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ONE HEALTH



One Health epidemic preparedness: Biosafety quality improvement training in Nigeria

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Abstract

Key components of One Health approach to epidemic preparedness is raising awareness and knowledge of EID's, prevention, and risk reduction.

Research involves risks to biosafety and biosecurity.

This study describes the process and outcome of a hands-on biosafety training program using a One Health approach across a multidisciplinary and multi-specialty group in Nigeria.

West African Center for Emerging Infectious Diseases (WAC-EID).

Team of clinicians, epidemiologists, bioinformaticians, and biologists in the United States, Sierra Leone, Nigeria, Liberia, and Senegal.

Conduct pathogen/host surveillance, study pathogen transmission and evolution, and study disease development and immune responses in the host.

National Institute of Allergy and Infectious Diseases of the National Institutes of Health.





One Health

Diverse sectors communicate and work to achieve change through a unified public healthcare approach based on the inseparability of the interaction between human, animal, and environmental health, creating a unified healthcare view.

Zoonotic pathogens are the source of > 70% of emerging and re-emerging infectious diseases and spillover to human populations.

COVID-19 pandemic has caused the death of > 3 million globally.

Severe economic and social consequences of zoonoses causing epidemics result from the global village (fast interconnectivity and ease of international trade).

Biocontainment of work related to zoonotic pathogens is essential to One Health.

"If our interaction with wildlife and our environment is tilted toward human benefit only and not a mutual benefit, we can continue to expect spillover from animals to humans with the devastating consequences of pandemics to our livelihood and economy."



One Health

Complexity of the mechanisms leading to outbreaks of zoonotic diseases.

Human medicine, veterinary sciences, social and environmental sciences must partner and be educated in a holistic way where each sector understands the interconnectivity between the three groups and their roles in preventing disease outbreaks whenever possible.

First key component of a One Health approach: raising awareness and increasing knowledge about emerging diseases, prevention, and risk reduction.

Second key component is expanding the scientific base into the complex nature of emerging diseases through surveillance and experimental research.

This study aimed to describe the process and outcome of a hands-on biosafety training program using the One Health approach in a multidisciplinary expert group in Nigeria.



Training program

A face-to-face hands-on training for 48 participants during 2021.

Topics covered:

- (1) an overview of the WAC-EID research
- (2) an overview of infection prevention and control
- (3) safety in animal handling and restraint, sample collection, and processing
- (4) safety in field studies including rodent, bird and bat handling
- (5) safety practices in the collection of mosquito and other arthropod vectors
- (6) personal protective equipment training (disinfection, donning and doffing) and
- (7) safety in sample collection, labelling, and transportation.

Slide presentations, practical hands-on sessions, and video demonstrations with pre- and post-course evaluation assessments.

Included virologists, infectious diseases physicians, medical microbiologists, ornithologists, and medical entomologists.

Preparation: A list of training content generated during 4-week meeting to identify trainers based on nominations from the organizers and expertise in diverse fields.



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Hands on

6

(8) transportation.

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Training program

Pre- and post-test evaluations collected on paper forms.

Data entered into excel spread-sheets for pre and post-test score comparison.

Same number of short multiple-choice single-answer questions drawn for all topics.

Training program feedback based on 5-point Likert scale ranging from 1 for completely agree to 5 for completely disagree.

Workshop logistics	Content
Format Venue Room arrangement Planning communication Travel logistics Time management Productivity, and Length of training.	Clarity of presentations Relevance of training Materials Organization of content Clarity of instruction Training effectiveness, and active participation



Results

Of 48 participants in this training:

- 12 (25%) were from ornithology
- 16 (33.3%) from entomology
- 14 (29.2%) from mammalogy, and
- 6 (12.5%) from clinical sections.

Pre- and post-test average scores were 29.4% and 57.1%, 28.1% improvement.

- 88.6% found the training valuable
- 82.6% said training was relevant
- 71.4% thought the explanation was clear, easy to understand and effective

62% thought that the material provided was useful

68% thought that the content was well organized

50% of the participants thought that the length of training was sufficient



Discussion

Participants covered all One Health components to healthcare.

Multi-sectoral profession inclusion in this training is needed to create awareness of the One Health approach.

Significant improvement in the pre- and post-test scores.

Measurable knowledge transfer during this training.

Highlights the perceived benefits of biosafety training to include individual capacity development, community, national, and global health issues.

To achieve preparedness for pandemics, knowledge and capacity development are key components.

The need for concerted efforts to ensure that zoonotic interactions do not lead to spillover infections and, if they do occur, that we are prepared to respond rapidly and precisely; this will require a timely and an organized response.



Supplementary data can be available from the corresponding author upon a reasonable request.

Juar, juar. "Reasonable"

RVPVE Red de Vigilancia de Patógenos Virales Emergentes



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