

Background
IHR(2005)

In 2005, the World Health Assembly (WHA) adopted the revised International Health Regulations [IHR(2005)], which require 194 States Parties, including all the Member States of the World Health Organization (WHO), to develop core capacities to detect, assess, report, and respond to public health threats [1]. The WHO is working with public and private sector partners around the world to help countries achieve IHR-mandated core capacities by 2012.

ASM LabCap Program

In 2005, the U.S. Centers for Disease Control and Prevention (CDC), specifically the Division of Global HIV/AIDS (DGHA), formerly the Global AIDS Program (GAP), approached the American Society for Microbiology (ASM) for assistance with capacity-building of global HIV and clinical microbiology laboratories in resource-constrained countries. The CDC and ASM have since entered into two cooperative agreements (2005 and 2009), and ASM established an International Laboratory Capacity Building Program, LabCap, housed under the ASM International Board. The main mission of ASM LabCap is to utilize ASM's vast resources and its membership expertise —

- Supporting the development of specimen referral networks
- Assisting with the coordination of infectious disease surveillance and outbreak response
- Developing national strategic plans for public health laboratory networks
- Guiding the development or optimization of national laboratory policies
- Assisting laboratories in their preparations for accreditation
- Developing a certification program for laboratory personnel

Key elements of the IHR(2005) laboratory core capacities are laboratory capacity mapping, specimen collection, handling, and transport, biosafety, laboratory-based investigation, QA, and reporting/communications [3]. ASM LabCap activities, as outlined above, are consistent with these except for laboratory-based investigation. Note Table 1, which outlines select ASM LabCap country activities.

ASM LabCap-CDC training cooperation

ASM LabCap has assisted CDC with developing and rolling out training events for laboratory personnel capacity building. These events include two international courses on Acid-fast bacilli (AFB) smear microscopy external quality assessment (EQA), one in English in Tanzania and one in French in Senegal; a national French-language *Mtbc* (Mtb) culture, identification, and drug susceptibility testing (DST) in Côte d'Ivoire; seven national basic microbiology workshops in Botswana, Kenya, Mozambique, Tanzania, and Zambia; and a national workshop for laboratory support of enteric disease outbreak surveillance and response in Kenya. A brief description of these programs follows.

AFB Smear Microscopy EQA Workshop in Tanzania and Senegal

ASM LabCap facilitated two five-day workshops entitled "Strengthening AFB Smear Microscopy EQA Programs", one in English in December 2009 in Dar es Salaam with participants from Angola, Bahamas, Barbados, Botswana, Ethiopia, Jamaica, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, Swaziland, Tanzania, Vietnam, Zambia, and Zimbabwe, and a francophone version in August 2010 in Dakar with participants from Senegal, Cameroon, Haiti, and Côte d'Ivoire. In line with Article 44 of the IHR(2005), which calls for States to share technical cooperation and assistance in order to strengthen and maintain public health capacities, these platforms allowed the participating countries to network and share experiences, challenges, best practices, and lessons learned from EQA implementation, as well as assess new opportunities to integrate AFB smear microscopy into other laboratory disciplines. ASM LabCap is providing follow-up support to many of the participating countries.

French-language Laboratory Identification of MDR-TB

From February 22 through March 5, 2010, ASM LabCap and CDC/PEPFAR-Côte d'Ivoire organized in Abidjan, Côte d'Ivoire, its first course on Mtb culture, identification and DST for French-speaking African laboratorians. Scientists, managers, and technicians from the National TB Program and four major Ivorian TB laboratories attended the two-week course held at the National TB Reference Laboratory housed in the Pasteur Institute of Côte d'Ivoire (IPCI). The course was the first national training event in Côte d'Ivoire to help increase detection and reporting of multi-drug resistant (MDR)-TB using newer, more rapid technology. TB, in its MDR and extensively drug resistant (XDR) forms, is a disease with the potential of causing public health emergencies which fall within the scope of IHR(2005). Its early detection, control, and containment in endemic regions of Africa, such as Côte d'Ivoire, are steps towards improving international public health security.

