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Lessons Learned from One Health Training, Republic of Armenia, 2021 – 2022

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2020

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Lessons Learned from One Health Training, Republic of Armenia, 2021 – 2022

By Darian Bishop

Introduction

More than two-thirds of (re)emerging infectious diseases stem from zoonotic pathogens, emphasizing the importance of national and international multisectoral coordination, communication, and collaboration (CCC). Public Health Practice, LLC, Defense Threat Reduction Agency, and the Armenia One Health Working Group (AM OHWG) partnered with the Republic of Armenia (RoA) to build a national One Health (OH) framework to establish national CCC to prevent and manage future zoonotic outbreaks.

Methods

Following an in-depth literature review, learning objectives were generated and teaching materials designed. I created pre- and post-surveys to distribute before and after each of three OH workshops. Translators ensured the surveys were provided in both English and Armenian and results received in English.

Results

While the surveys demonstrated an increase in the understanding of the learning objectives, open-ended questions proved insight. Participants noted a desire to return to in-person events, an interest in additional training in the future, and a need for more, similar platforms to support CCC among sectors. Attendees planned to assess existing OH legislation following Workshop #3 so that a OH framework for RoA could be drafted during Workshop #4.

Discussion

Although the training emphasized learning objectives relevant to the prevention and control of zoonotic diseases, the most valuable contribution made was providing a place and time for individuals in human, animal, and environmental health sectors in RoA to discuss shared issues, potential solutions, and common goals. These multisectoral round-tables determined the need for shared public health surveillance mechanisms and shared publishing silos. The discussions and trainings reflected the goal of creating a national OH Framework for RoA. The RoA OH Workshops serve as an example not only to create and implement OH frameworks, but also to provide a platform for direct, multisectoral CCC.

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Introduction

As the world globalizes with unprecedented speed (especially in the wake of the CoVID-19 pandemic), the need for World Health Organization (WHO) Member States (MS) to move to a One Health (OH) framework of coordination, communication, and collaboration (CCC) among national ministerial organizations is increasingly urgent. Implementation of this OH alignment has been initiated through an effort between the U.S. Defense Threat Reduction Agency (DTRA) Biological Threat Reduction Program (BTRP) and the Government of Armenia (GoA) by convening an Armenia OH Working Group (AM OHWG).

In support, we hosted four interprofessional education and training workshops in 2021 and 2022 to provide both OH information to the AM OHWG and allocated time to discuss future collaborative needs such as modifying the legal infrastructure, establishing a OH strategic plan, establishing the first OH Field Epidemiology Training Program (FETP) and integrating public health surveillance (PHS). This special studies project documented the workshop processes, outlined the monitoring and evaluation plan, and interpreted initial data and feedback.

An estimated two-thirds of (re)emerging infectious diseases are caused by zoonotic pathogens. (8) The World Bank estimates that between 2000 – 2010, zoonotic pathogens caused > $20 billion USD in losses, with an additional estimated *$200 billion indirect losses to affected economies as a whole.* (17) These costs resulted from loss of livestock, missed work due to sickness, and additional healthcare expenses. (11)

While there has been an increase in intersectoral CCC as indicated by shared authorship among professionals in different sectors, these projects struggle to disseminate newfound information to their respective audiences. OH research tends to be published in one of three silos: ecological; veterinary; or human health. Researchers from different sectors who do work together are unable to find *publication venues for interdisciplinary projects*. (9) This issue not only disincentivizes the initiation of multisectoral collaboration, but also limits the reach of existing projects by only presenting findings to a singular sector's audience.

The term *One Health* appears with increasing frequency in publications, research, and collaboration efforts. If this measure was used to assess success of existing OH policies and frameworks, these efforts could be considered successful. However, with the interdisciplinary nature of OH, it is difficult to establish cost-effectiveness or a total reduction in morbidity and mortality as a measure of success. (14) This emphasizes the need for unified PHS. As more cost-effectiveness data are generated, they can serve as evidence to persuade countries to adopt OH Policies.

The Republic of Armenia (RoA) – a nation from the former Soviet Union –transitioned to independence in 1991. As RoA moved from a centralized health system to one funded by both public and private means, patients suffered from a decrease in quality of care and accessibility. (7) The system still suffers from a *weak primary care system and low health service utilization*. (2)

Zoonotic special pathogens of concern endemic in RoA include, but are not limited to anthrax, plague, and brucellosis. (3) Physicians, veterinarians, and epidemiologists recognize the limitations of siloed, vertical PHS and the need to move to OH integrated PHS to prevent outbreaks of these dangerous pathogens. (2) Partner organizations involved included the AM OHWG; Jacobs; BTRP; and Public Health Practice, LLC.

The AM OHWG includes representatives from the Food Safety Inspection Bureau (FSIB); National Center for Disease Control and Prevention (NCDCP); National Center for Infectious Disease (NCID); Ministry of Education, Science, Culture & Sports (MESC&S); Ministry of Economy; Ministry of Health (MOH); Ministry of Environment, Yerevan State Medical University, RoA Police, and Armenian National Agrarian University.

BTRP partners with other governments to *address the challenges of especially dangerous infectious diseases and develop and strengthen capabilities and capacities to curtail current, and prevent future, biological risks and threats.* (3) Their role is primarily logistic facilitation. Public Health Practice LLC – a private consulting firm – is tasked to generate the OH educational content according to DTRA media standards. They served as hosts and presenters during workshops and facilitate discussion among sectors involved in the AM OHWG. All groups share a united goal of generating a OH

framework in RoA to reduce the negative outcomes associated with zoonotic diseases and provide an example for other MS.

Problem statement

The global community lacks peer examples of approaches to develop OH frameworks implemented at a country level.

Purpose statement

This collaborative effort will serve as an example for other MS striving to implement OH frameworks.

Research objective

Develop a monitoring and evaluation (M&E) program to be used for similar workshops in other MS.

Significance statement

Better health for humans, animals, and the environment to increase global security and decreased economic losses due to zoonotic disease supports the vision of modernizing the global health security agenda to prevent, detect, and respond.

Literature Review

To encourage Member States (MS) to move to a One Health (OH) architecture, the U.S. Centers for Disease Control and Prevention (CDC) offers a Zoonotic Disease Prioritization process workshop. (1) In it, the group works to prioritize zoonotic diseases based on certain criteria. These include the prevalence of a disease, case fatality rate, and estimated economic impacts.

Following the finalization of the priority zoonotic disease list, participants develop next steps which may include follow-up meetings, formalized partnerships, and data-sharing mechanisms. This step also includes the delegation of responsibilities to different sectors so that each can be held accountable for their own part in the collaborative process. (1)

These countries and regions have participated: Azerbaijan; Bangladesh; Burkina Faso; Cameroon; Colombia; Côte d'Ivoire; China; Democratic Republic of the Congo; Economic Community of West African States Region; Ethiopia; Ghana; Kenya; Mali; Mozambique; Pakistan; Rwanda; Senegal; Sierra Leone; South Africa; Tanzania; Thailand; Uganda; United States; and Uzbekistan.

