outlining the workshop methods and outcomes; as well as next steps, roles, and responsibilities for how each organization will collaboratively engage in developing control and prevention strategies for the newly prioritized diseases.

Viral Hemorrhagic Fever outbreak preparedness and response in India	Technical consultations, reagents and training in diagnosis and surveillance of CCHF, Nipah virus and Kyasanur Forest Disease in India.
Anthrax diagnostic training in Bangladesh, Cameroon, Ethiopia	<ul style="list-style-type: none"> <li>•Bangladesh: Conducted refresher training for conventional PCR for anthrax diagnostic testing at the veterinary laboratory in Bangladesh, and microscopy training with two regional veterinary laboratories for gram staining to have a faster presumptive diagnosis of anthrax closer to the source of the outbreak.</li> <li>•Ethiopia and Cameroon: Conducted molecular diagnostic training with the national veterinary and public health lab in Ethiopia and Cameroon. Provided theory, demonstrations and hands on training for PCR testing.</li> </ul>
Brucellosis diagnostic testing capacity in Ethiopia, Iraq, Pakistan and Jordan	<ul style="list-style-type: none"> <li>•Ethiopia: Support training human and animal health care providers to recognize human signs of brucellosis and improve laboratory diagnostic capacity for brucellosis in Ethiopia.</li> <li>•Iraq, Pakistan and Jordan: Support laboratory diagnostic capacity and sample collection among public health labs.</li> </ul>
Leptospirosis diagnostic capacity in Indonesia	Provided technical assistance to Indonesia to improve diagnostic capacity for leptospirosis. Assisted with reviewing MAT results and providing feedback and planning for additional training.
Meloidosis in Latin America	Held a melioidosis meeting in Latin America to increase awareness about the disease among Ministries of Health. Background, diagnostic testing algorithms and treatment options were discussed. More than 15 Latin America countries were represented.
Rabies in multiple countries	CDC staff provided in-country technical assistance to 19 OIE-member countries, including surveillance capacity building (11 countries / >260 participants), vaccination systems strengthening (>425,000 dogs vaccinated), and laboratory training (9 countries / 86 participants). CDC led 7 international workshops to improve rabies control program development using the globally adopted Stepwise Approach towards Rabies Elimination tool. Additionally, CDC participated in the 5 regional meetings and workshops aimed at improving regional rabies control coordination.
Influenza Global Systems Development in Multiple Countries	<p>CDC Influenza Division's international capacity-building efforts have led to substantial improvements in foreign countries' ability to conduct influenza surveillance and detect emerging virologic threats. Progress was made in the quality of influenza testing and the extent to which countries report data to WHO FluNet and contribute to vaccine strain selection. Key 2018 zoonotic influenza training and capacity building activities include the following.</p> <ul style="list-style-type: none"> <li>•AFRO/EMRO-Biosafety Training and Year 1 Mentorship Summit, Aug 2018.</li> <li>•PAHO/SEARO/WPRO-Influenza surveillance data analysis, April 2018.</li> <li>•EMRO-Pandemic Influenza Severity Assessment training, Tunis, October 2018.</li> </ul>