Bacterial Biogeochemistry: Basic, Applied, and Environmental Microbiology

ASM consultants have facilitated workshops on basic bench top procedures for clinical microbiology for a total of 145 participants thus far. The goal of each workshop, as developed by an ASM LabCap Committee Member, was to enable clinical microbiology laboratory technologists to instruct clinicians on proper choice and collection of patient samples for microbiological studies, to properly handle the samples in the laboratory with respect to initial testing and culture processes, to adequately identify the major pathogens in each site (and to not report non-pathogens), and to perform necessary antimicrobial susceptibility tests (AST) on those pathogens.

These procedures are encompassed in a series of flow-charts and are demonstrated with real cultures and organisms. Participants learned in the laboratory by performing the procedures themselves. A list of the reagents and simple supplies used in the laboratory were provided to the participants for training and QC purposes in their own facilities. ASM LabCap places consultants in-country to work with the various participating laboratories as a follow-up to the training.

Course topics covered during these workshops relevant to the IHR(2005) included procedures for AST, detection of *Shigella*, *Salmonella*, and other pathogen-causing epidemic diarrheal diseases, meningococcal meningitis, and respiratory infections.

CDC-ASM Joint Workshop on Laboratory Support for Enteric Disease Outbreak Surveillance in Kenya

Since 2008, there have been ongoing diarrheal outbreaks

timely laboratory identification of the etiological agents of outbreaks has been challenging for Kenya's District and Provincial hospitals, which have limited skills and resources. Consistent with IHR(2005)'s focus on strengthening laboratory-based surveillance systems for epidemic-prone diseases such as cholera, in October

2009, 39 district-based laboratory technologists, surveillance officers, and clinical officers

Field Epidemiology and Laboratory Training Program (FELTP), the Kenyan Ministry of Public Health and Sanitation (MoPHS), the CDC National Center for Emerging, Zoonotic & Infectious Diseases (NCEZID) in Atlanta, CDC/DGHA, and ASM LabCap. The course illustrated the critical link between epidemiology, outbreak investigation, and both rapid and traditional detection by the laboratory.

The trainees were presented with the basic principles of epidemiology and outbreak detection; determination of proper samples to collect in an outbreak; collection, packaging, and transport of biological samples from an outbreak; and rapid testing for detection of *S. typhi*, *S. dysenteriae* Type 1, *S. flexneri* serovar 1, and Shiga toxin-producing *E. coli* from biological samples. Furthermore, ASM LabCap facilitators discussed essential microbiological procedures and techniques for processing samples and traditional methods for culture, identification and susceptibility testing of the four enteric pathogens. Overviews of Gram staining, laboratory diagnosis of common HIV-related OIs and other outbreak pathogens, QC, and media preparation were also included.

International Emerging Infections Program (IEIP) initiatives
IEIP is an international effort by the CDC as part of its Global Disease Detection Program to build capacity around the world to detect emerging infectious disease. ASM LabCap is providing technical expertise and consultation for building laboratory capacity and improving clinical microbiology for the diagnosis of respiratory diseases in select IEIP sites. Each site is set to implement active, population-based surveillance for pneumonia with varying levels of microbiological capacity. Below are descriptions of the IEIP sites that ASM LabCap has supported to-date, and the specific support provided by ASM.

China

The U.S. CDC and China's CDC collaborate to conduct active surveillance for patients hospitalized with community-acquired pneumonia in China. A three-month pilot project evaluating procedures for patient enrollment and specimen collection, transport, testing, and reporting, was conducted from mid-November 2008 to February 2009 in three sites (Panjin, Liaoning Province; Jingzhou, Hubei Province; Zhuhai, Guangdong Province). Patients enrolled in this study had specimens collected for microscopic examination, bacterial culture, viral culture, urine antigen testing, and polymerase chain reaction (PCR)-based identifi

- Development of guidelines for preventive maintenance and troubleshooting for equipment at IRLs, and a Biosafety Manual.
- Offering recommendations for the organization of an NRL/IRL Workshop held in November 2009. It was the first time that microbiologists from IRLs had the opportunity to come together and share their experiences in the presence of their NRL supervisors and peers. The workshop was facilitated by, among others, the ASM LabCap consultant, who guided the technical

is anticipated that future projects will be more directly conceptualized in the context of IHR(2005). In addition, ASM LabCap will continue its active collaboration with the WHO and other international organizations in order to further coordinate efforts for building integrated disease surveillance and response capabilities worldwide.

Abbreviations

ASM LabCap: ASM Laboratory Capacity
IHR(2005): International Health Regulations (2005)
WHO: World Health Organization