A key informant interview in 2018 assessed how OH coordination, communication, and collaboration (CCC) occurred in low-resource settings. (15) Local government officials in public health and veterinary services in Western Kenya were interviewed. recorded, and transcribed. One recurring theme was having veterinarians and medical professionals share lab space. This is not only an efficient use of resources in a limited-resource setting, but a way to expedite data sharing. (15)

The theme particularly relevant to this project is how to better utilize existing OH infrastructure. When systems for data sharing are in place, individuals must be familiar with standard operating procedures. Clarifying information sharing can expedite this process. Similarly, scientists in all relevant sectors should be familiar with common goals or objectives so that shared purposes can inspire CCC. (15)

The final report from Uganda's 2019 OH Zoonotic Disease Prioritization Process was recently completed and referenced during AM OH workshops. Uganda has a robust OH

Framework that can serve as an example to MS developing frameworks. Like other MS, Uganda struggles with the increasing prevalence of zoonotic diseases and worsening antimicrobial resistance (AMR). Challenges specific to Uganda include increasing extreme weather events due to climate change and an economy that depends heavily on livestock (humans frequently interact with pathogen-carrying cattle). (5)

Prior to the workshop, participants conducted a data and literature review along with an analysis of pre-existing OH related collaborations and legislation. Additional methods include the use of a mathematical model of livestock supply chain, which could estimate losses resulting from zoonotic diseases and estimate potential savings if addition prevention strategies were implemented. (5)

Outputs of the workshop include: “formation of the National One Health (NOH) platform with a Memorandum of Understanding between sectors; a national priority list of zoonotic diseases, the NOH Strategic Plan and an OH communication strategy to strengthen engagement across sectors and stakeholders”. (5) This not only served as an example of the formation of collaborative groups and OH policies, it also has the potential to produce an example of successful OH work depending on the results of Uganda’s future evaluations.

In 2020, a research team from Armenia’s Ministry of Health performed cross-sectional survey to assess public opinion toward the healthcare system. The survey was conducted via telephone, numbers having been selected through a Random Digit Dialing technique. (7) The final sample size included 576 adult residents in the capital city of Yerevan. The questionnaire was both structured and pretested, and results collected were then analyzed using SPSS 22 and STATA 13 software. (7) Approximately 45.5% of participants responded that they were dissatisfied or very dissatisfied with their healthcare system. Two factors stood out as having strong correlation with satisfaction: having used health services in the past year and self-identifying as having good health. Individuals who utilized health services within the last year were more likely to express satisfaction ($p < 0.001$). Similarly, the better an individual considered their own health to be, the more satisfied they claimed to be with

the healthcare system (p-value <.001). (7) A positive correlation was also noted between trust in the government and satisfaction with the existing health system. (7)

This study is relevant to AM OH as it describes current dissatisfaction with health systems and the widely held belief that the RoA should be responsible for the health of the Armenian people. (7)

A 2018 metanalysis of OH educational programs conducted an in-depth search using key terms such as “one health”, “one medicine”, and “veterinary public health” found 24 manuscripts related to OH as well as 45 degree programs within the United States that claimed to teach OH competencies. (16)

As of 2018, the degree programs could be broken down as follows: 27 masters programs, 10 bachelor’s degree programs, and eight doctoral programs. Ten of these programs come from private universities whereas the 35 program majority is hosted by public institutions. While Public Health schools go through an accreditation process, OH programs do not as they are presently considered *more of an approach and less of a discipline*. (16) This contributes to the lack of centralized OH competencies which could be taught across programs.

The study was able to identify the following core competencies: “(1) Management, (2) Communication and informatics, (3) Values and ethics, (4) Leadership, (5) Team and collaboration, (6) Roles and responsibilities, and (7) Systems thinking”. (16) The primary takeaway from this research was the need for a uniform set of OH educational standards.

The 2014 – 2016 West African Ebola epidemic is one such example of an outbreak situation that could have been prevented or at least better prepared for by the implementation of OH practices. A retroactive needs and gaps assessment was conducted in 2016 to determine where OH infrastructure would have been helpful and how to implement it in the future. (10)

Prior to the outbreak, the region was suffering from *insufficient monitoring and ecological modeling of zoonotic infection and transmission*. (10) The outbreak itself was further impacted by *insufficient systems for rapid dissemination of and community*

education about the ecological aspects of disease outbreak and management. (10) The authors suggest that to limit the harm done by future zoonotic outbreaks, the region work to develop OH infrastructure, train health practitioners in OH policies, and relay such concepts to the public through community health education. (10)

A 2014 piece assessed options for OH education outside of traditional degree programs, in the form of interprofessional education activities, defined as education programs in which *students from two or more professions learn about, learn from and learn with each other to empower effective collaboration*. (4) Such educational experiences can take place during initial career training in various sectors, as well as in the form of continuing education units, required in multiple sectors.

Two disadvantages result from this approach. By introducing OH competencies only as continuing education units to inform current practitioners, those who are currently in school and or training are excluded and may practice for multiple years before coming across the information. In addition, many interprofessional education seminars are one-time events. (4) While this provides some time for cross-sectoral communication in the form of education, this limits the potential for collaboration as there is no follow-up nor accountability for plans or recommendations made. Such singular meetings do not generate sustainable change. These findings will be relevant when developing recommendations for RoA.

In her 2009 address at the 23rd Forum on Global Issues, WHO Director-General, Dr. Margaret Chan, expressed concern that without more integrated zoonotic disease PHS, the global health community would be unable to *catch the next SARS* or *spot the emergence of a pandemic virus in time to warn the world*. (13) This quotation is used to begin an exploration of existing zoonotic disease PHS and their impact.

This study outlines the following necessities for an effective zoonotic disease PHS: multi-sectoral data collection and reporting, increased laboratory capacity for diagnosis, the use of mathematical modeling to predict disease trends and respond preemptively, and the inclusion of social scientists to perform risk communication to the general public. (13)

Existing PHS for zoonotic disease includes WHO Global Outbreak and Response Network (GOARN), Global Early Warning System (GLEWS), Global Emerging Infections Surveillance and Response System (GEIS), the OIE World Animal Health Information System, and Food and Agriculture Organization of the United Nations (FAO) Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases. (13) Despite existing, they have been ineffective in preventing zoonotic pandemics, such as COVID-19. In addition, overlap of activities may be inefficient and a larger analysis could result in more effective divisions of time, labor, and funding.

Project Content

Summary of Workshops

Through collaboration with the leaders of the AM OHWG, instructors created a syllabus for the proposed course. Learning objectives were written and ordered to span three sessions so that the fourth session could be used to create the framework itself. Sessions were scheduled to be two 4-hour blocks, one block daily for two consecutive days. Each session included a mixture of instructional time, group discussions, and breakout activities. Slide decks and other informational materials used met DTRA's content guidelines. Three of the four sessions were completed before the compilation of this report.

Representatives from the World Health Organization (WHO) attended the third workshop and offered their assistance in conducting the fourth workshop. Instructors will defer to their learning content. Workshop #4 is scheduled to occur at the end of May 2022 in Yerevan.

Learning Objectives

By the end, trainees were able to …

• define and explore the role of OH.

• give a basic understanding of the role of OH in applied epidemiology.

• explain the role of epidemiology and surveillance in improving human, animal, and environmental health.

• provide examples of professional development to connect with other OH and law enforcement professionals.

• identify major zoonotic infectious disease issues and especially dangerous pathogens in RoA.

• clearly identify current OH laws in RoA.

• collaborate with stakeholders to develop and implement an OH framework for RoA.