Global Disease Detection centers' trainings in multiple countries	<p>A public health training is an organized activity aimed at imparting information and/or instructions to improve the recipients' performance and assist them to attain a required level of knowledge or skill through active engagement and interaction.</p> <p>Global Disease Detection Centers in Bangladesh, Guatemala, China, India, Kenya, and Thailand conducted 32 training sessions and trained 1,564 national and regional participants on topics related to emerging and re-emerging zoonotic diseases and One Health. Training topics included laboratory training for Trioplex RT-PCR for Zika, dengue and chikungunya, mosquito insecticide resistance testing, typing of rabies virus, third generation sequencing of zoonotic influenza, tabletop exercise on novel/avian influenza outbreak preparedness and response, sample collection and testing for anthrax, training on Livestock Emergency Guidelines and Standards in collaboration with FAO Myanmar team and scientific writing workshops.</p>
<b>Zoonoses</b>	
<b>Title of activity</b>	<b>Scope</b>
Preventing, Detecting, and Responding to Emerging and Reemerging Zoonotic Diseases	Details on a number of zoonotic disease activities around the globe are cross reported in other sections of this report.
<b>Diagnosis, biotechnology and laboratory</b>	
<b>Title of activity</b>	<b>Scope</b>
Viral Hemorrhagic Fever Training Program in Uganda	Training program on VHF diagnosis in support of the Uganda Wildlife Authority in establishing an animal reference laboratory by 2020.
Ebola Virus Persistence study in Sierra Leone	Technical support for research on the persistence of Ebola virus in multiple body fluids of survivors of Ebola virus disease.
Poxviruses in Colombia, Nigeria, and the Republic of Georgia	CDC staff provided technical support for diagnosis and investigation of monkeypox in Nigeria, and the diagnosis of orthopoxvirus infections in Georgia (Akhmeta virus) and Colombia (Vaccinia virus).
Pan-lyssavirus PCR assay for Rabies	CDC published the first-ever molecular assay that fulfills OIE requirements for a primary diagnostic assay, thereby opening the door for molecular diagnostics into a landscape that had previously relied solely upon fluorescence and immunohistochemical assays.
Leptospirosis diagnostics in Colombia	CDC is conducting a leptospirosis rapid diagnostic test validation and comparison study using national leptospirosis surveillance samples from the past 3-4 years.

<p>Zoonotic Influenza Laboratory Activities</p>	<p>CDC Influenza Division provides diagnostic and laboratory support to domestic and international partners related to zoonotic influenza virus detection and characterization. Select 2018 laboratory activities include the following.</p> <ul style="list-style-type: none"> <li>•Strengthening global influenza laboratory surveillance through improved diagnostic capacity through provision of reagents and support of training.</li> <li>•The International Reagent Resource (IRR) website at <a href="http://www.influenzareagentresource.org">www.influenzareagentresource.org</a> serves as the program's online hub for managing more than 1000 annual requests for influenza reagents.</li> </ul> <p>oLaboratories can view the IRR's catalog of 700+ influenza reagents and submit their requests electronically, as well as download product information sheets and certificate of analyses.</p> <p>oThe IRR distributed more than 10,000 reagents for surveillance and research activities to more than 300 international laboratories in approximately 150 countries.</p> <ul style="list-style-type: none"> <li>•Strengthening global coordination of and communication with GISRS by supporting periodic National Influenza Center (NIC) surveys.</li> <li>•Supporting NICs to attend the WHO vaccine composition consultations in September and February.</li> </ul>
<p>Global Disease Detection centers' laboratory activities in multiple countries</p>	<p>In addition to providing laboratory support for outbreak responses, the Global Disease Detection Centers assist host countries in developing a wide range of technical assistance to support areas such as laboratory facility assessments, laboratory reagents and supplies, information systems upgrades, biosafety and biosecurity maintenance, and introduction of new laboratory diagnostics in order to meet International Health Regulation requirements.</p> <ul style="list-style-type: none"> <li>•In May 2018, GDD Bangladesh introduced the Next Generations Sequencing, at the Manipal Centre for Virus Research and National Institute of Virology Pune, to identify Nipah virus as a newly detected pathogen in country, with assistance from CDC subject matter experts (SMEs) following a suspected Nipah encephalitis outbreak.</li> <li>•GDD India introduced IgM Elisa testing for Japanese encephalitis, dengue, and Orientia tsutsugamushi viruses in 15 district hospitals in Assam and West Bengal, and antimicrobial susceptibility testing (AST) at the College of Veterinary Sciences, Guwahati, Assam.</li> <li>•GDD Egypt introduced homemade Brucella ELISA plates. Coating, blocking, validation, and QC of the prepared plates were completed and tested during a 3-day training at Damnhour IEIP laboratory.</li> </ul>
<b>Vaccines</b>	
<b>Title of activity</b>	<b>Scope</b>