• prioritize public health challenges with an OH lens.

• develop methods to respond to OH outbreaks with coordination and collaboration with international and local stakeholders.

• identify non-infectious environmental risks affecting both humans and animals in RoA.

• define sentinel events in both humans and animals and formulate methods on how to use these events to detect and prevent hazardous exposures.

• describe an integrated assessment of a health issue that considers human, animal, and environmental aspects.

• describe the implementation of an integrated intervention that considers and monitors the impact to humans, animals, and the environment based on surveillance systems RoA already has in place.

• recognize the roles of different members of an OH team working at the human animal interface and present how to assemble and manage such transdisciplinary team interactions.

• understand the conceptual framework of OH and describe its significance towards the quality of life in RoA.

• explain the concepts of OH to a lay audience.

• illustrate how scientists, health care providers, law enforcement, and government regulatory agencies from different disciplines interact to produce science-driven positive changes in the health of both animals, humans, and the environment.

Workshop 1

Workshop 1 Day 1 began at 05:00 Eastern Standard Time (EST) with introductions from the hosting organization and the facilitation of the introduction of the participants. Instructors reviewed the syllabus and schedule. The first slide deck used introduced the current state of OH in RoA, existing zoonotic pathogen surveillance networks in RoA, and zoonotic pathogens endemic to RoA.

Participants shared the following during group discussion:

• Vertical PHS is occurring, but more horizontal PHS is needed. Additionally, government ministries should be involved and there should be a centralization of a higher level of framework or policy. Faster response would be helpful as well.

• Additional collaboration between veterinarians and the public health sector is needed given the high prevalence of zoonotic diseases. This participant also recommended the hosting group serve as an intermediary between the veterinarians and public health sector while a new framework is being built. A question was asked about how the United States goes about preventing disease in livestock. There was concern expressed about how to distribute vaccines in a timely manner in the event of an outbreak.

• Introducing health education concepts early through school systems may be employed with the hope that a more informed child will grow up to be an adult who makes better health decisions.

• Knowing which organization is responsible for keeping track of new cattle births and cattle movement, such as seasonal grazing, in the United States would be helpful. The idea of incentivizing farmers to register their livestock was mentioned.

• There are rumors that people don't register cattle for socioeconomic reasons. Fewer cattle may make them eligible for additional social assistance. Additional reasons can include that they are too busy or do not want to be expected to spend money treating sick animals.

• There is an interest in hiring communication specialists for all sectors and having more centralized plans for rapid response in case of emergencies.

• Previous working groups suffered high turnover rates of professionals. AM OHWH needs reorganization and restructuring. They have general OH background information. There are two legal documents used that need to include more OH terminology and framework. Both the EU and DETRA are helping to provide facilities. There are concerns regarding information security, so an information security certificate, which has proven to be successful in other contexts, needs to be pursued.

•These work groups had to restructure work during the ongoing pandemic, but they assure that "supervising audits" are still being conducted. A reference was made to forming a national team with all relevant stakeholders to best manage OH concerns in the future.

An additional slide deck provided information on framework design and implementation activities. This slide deck also discussed needs and gaps in current AM OH policy.

A call for laboratory perspectives produced the following commentary:

•A change of government negatively impacted the development of additional laboratory capacity. There is particular interest in having lab capabilities to work with especially dangerous pathogens and zoonotic diseases. DTRA is a collaborator. There are two reference labs on same site but in two different buildings for sake of the safe archiving of pathogens. Interagency communication is good. There different funding sources including the Japanese government & "Zodiac Global Program". An e-library is in development. Veterinarians have their own training facilities but are welcome to share.

•Having more animal health reference lab facilities would expedite laboratory processes. Three would be sufficient.

A closing was provided at 08:00 EST, but some participants stayed on until the call ended at 08:15 EST to complete the pre-workshop survey.

Workshop #1 Schedule

Armenia Time	Tuesday, Sep 28, 2021	Wednesday, Sep 29, 2021
13:00 – 13:45	Welcome, Orientation, & Course Introduction	Mechanisms for Collaboration
13:45 – 14:00	Break	Break
14:00 – 14:45	Introduction to One Health	Coordinated Response
14:45 – 15:00	Break	Break
15:00 – 16:00	Overview of One Health	Group Work: Conceive Armenia National One Health Framework- Q1. How should Armenia collaborate, coordinate, and communicate One Health prevention, detection, and response?

Workshop 1 Day 2 began at 05:02 EST with re-introductions and a review of the previous day's activities. The learning objectives reviewed the current state of surveillance and the importance strengthening systems moving forward. Instructors introduced the three C's of the OH approach - coordination, communication, and cooperation.

Priority diseases and the economic impact of infectious disease were discussed in the learning material. The slide deck explained that action plan creation involves determining which groups are collaborating and what their roles are as well as creating a framework in case of emergency.

This slide deck explored key attributes of successful OH Programs. A participant noted that OH groups in RoA want to include plant health and involve the appropriate parties, but the plant health groups hesitate to participate. Coordinated Activities, how to determine if they are needed and how to implement them, were also detailed.

The instructor then asked participants to share their previous collaboration experiences.

• OH cooperation started in RoA in 2015. Other diseases, such as malaria, have been successfully addressed through multisectoral collaboration. There are no laws are regulations that assign roles to groups, and that is a gap that needs to be filled. Agencies represented today are sufficient to form a working group or taskforce.

• There was a previous collaboration of disease hospital, veterinarians, and insect specialists. This created new opportunities. There are catch-and-release programs for stray dogs to check for disease. These collaborating groups provided health education but were met with some initial hesitancy by community members. Additionally, there was community and district level involvement. This experience was largely regarded as positive.

• Regional level cooperation allowed fast, effective response, which contained a recent, regional Anthrax outbreak.

• There are algorithms put into law in RoA, but their implementation falls short. The ministry of health is currently developing a draft of a Brucellosis response strategy. Collaborating agencies will be added in gradually as the document progresses. Local cooperation should also be a goal.

Examples of other countries' collaboration and guidelines were presented and the importance of surveillance was emphasized. The topic turned to what barriers may exist to building OH country level template. The host presented the following question to facilitate discussion amongst participants: how can you further use the 3 C's with OH professionals in your current position? Responses included:

• Some individuals feel that a lot of public health collaboration occurs at a higher level and that these higher levels should distribute more information to "lower levels" such as hospitals and labs. There also needs to be more collaboration amongst these "lower level" groups. Maybe an improvement can be made in limiting excessive bureaucratic steps in the transfer of information to maximize efficiency. Animal labs transfer information to ministry of health and a food safety inspection body, despite there being no direct collaboration between Ministry of Health and this lab.

• Communication needs to be better between labs is essential, but there needs to be action in addition to communication.

• Stakeholders should be informed concurrently. This is an example of why a centralized surveillance is needed.

• The need for local authorities in regards to enforcement of laws or quarantine procedures was emphasized. There needs to be better risk communication mechanisms to explain risk at a community level, in a timely manner, without creating panic in the general public.

• The concern should not be how the information is transferred, but who is responsible for transferring the information.

• There are laws about reporting, but they need to be better implemented. Similarly, there are reporting software options but they are not widespread, nor do they function well. Journalists play an important role in dissemination of health information; but providing too much information too early could lead to panic. “Lead” system would be a great support, with increased confidentiality. Existing laws and programs should be evaluated before new ideas are implemented.

• This workshop included professionals from all levels. Because there were “more experienced” individuals present who may have more ability to change national level policy, “less experienced” local professionals should have used this opportunity to speak up and share their perspectives. There are complications of having an information chain because that can result in delays. Instead, information needs to reach groups in all sectors simultaneously.

A “take home activity” was issued. Participants were asked to review existing laws/polices and consider how they should be updated to better establish collaboration, coordination, and cooperation.

Multiple participants want to see examples of guidelines and frameworks from other countries to then compare to Armenian law to see if they can legally be implemented. A participant noted that avoiding uncomfortable issues for the sake of being pleasant was

not helpful in this context, because this context exists to highlight gaps for future improvement.

Closing comments were made and participants were reminded of the next workshop which was scheduled for November. The post workshop survey was posted for participants to take and the call ended at 08:10 EST. Multiple breaks were taken, in part, due to technical difficulties and complications with the interpreters.

Workshop 2

Instructors, facilitators, and interpreters joined the call at 03:30 EST. Facilitators sent QR code to join the external group chat as well as the pre-survey in the Zoom chat. The introduction began at 04:00 EST and acknowledged the ongoing difficulty of the COVID-19 pandemic. Attendees were thanked for their time and participation. The host reviewed the learning objectives, goals, syllabus, and schedule for the day. A moment was taken to recognize the World Health Organization's “go blue” week of Antimicrobial Resistance awareness. This prompted a discussion of recent proposals for brucellosis control and AMR prevention in development. The topic transitioned to barriers to OH implementation.

One of the barriers discussed was the ongoing COVID19 pandemic, which delayed of research and forward motion. A brief discussion of the Armenian response to COVID19 occurred.

Instructors provided an overview of transparency and trust play roles in OH collaboration, what mechanisms of collaboration already exist, and how to strengthen them.

Following the introduced of OH funding mechanisms, one participant noted that organizations and governments may be more willing for fund outbreak-prevention style surveillance due to lessons learned in the ongoing COVID19 pandemic. Hosts offered an invitation to explore FAO and WHO country level collaborative entities listed on their respective websites.

Uganda's OH Framework served as an example of how to build an OH framework. The group transitioned into a discussion about the visions, goals, and objectives of their framework. Responses are included below:

• AM OHWG did have these objectives defined, so they will need to reach a consensus about objectives.

• The ministry of economy has an initiative to engage farmers and educate communities. There are two teams working to lead this national campaign.

• As Armenia set their strategic objectives, they prioritize sharing data across sectors.

• OH principles and the strategic framework should be introduced in the educational sector so that specialists come into the labor market ready to implement.

• OH trainings should be tailored to specific geographic areas.

• There is a need for integrated surveillance because of the overlap of symptoms of some infectious diseases could result in inaccurate diagnosis, negatively impacting the accuracy of case counts. (The example given was an individual with malaria being misdiagnosed with COVID19.)

• The OIE would be a potential collaborator and their capacity to support the AM OHWG should be assessed.

• Participants from the environmental sector and representatives from the ministries of science and education need to be invited. Some participants were concerned that some groups might decline the invitation.

• Because of logistical obstacles such as IT issues and technical difficulties during training, IT personnel and computer scientists should be included in OH collaboration.

• A creation of an interministerial IT department for OH PHS would be advantageous.

• An OH mentorship program would allow countries that developed OH frameworks with some success to share their experience with others.

The instruction introduced the concept of a Memorandum of Understanding and explained that the existing OH MOU in RoA only applies to the Field Epidemiology Training program. The AM OH WG agreed develop their own MOU along with a budget.

Reminders were given to complete the pre-workshop survey, join the external group chat, and return for the next session. The participants were thanked again, and the session concluded at 07:02 EST.

Workshop #2 Schedule

Armenia Time	Tuesday, Nov 23, 2021	Wednesday, Nov 24, 2021
13:00 – 13:45	Creating a National One Health Framework	Optimizing One Health Surveillance in Armenia
13:45 – 14:00	Break	Break
14:00 – 14:45	Uganda's National One Health Framework	Risk Reduction
14:45 – 15:00	Break	Break
15:00 – 16:00	Wrap-up Presentations & Facilitate Discussion	Group Work: Conceive Armenia National One Health Framework

The call began at 03:30 EST. Instructors welcome participants to the call at 4:00 AM EST and reminded participants to complete the post-survey following the workshop.

The first slide deck covered optimizing OH surveillance in RoA. After acknowledging the difficulty of working across silos, the instructor introduced a pathway of development for AM OHWG.

A participant noted the need for a comprehensive gaps analysis to look for amendments to be made to existing legislation. The host suggested the formation of a smaller group within AM OHWG to perform this analysis and offered support.

Another participant recognized that gathering this proposed group would be logistically difficult, but there would be a possibility for the introduction of an international One Health document at a World Assembly. Additional participants chimed in to express their support and willingness to participate in this smaller group.

The learning material turned to cost effectiveness of OH implementation and a discussion followed. One participant recognized that research organizations need to improve data sharing efforts so groups know what research is being done, what data is available, and can avoid duplicating efforts. The hosting organization ensured participants would have access to reports and slides used. A participant mentioned how this topic came up naturally in her work when discussing vaccination and cost effectiveness. She noted the importance for research analyzing cost effectiveness for various interventions and surveillance so that best practices can be developed.

The final slide deck to detailed potential surveillance options. The host then prompted a group discussion and participants made the following contributions:

• Digitizing data is a complicated process, but one that has already started. Roles should also be defined for each sector, so everyone knows who is responsible for what data.

• A set of indicators need to be defined to be used in surveillance.

• While they have moved away from previously existing Soviet systems, there were some efficiencies that could be revisited.

• Collaboration in public health surveillance is difficult without a centralized database.

• If student collaborative groups were formed, relationships could be built across sectors early.

• A glossary should be developed so that collaborators across sectors are on the same page when it comes to terminology.

Instructors issued a reminder to complete the post-survey during concluding comments. The session ended at 07:00 EST.

Workshop 3

Group 1's session began at 05:00 EST. The introduction included an acknowledgement of the difficulty of the ongoing COVID-19 pandemic, a reminder to complete the pre-survey, and a reminder to choose an interpretation language. Event planners allocated the first twenty minutes of the session for the participants to complete the surveys.

The first slide deck focused on pandemics and disaster medicine in OH. Relevant topics included hazards and exposures, climate change and increasing frequency of severe weather events, biosafety and biosecurity measures, and lessons learned from COVID pandemic. Viruses, their seasonality, and the importance of genomic sequencing in future pandemics received particular attention.

The topic moved to outbreak prevention and control and included a review of especially dangerous pathogens endemic to RoA.

Following a brief intermission, hosts introduced a “building a framework” breakout activity. Due to technical difficulties, we remained in a singular group instead of breakout groups.

• Mandatory health insurance could help identify health conditions in the population.

• COVID-19 surveillance serves as an example of successful collaboration between sectors and how it helped raise awareness regarding the importance of this multi-sectoral collaboration.

• When prompted about COVID guideline adherence, someone noted that individuals’ compliance varies as case counts go up or down.

• There was initial vaccine hesitancy regarding efficacy in such a short period of time. The state intervened with informational campaigns and health education. Vaccine coverage has now risen accordingly.