Evaluation of livestock anthrax vaccine in Bangladesh	Assisting the Bangladesh Division of Livestock Services (DLS) with an evaluation the anthrax vaccine produced in-country for use in livestock. Safety and efficacy testing will be done in accordance to OIE guidelines. Planning meetings with members from CDC and DLS were held in February and September, 2018.
Rabies vaccination in Bangladesh, Haiti, and India	CDC provided technical and financial support that led to the vaccination of over 425,000 dogs against rabies. Additionally, CDC and NGO Mission Rabies developed two mobile applications to improve the effectiveness of rabies vaccination programs. A dog vaccination app was used to manage the national dog vaccination campaign in Haiti and a pilot program in Bangladesh. A rabies exposure case management application was piloted in India and Haiti; in 2018 over 1,000 rabies exposure cases have been managed using the App. CDC has also provided technical assistance to United Kingdom and China to support vaccine development activities.
Monkeypox Vaccination in the Democratic Republic of the Congo	Ongoing vaccine study to evaluate the effectiveness of third-generation smallpox vaccine (IMVAMUNE) for the protection of healthcare workers against monkeypox in the Democratic Republic of the Congo.
Zoonotic Influenza Vaccine Activities	<p>CDC contributes to the genetic and antigenic analyses of influenza A viruses with zoonotic or pandemic potential to make recommendations and develop Candidate Vaccine Viruses (CVV) for pandemic preparedness. Key 2018 activities include:</p> <ul style="list-style-type: none"> <li>•Assessment of the genetic and antigenic properties of Asian lineage avian influenza A(H7N9) CVVs. CVVs developed by CDC to match the antigenically distinguishable low pathogenicity and highly pathogenic A(H7N9) viruses were tested to assess cross-reactivity with emerging A(H7N9) viruses</li> <li>•Performed antigenic testing of A(H7N9) CVVs developed by WHO Collaborating Centers and Essential Regulatory Laboratories to verify their cross-reactivity with parental strains. These studies have led to ongoing collaborations with vaccine manufacturers to evaluate A(H7N9) CVVs for use in clinical trials</li> <li>•Based on genetic and antigenic analyses performed by CDC and other partners, WHO recommended the development of new CVVs derived from emerging A(H5N6), A(H5N1), A(H9N2), and A(H1N2) variant viruses. These CVVs, can be used for vaccine production, clinical trials, stockpiling and other pandemic preparedness purposes</li> <li>•Surveillance of avian influenza viruses in live poultry markets in Bangladesh and Vietnam identified ongoing circulation of low pathogenicity A(H9N2) viruses and highly pathogenic A(H5) viruses. Genetic analysis of highly pathogenic A(H5N6) viruses causing poultry outbreaks in Vietnam identified new lineages of viruses in this country</li> </ul>

***ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated specialty***

**2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare**

Proposal title	Scope/Content	Applicable area
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Collaborating for the Implementation of the Revised International Health Regulations National Surveillance and Response Capacity	NCEZID works with CDC's Division of Global Health Protection, the Global Disease Detection program, and GDD Regional centers to assure that the IHR process will be accommodated during all investigations, surveillance activities, and research when appropriate. Whenever possible, animal and human components are sharing biologic isolates and epidemiologic data to facilitate the control and containment of disease.	<input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare
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***ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same specialty, and should the need arise, with Collaborating Centres in other disciplines***

***ToR: To carry out and/or coordinate scientific and technical studies in collaboration with other centres, laboratories or organisations***

**3. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?**

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Multiple OIE CCs/RLs/other organizations	Multiple	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	CDC is in communication with multiple collaborating centers, reference laboratories, and other organizations from multiple countries to maintain a network and share information on One Health activities related to emerging and re-emerging zoonoses.