• Creating legal framework means adherence can be measured. This individual continued to elaborate on how sectors collaborated during a recent foodborne illness outbreak.

During the conclusion, participants expressed some confusion regarding the similarities in the pre and post survey. Event planners explained that the same questions were asked intentionally to measure change. The meeting concluded at 08:20 EST.

Training #3 Schedule – Group 1

Armenia Time	Tuesday, Mar 9, 2022
14:00 –14:45	Pandemics and Disaster Medicine in One Health
14:45 – 15:00	Break
15:00 – 15:45	Responding to Outbreaks of Especially Dangerous Pathogens
15:45 – 16:00	Break
16:00 – 16:45	Review Steps for Creating a One Health National Framework
16:45 – 17:00	Break
17:00 – 18:00	Discussion: Challenges in Creating a One Health Framework for Armenia

Despite being scheduled to begin at 05:00 EST, Group 2's session did not begin until 05:20 due to technical difficulties. Because many participants attended an in-person session, attendance taken on the virtual call underestimated the actual number of attendees. The welcome provided thanked all present sectors, as well as DTRA, CDC, and WHO colleagues. Participants were reminded to complete both the pre- and post-surveys before being allowed time to introduce themselves and their affiliations.

The instructors' introduction reviewed the 3 C's of OH Implementation along with steps to operationalizing OH. The OH Framework objectives lecture covered how to perform a needs and gaps assessment of existing legal infrastructure. The community engagement topic included a discussion on the importance of raising awareness and ensuring all relevant parties are included in OH activities.

When hosts introduced a group activity originally planned to have the participants split into two groups, hosts instead decided to keep the group together for discussion given the number of participants. This group activity yielded comments listed below:

• The World Health Organization is planning a session to discuss OH in RoA on March 21st, 2022.

• Previously, each sector working independently resulted in repetition of efforts in some areas but gaps in others.

• The laboratory sector invited other sectors to participate in their work (Workshop March 22nd) and noted that they would share data as was relevant.

• Laboratory safety laws already exist and include OH definitions.

• The ministry of labor and social affairs should be included as they could help with risk communication to the community and human infectious disease prevention measures such as quarantines. Additionally, they could potentially help tackle social issues such as misinformation.

• There were lessons learned during the war, which disrupted existing plans.

• The United States has a policy that rewards farmers/ranchers for putting down infected livestock as opposed to selling infected meat. RoA could consider adopting such a policy.

• Information campaigns thus far have centered on agriculturalists. More health education campaigns need to be directed towards the general public.

• There was a discussion regarding including media organizations in the dissemination of OH information, particularly TV stations or other groups that can access a large percentage of the population.

• The mayors of settlements can be important sources of information in their communities.

• Outbreak response has often been slow because there were no legal requirements for collaboration. Sectors receive funding from different sources. Late receipt of instructions can impede response.

• Sometimes community leaders who don’t work specifically in health don’t consider health their responsibility.

• Collaboration should be described in detail at all levels (local, national, international) so that local partners are also included and aware of their roles.

• A needs assessment needs to be conducted for each region so that strategic plans/action plans can be tailored to each region.

The group was prompted to determine next steps following the workshop. They determined that the present laws would need to be assessed and perhaps amended. Pending approval of amendments or new laws, corresponding action steps would have to be determined at that point in time. Additional steps included clarifying expected functions in partner organizations and including IT specialists to create surveillance and data sharing platforms

The concluding comments included reminders to complete the post-survey, to join the external group chat, and to attend the next workshop scheduled for May. The call concluded at 08:50 EST.

Working #3 Schedule – Group 2

Armenia Time	Wednesday, Mar 10, 2022
14:00 – 14:30	One Health Policy Examples
14:30 – 16:00	One Health Framework Objectives
16:00 – 16:30	Break
16:30 – 17:15	Next Steps in Creating a National One Health Framework in Armenia
17:15 – 18:00	Group Work: Conceive a One Health National Framework

Monitoring Plan

Because the learning material was divided into four sessions consisting of two days each, a monitoring plan needed to be designed to check on progress following each session. Pre and post workshop surveys were created for each workshop to evaluate how the workshop met its intended objectives, as detailed in the syllabus. The post-survey was designed to mirror the pre-survey, so that a before and after comparison could be drawn. The achievement of learning objectives was measured using a five-point scale: disagree, somewhat disagree, neither agree nor disagree, somewhat agree, and agree. Questions were divided into sections of participant information, OH Learning Objectives, Armenia-Specific Learning Objectives, and Collaboration Learning Objectives. An Epidemiologic Learning Objectives portion was added for Workshop #2. Effectiveness of presentation and activities was measured using open-ended questions at the end of the post-workshop, allowing for participants to communicate their feedback.

Language used was simplified for the sake of translating the document into Armenian. Participants had the option of completing the survey in English or Armenian. The pre-survey was sent to participants prior to the start of Day 1 and participants were asked to complete it before the workshop. Participants were reminded to complete it at the

beginning of Day 1. The post-workshop survey was sent out at the end of the workshop, Day 2. Participants received multiple reminders to complete the surveys.

While the surveys distributed for Workshop #1 used Google surveys, feedback suggested that format was not easily accessible for participants. For this reason, the surveys that accompanied Workshop #2 used Word documents and were sent via email.

Using the feedback from Workshop #1, a plan to increase participation was developed to be employed during Workshop #2. The following steps were taken to improve participation in assessment activities: leaders were asked to encourage participation before meeting, interpreters were asked to post messages in both English and Armenian in the chat, time was allotted to take the survey(s) during the workshop, these designated time allotments were noted on the workshop schedule, and the option was presented for the survey(s) to be walked through as a group, transferring to a focus group format.

At the start of 2022, the previous supervisor needed to turn her attention to a concurrent Field Epidemiology Training Program. For this reason, another AM OHWG member took over the Armenian lead on the project. This resulted in two changes to the programming as well as M&E plan. In reviewing original, untranslated feedback, this new lead recognized confusion in some of the responses and determined that there were varying levels of experience and familiarity with OH within the participant group. Recognizing the need for two different levels of information, participants were divided into two groups: group 1 (informational) and group 2 (decision-making). This allowed for workshops to be most efficient in providing additional information and support to those less familiar or experienced with OH while the higher-level group was permitted to move on to discussing potential policy changes. The second change came in the form of returning pre- and post- surveys to online survey formats.

The Workshop #4 post-survey was designed to be a cumulative review of the achievement of learning objectives.

Results

Workshop Survey Results

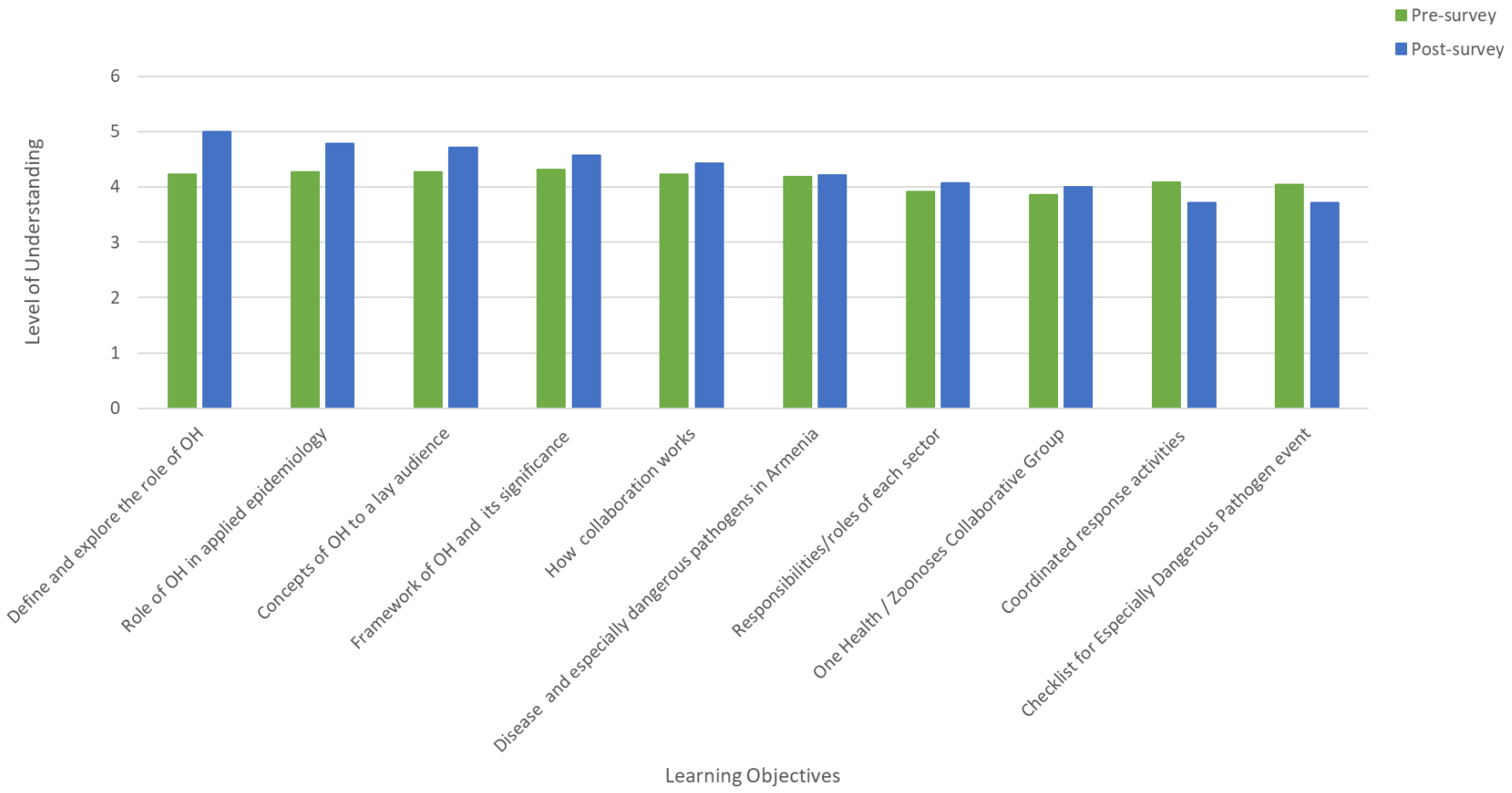
In feedback from Workshop #1, it was recommended that individuals from local governments be included in future workshops. Additionally, multiple participants noted that they would prefer in person sessions. This was, unfortunately, not feasible due to the on-going COVID19 pandemic.

There were two learning objectives in Workshop #1 that were outliers in not seeing an improvement of comprehension:

1. I have the ability to develop a checklist or ground rules used during an Especially Dangerous Pathogen event.

2. I can define coordinated response activities (epidemic investigations; biosecurity/biocontainment; risk assessments; control measures; information sharing; and sharing diagnostic capacity).

AM OH Workshop #1 Pre and Post-survey Comparison, 2021



These learning objectives were addressed again in Workshop #2 and demonstrated improvement.

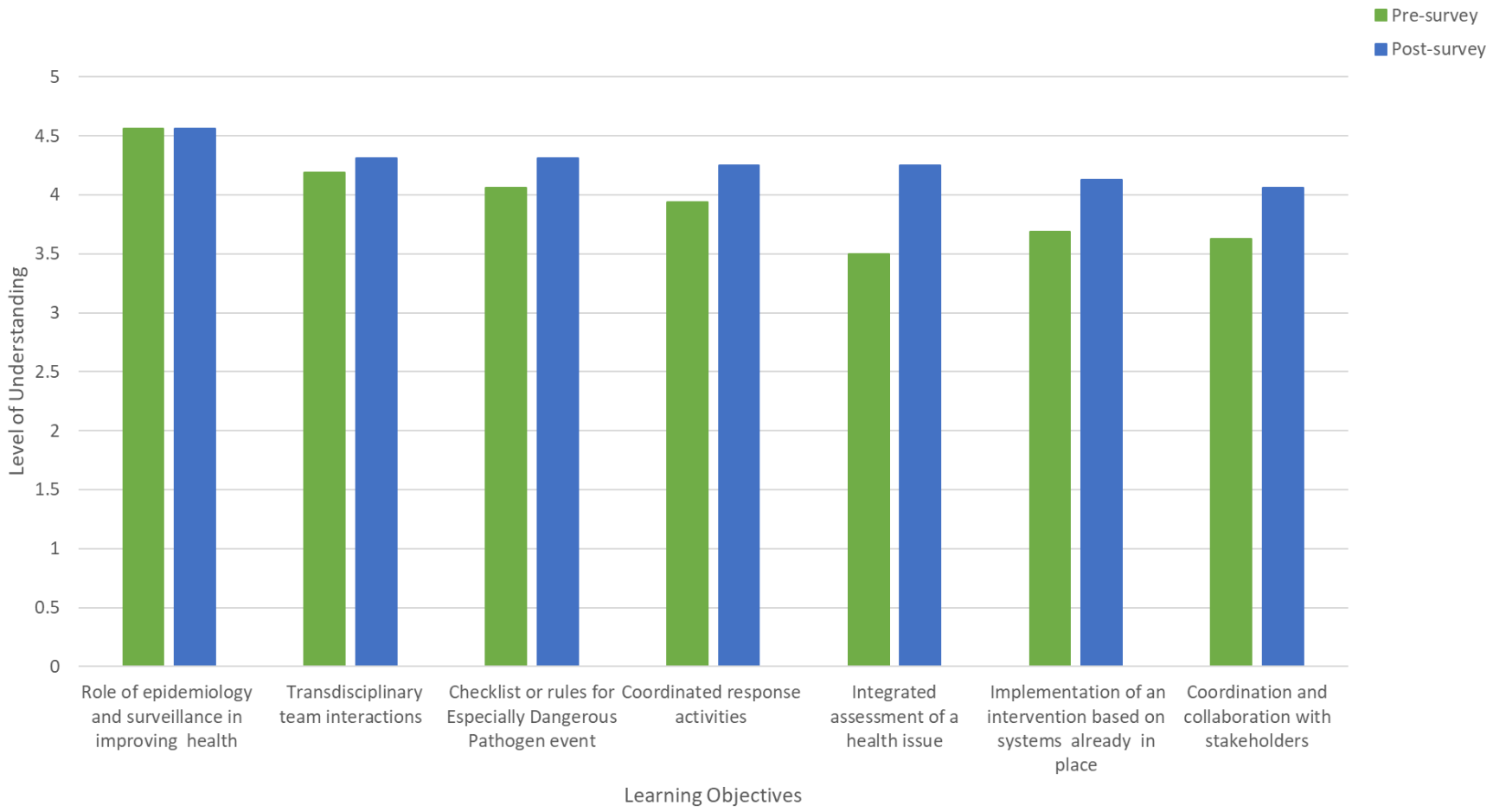
Twelve participants completed both the pre- and post-surveys for Workshop #2 and their data is included in the individual comparison of results page. A few participants marked an objective as less understood following Workshop #2. Given that there is no consistency in the objectives that received negative changes, this could be attributed to potential variations in translation of the survey or forgetting what one had marked on the pre-survey and responding lower on the post-survey unintentionally.