**4. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?**

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose

Centers for Disease Control and Prevention; United States Department of Agriculture; National Institutes of Health; Food and Drug Administration; Environment Protection Agency; U.S. Department of the Interior: National Park Service, U.S. Fish and Wildlife Service, U.S. Geological Survey; U.S. Department of Homeland Security; U.S. Department of Defense; Defense Threat Reduction Agency; U.S. Department of Labor, U.S. Agency for International Development, and others	United States	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	<p>To communicate, coordinate, and collaborate on projects related to One Health; Approaches to prevention and control of emerging and re-emerging zoonotic diseases;</p> <p>To identify and pursue opportunities to improve efficiency outcomes for human, animal, and environmental health across the U.S. government.</p>
Food and Agriculture Organization, World Health Organization	International	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	<p>To communicate, coordinate, and collaborate on projects related to One Health; Approaches to prevention and control of emerging and re-emerging zoonotic diseases;</p> <p>To identify and pursue opportunities to improve efficiency outcomes for human, animal, and environmental health.</p>

**ToR: To place expert consultants at the disposal of the OIE.**

##### 5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?

Yes

Name of expert	Kind of consultancy	Subject
Casey Barton Behravesh, MS, DVM, DrPH, DACVPM	Technical Assistance, Attendance at OIE Meetings, Steering committee Members, Editor of Upcoming OIE Science and Technical Review	Global health security, emerging and reemerging zoonoses, antimicrobial resistance, and World Animal Health Information System + Steering Committee
Julie R. Sinclair, MA, DVM,	CDC Liaison to the World Organisation for Animal Health (OIE); Co-editor of Upcoming OIE Science and Technical Review	Global health security, emerging and reemerging zoonoses, border health, surveillance, laboratory capacity, workforce development, joint risk assessment, antimicrobial resistance, and World Animal Health Information System + Steering Committee

Sean Shadomy, DVM, MPH, DACVPM	CDC Liaison to the Food and Agriculture Organization of the United Nations (FAO); Technical assistance (participant), OIE Workshop on Bridging Epidemiology and Forensics (Mar 2018); Technical assistance (Ad hoc Working Group member), PVS/rabies methodology working group (Nov 2018)	Global health security, emerging and reemerging zoonoses, bioweapons/weapons of mass destruction, surveillance, laboratory capacity, outbreak response, and antimicrobial resistance
Laura Smith Murrell	Communications	OIE WAHIS+ communication strategy
Ryan Wallace, DVM, MPH	Technical Assistance, Ad-hoc Committee Member on Rabies, Head of the OIE Reference Laboratory for Rabies, Technical assistance on Chapter on Rabies Surveillance for the OIE Terrestrial Manual	Rabies
Multiple CDC Subject Matter Experts	Technical Assistance	One Health, Zoonotic Diseases

***ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries***

**6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?**

Yes

- a) Technical visits: 50
- b) Seminars: 25
- c) Hands-on training courses: 20
- d) Internships (>1 month): 30

Type of technical training provided (a, b, c or d)	Content	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
b	CDC's One Health Office hosts the Zoonoses and One Health Updates (ZOHU Call), a monthly webinar to provide the latest news and resources on zoonoses and other One Health issues for US audiences, including public health and animal health professionals working in government, non-governmental organizations, industry, and academia. ZOHU calls offers continuing education for a variety of health professionals. For more information on the ZOHU calls, please visit: <a href="https://www.cdc.gov/onehealth/zohu/index.html">https://www.cdc.gov/onehealth/zohu/index.html</a>	United States	10000
d	CDC's One Health Office hosted Epidemiology Elective Students and graduate student interns to provide public health training; students supported work on OIE projects.	United States	23

c	CDC's One Health Office and other trained CDC facilitators conducted a training on the One Health Zoonotic Disease Prioritization tool in Ghana.	Ghana	11
c	CDC's One Health Office and other trained CDC facilitators conducted a training on the One Health Zoonotic Disease Prioritization tool in Mozambique.	Mozambique	6
c	CDC's One Health Office and other trained CDC facilitators conducted a training on the One Health Zoonotic Disease Prioritization tool in Uzbekistan.	Uzbekistan	10
c	CDC's One Health Office and other trained CDC facilitators conducted a training on the One Health Zoonotic Disease Prioritization tool in San Diego.	United States	10