In addition, numerical averages were taken for each scale question. Each scale question could then be evaluated by comparing the pre and post survey averages to measure increased attainment of learning objectives. All learning objectives saw a level of improvement, so there were no outliers in Workshop #2. On average, learning objectives saw a 0.3 increase in level of understanding, using the numerical scale. This increase typically designated a movement between “neither agree nor disagree” to “somewhat agree” or a movement between “somewhat agree” to “agree”.

When asked if the course was well-organized following Workshop #2, 12.5% of respondents said they “somewhat agree” and 87.5% said they “agree”. Approximately 18.7% of participants responded that they “somewhat agree” with the statement “The slides used were easy to read and understand” and 81.2% responded that they “agree”.

Following Workshop #2, 31.2% of participants “somewhat agree” and 62.5% of participants “agree” with the statement “I can work towards developing a One Health Framework for the Republic of Armenia”. In the written feedback, many participants said the support they needed from the hosting organization to build the RoA OH framework should come in the form of additional trainings and continued collaboration.

AM OH Workshop #2 Pre and Post-survey Comparison, 2021

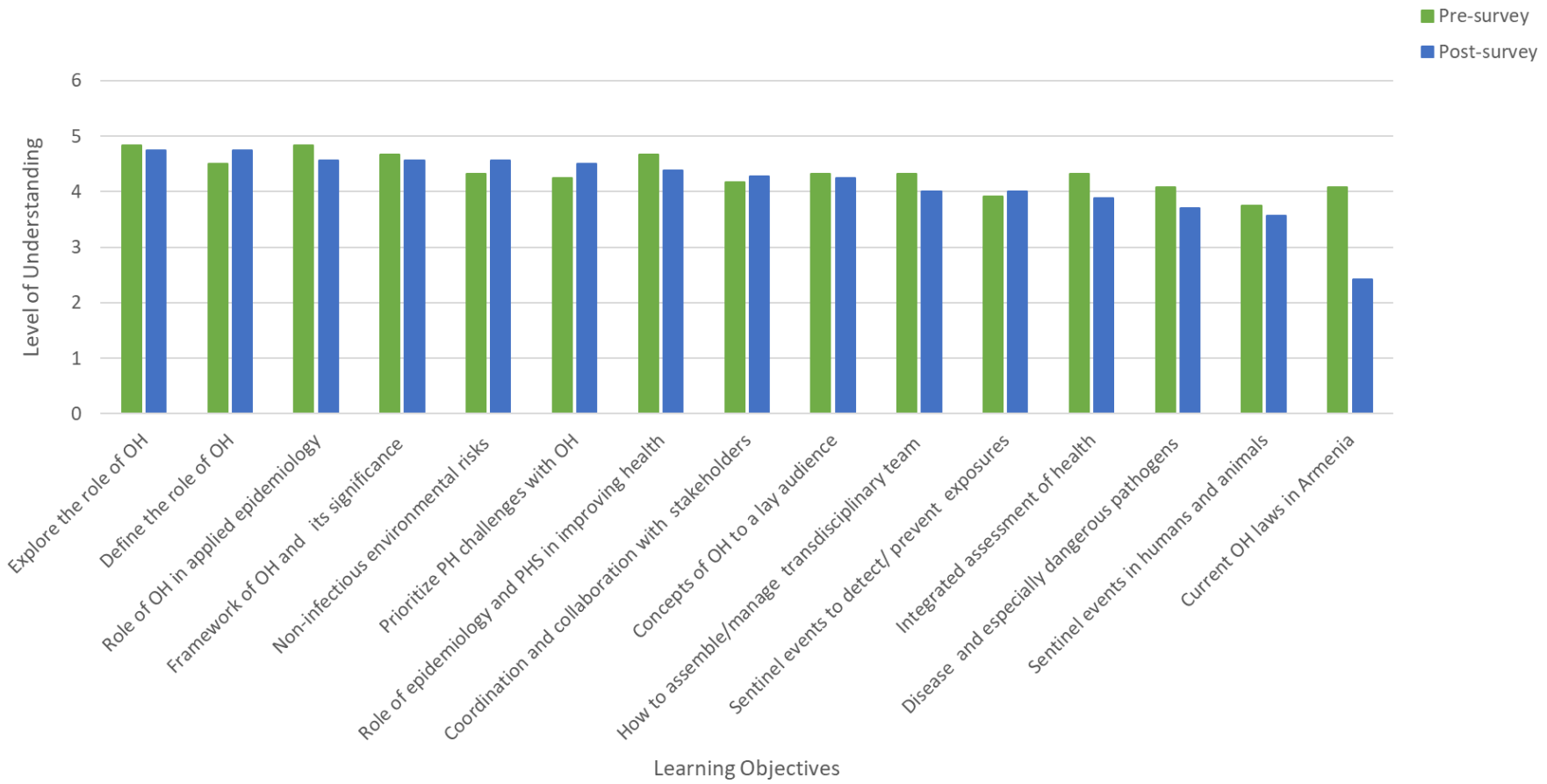


Workshop #3 consisted of five participants from Group 1 and ten participants from Group 2 complete both the pre- and post-surveys. Both groups listed similar responses to the Workshop Expectations portion of their respective pre-surveys: wanting to gather additional information and to better collaborative practices. When asked about questions participants may have going into the Workshop, multiple participants asked about other countries experiences implementing OH frameworks. For this reason, they were provided examples of existing OH frameworks in other countries and their progress to-date.

Group 1 saw variances in progress using the comparison of mean results from the pre- and post-survey. This is likely due to inconsistency between survey-takers; the group that took the pre-survey only overlapped slightly with the group that took the post-survey despite both being available to all participants. For the five individuals who completed both, there was an average .7 increase in understanding of the learning objectives.

Group 1 experienced an improvement of 0.3, the highest increase in understanding, in the following two learning objectives: “I am able to prioritize public health challenges with a One Health lens” and “I am familiar with non-infectious environmental risks affecting both humans and animals in Armenia”. One learning objective became an outlier with a seeming decrease in understanding: “I can clearly identify current One Health laws in Armenia.” This indicates confusion amongst participants and will be readdressed in the subsequent Workshop.

AM OH Training #3 Pre and Post-survey Comparison, 2022

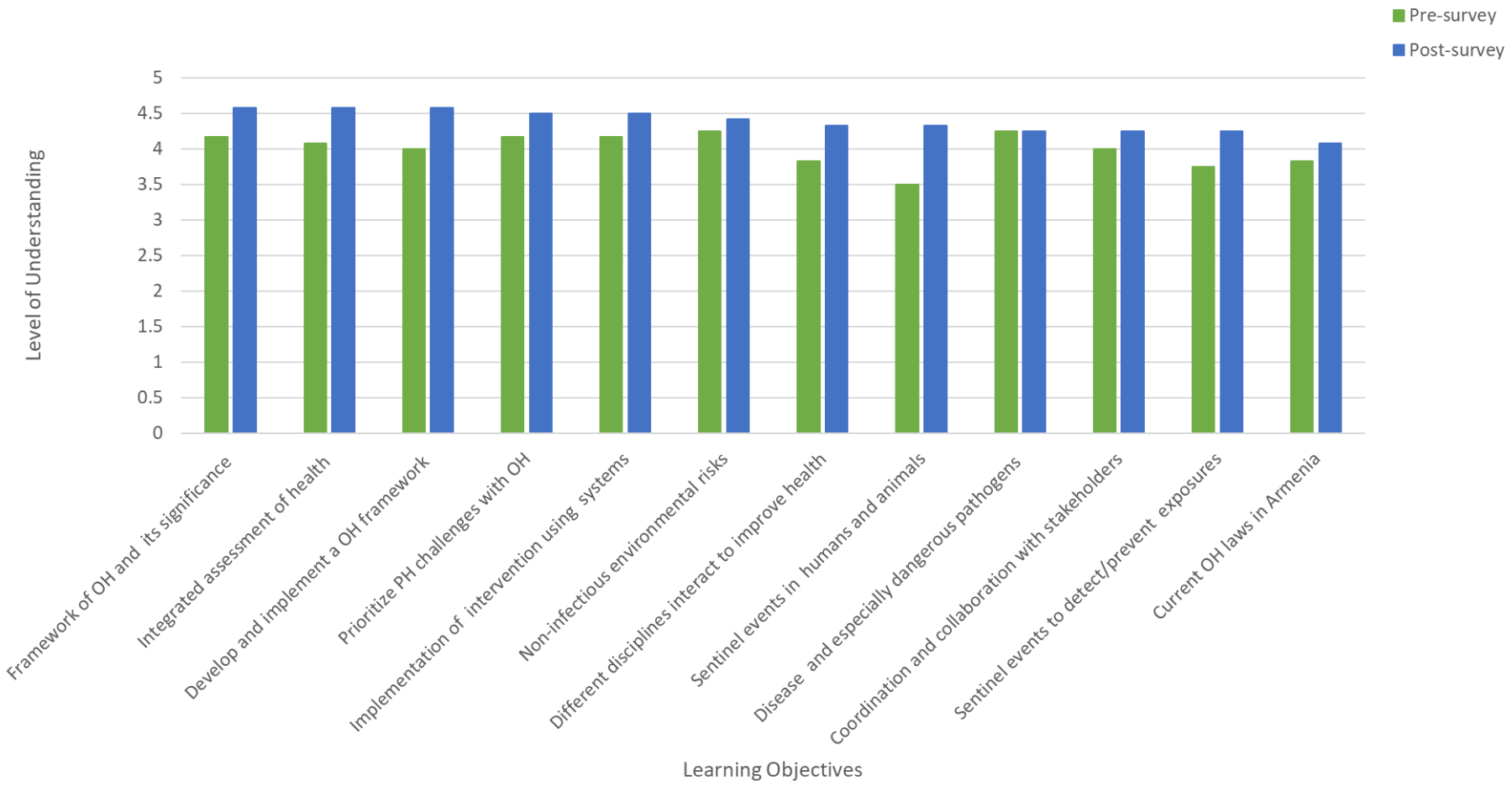


Despite variances in progress using the individual comparison of results for Group 2, the comparison of mean results yielded an average improvement of .4 overall. The least improved learning objective for Group 2 was: “I am able to identify major zoonotic infectious disease issues and especially dangerous pathogens in Armenia.” The pre-survey demonstrated that participants already agreed with this statement, justifying the lack of increase in understanding. The most improved learning objective, seeing an increase of 0.8 in understanding, was: “I can define sentinel events in both humans and animals.”

Across both post-surveys, 100% of respondents agreed with the following statements: “The course was well-organized” and “The slides used were easy to read and understand”. Both groups provided overall positive course feedback, noting that they found the training to be “helpful” and “relevant”. Multiple participants in each group requested additional future trainings and participants in Group 2 requested ongoing support from the hosting organizations as they build the OH framework for RoA.

Much like the feedback from the previous workshop, multiple participants noted that they would prefer in person sessions. This could be possible for Workshop #4 depending on the ongoing pandemic.

AM OH Workshop #3 Pre and Post-Survey Comparison, 2022



Limitations

This special studies thesis project was conducted during the COVID-19 pandemic. Workshops that were originally planned to take place in person were transitioned to an online format. There were delays in communications and missing survey responses due to participating public health professionals being heavily involved with COVID-19 response in their respective countries.

Because participants speak a range of languages, interpreters were employed during the trainings and translators prepared documents such as surveys in both languages. Both groups proved crucial in this process, however, there is a possibility that misunderstanding or mistranslation may have impacted workshop discussion and or survey results.

Recommendations

In the education sector, the primary objective should be forming an OH accreditation body. Existing OH programs are inconsistent in their learning objectives, in part, due to the lack of universally accepted OH competencies. An accreditation body with representatives in each sector could not only agree upon a set of unified OH competencies but could also hold education programs accountable for teaching what is advertised. The education sector should also continue to develop new and expand upon existing OH programs whether that be degree tracks or additional certifications. These actions could ensure future human, animal, and environmental health practitioners are informed of OH methodologies before their professional practice begins.

For working professionals in human, animal, and environmental health sectors who did not have the opportunity to learn OH competencies during their degree programs, continuing education units will be crucial. These continuing education units could be hosted by the proposed OH accreditation body and would be opportunities for interprofessional collaboration.

Coordinated PHS will be a crucial step to implementing future OH frameworks. Coordination between sectors in zoonotic disease tracking can both identify gaps in

existing PHS and reduce replicated efforts to maximize cost effectiveness. Data sharing between will also facilitate more accurate, predictive mathematical modeling.

Following the proposed research CCC in the publishing process will also be necessary to successfully disseminate OH data and information to all relevant audiences. Presently, OH related publications are published in the academic silo of the sector that wrote the piece. This means a piece produced by human health epidemiologists is published in a public health journal shared to a public health audience only, despite its relevance to veterinarians. The formation of a multisectoral OH journal could solve this challenge, as could permitting zoonotic pathogen related articles to be published in multiple journals representing each sector simultaneously.

Public Health Implications

National level outcomes resulting from workshops in RoA will hopefully include amendments to existing legislation, new legislation, and the allocation or reallocation of funding for the purposes of OH surveillance and implementation. Through the creation of the AM OHWG, individuals across sectors will now have a continued platform for future collaboration.

RoA's process of building an OH framework can serve as an example for peer countries also looking to implement an OH approach and can help raise awareness of the necessity of OH policy on an international level. The implementation of OH policy in a singular country can not only reduce the burden of zoonotic infectious disease within that country but reduce the spill over into neighboring countries as well.

As more countries implement OH policy, opportunities for global zoonotic disease surveillance and other modes of cooperation increase. Working towards these goals as global citizens can help us both prevent and manage future zoonotic outbreaks, resulting in better health outcomes.

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