**ToR: To organise and participate in scientific meetings and other activities on behalf of the OIE**

**7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?**

Yes

National/International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
International	2018 Prince Mahidol Award Conference	Thailand, USAID	1/29 - 2/03/2018	Bangkok, Thailand	800
International	Field Epidemiology Training Program – Veterinary core competencies development workshop	FAO	02/19-02/20/2018	Rome, Italy	40
International	Tripartite Executive meeting	OIE	02/21-02/22/2018	Paris, France	30
International	Tripartite Zoonoses Guide Preparatory Meeting	WHO	02/26-02/28/2018	Geneva, Switzerland	20
International	OIE Working Group on Bridging Epidemiology and Forensics	OIE	03/13-03/15/2018	Paris, France	30

***ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated specialty***

**8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE**

a) Articles published in peer-reviewed journals: 10000

CDC Stacks is a free, digital archive of scientific research and literature produced by CDC. This online archive is composed of curated collections tailored for public health research needs. This repository is retained indefinitely and is available for public health professionals, researchers, as well as the general public. CDC Stacks provides access to current CDC research and literature such as the Open Access Collection. In addition, CDC Stacks offers a historical perspective that was previously not available, such as the first 30 volumes of the Morbidity and Mortality Weekly Report. As a fully-featured repository, CDC stacks provides the ability to search the full text of all documents, browse journal articles by public health subjects, and explore the curated collections of documents on relevant topics.

b) International conferences: 100

Each year, CDC NCEZID technical and program staff attend and present at numerous international conferences.

c) National conferences: 100

Each year, CDC NCEZID technical and program staff attend and present at numerous national conferences.

d) Other

(Provide website address or link to appropriate information): 5

Emerging Infectious Diseases (EID) Journal - Published monthly by CDC, EID was established to promote the recognition of new and re-emerging infectious diseases around the world and improve the understanding of factors involved in disease emergence, prevention, and elimination. EID Journal Website:  
<http://www.cdc.gov/ncidod/EID>

The National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) website maintains updated information on current outbreaks, recent work, and publications. <http://www.cdc.gov/ncezid/>

CDC's One Health Office maintains two websites (One Health website [<https://www.cdc.gov/onehealth/index.html>] and Healthy Pets, Healthy People website [<https://www.cdc.gov/healthypets/index.html>]), which provide up-to-date information on One Health activities and zoonoses-related prevention for the general public, public health professionals, human and animal health professionals, policymakers, partners, and other stakeholders. The One Health Office led efforts for or participated in numerous One Health-related communication campaigns, including One Health Day, National Pet Week, National Preparedness Month, and US Antibiotic Awareness Week. Promotional activities included social media, graphic development, blog posts, feature articles, newsletters, ZOHU Call presentations, and partner outreach, resulting in global awareness. The One Health Office supported CDC programs in promoting One Health-related activities, publications, and events, such as new tickborne disease data, clinical tools for Rocky Mountain Spotted Fever, and the AMR Challenge. Part of this support included providing scientific input for hurricane response and Zika webpages, and responding to media inquiries for capnocytophaga infections in the news.

Additionally, the office continued its monthly Zoonoses and One Health Updates (ZOHU) Call, a webinar that reaches public health and animal health officials, epidemiologists, physicians, nurses, and other public health practitioners in federal, state, and local agencies as well and non-governmental organizations, industry, and academia. In 2018, ZOHU Calls started offering free Continuing Education, and subscribers to the call increased 730% to more than 10,000.

Other communication activities included a new One Health infographic; a zoonotic disease infographic; three new One Health in Action stories posted online; three new resources describing prevention measures for pet reptiles, amphibians, and small mammals; updated webpages on pet safety in emergencies and a new webpage on pets in evacuation centers; a new webpage listing zoonotic disease outbreaks in the US; and a new One Health feature. The office distributed 45 newsletters on zoonotic diseases and One Health topics to >65,000 subscribers in 2018.