One Health Nicaragua - Methods of improving cattle and poultry production in Sabana Grande, Nicaragua

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Program/Project Purpose: One Health Nicaragua is an interdisciplinary project led by University of California, Davis students to address interrelated human and animal health concerns in Sabana Grande, Nicaragua. Inadequate nutrition for both humans and animals is a community concern identified through previous years' work. Many families in Sabana Grande are subsistence farmers, so food animal production is an essential part of household economies in addition to being an important source of dietary protein. Students from the veterinary and medical schools, public health program, international agricultural development program, and Design Lab course have collaborated to address these challenges.

Structure/Method/Design: To improve human nutrition and increase income, the veterinary branch—focused on improving cattle and poultry production, as 96% of families own poultry and 48% own cattle. Last year, poor cattle nutrition was identified as an important factor limiting cattle production, especially in the dry season. Producing silage, stored fermented feed, was explored at the time, but it was not a scalable solution since it required silage to be chopped by hand. Collaboration with the Design Lab was initiated to develop a better method. To improve poultry production, the veterinary team implemented a year-long pilot project for 16 participating families. Families were trained to monitor and record data on their flock and helped to design and build coops for greater protection, easier care, and closer monitoring of poultry flocks. We also hosted workshops on coops and poultry disease prevention for the project families and other interested community members. Our objective is to increase poultry production so these families will have greater protein and incoming-generating resources.

Outcome & Evaluation: A silage chopper was built from materials available in the community, thus making the production of silage feasible for community members. A return trip to the community in December found that 14/16 families had finished building coops. Management data analysis is still ongoing.

Going Forward: By continuing to focus our efforts on cattle and poultry production, we hope to improve the nutrition of families in the community and empower them to share these techniques with their neighbors through farmer-to-farmer information exchange.

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Abstract #: *1.015_PLA*

Collaborating with finnish nursing students: Expanding nursing education and global health

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Program Purpose: The purpose of this program is to provide nursing students a global health experience looking through the perceptions of international peers and exchange ideas, improve communication, increase self-confidence, and understand healthcare systems. The nursing students were from Brigham Young University (BYU) in Provo, Utah and Mikkeli University of Applied Sciences (MAMK) in Savonlinna, Finland. Stakeholders of MAMK were selected because the students speak English and they were in an English nursing class. The class was interested in the program with BYU students. BYU students applied and were randomly chosen into ten slots to participate in a study abroad program to Finland.

Method: The Program took place between BYU and MAMK nursing students. The ten BYU students were each paired with two to three students from MAMK for a total of 30 MAMK students. The groups participated in e-mail and Skype encounters prior to one day of planned activities in Finland. After the day of activities, a 15-item questionnaire was given to each student. IRB and Finnish nursing school approval was obtained prior to students giving their consent and completing the survey. The responses were entered into Qualtrics for descriptive quantitative analysis. The Qualitative data was analyzed for themes. No funding was provided for this program.

Outcome and Evaluation: Findings indicated that students believed that working with a foreign peer increased their confidence and communication skills. While BYU students felt their understanding of healthcare systems increased; MAMK did not feel as robust in understanding health care issues in another culture. Although there were only a few structured interactions, the first year data indicates that this type of international collaborative learning is beneficial for nursing students to increase their cultural competency, communication skills, self-confidence, and understanding of healthcare systems.

Going Forward: There is a plan for Brigham Young University students to return to Savonlinna, Finland for a sixth year. Both parties are interested in continuing the learning experience and collaboration.

Abstract #: *1.016_PLA*

Water quality analysis of a nontraditional distribution system in Trujillo Peru

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Background: Due to the mass movements of Andean people to the Peruvian coast, many cities have designated additional residential zones. Alto Trujillo is one such periurban area on the outskirts of Trujillo, Peru. The housing units in Alto Trujillo do not have running water, but rather residents obtain water from 10,000 liter tanks dispersed throughout the community. The purpose of this study was to assess the water quality in the distribution tanks and in individual homes in order to understand the overall safety of this nontraditional water distribution system.

Methods: Water samples were obtained from central tanks and a convenience sample of homes in both Alto Trujillo and urban Trujillo. Water samples were analyzed for total coliform growth, E coli growth, temperature, total dissolved solids, turbidity, pH,

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alkalinity, total hardness and chlorine. Water quality was compared between samples from Alto Trujillo, and urban Trujillo proper. Data was entered and analyzed using Research Electronic Data Capture (REDCap).

Findings: A total of 50 water samples were obtained and analyzed. 25 samples came from homes in urban Trujillo. 25 samples came from periurban Alto Trujillo, 8 from distribution tanks and 17 from individual homes. Homes in Trujillo proper were 32% positive for total coliforms and 4% positive for E. coli. In comparison, the distribution tanks in Alto Trujillo were 50% positive for total coliforms and 12.5% positive for E. coli. Homes in Alto Trujillo were 70% positive for total coliforms and 58.8% positive for E. coli.

Interpretation: A noticeable decrease in water quality was observed between the homes in Alto Trujillo, which utilize a nontraditional water distribution system, when compared to homes in Trujillo proper.

Discussion: Below ground water systems should be designed and operated to supply water of sufficient quantity and quality to the community. Intermittent systems, whether by tank or by pipe struggle to meet population demands and frequently compromise water quality and overall population health.

Funding: None.

Abstract #: *1.017_PLA*

Assessment of knowledge of neglected tropical diseases among future public health professionals

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Project Purpose: The World Health Organization characterizes neglected tropical diseases (NTDs) as the most common diseases amongst the world's poor. These communicable diseases are contracted via vectors or consumption of contaminated food and water. NTDs disable, debilitate and kill one in six people worldwide. Treating NTDs can aid nutrition, improve health education, and economic productivity in vulnerable populations. The primary purpose of this project is to investigate knowledge of neglected tropical diseases among future public health professionals.

Project Design: The Global Network for Neglected Tropical Diseases, an initiative of the Sabin Vaccine Institute, is dedicated to raising the awareness of NTDs. The END7 campaign advocates and educates the public about NTDs to facilitate the delivery of medication that treats seven of the most common NTDs. Participants involved in the study will be enrolled in core level courses at the University of Cincinnati in the College of Medicine's Master of Public Health program. The project will determine the prior knowledge of NTDs among public health professionals. Examine the participant's knowledge based on sex, age, nationality, concentration of study, and assess knowledge of NTDs following a 10-week educational seminar.

Outcome & Evaluation: Statistical analyses will be used to categorize important variables and test for significance. Awareness of NTDs among future public health professionals is critical in shaping the necessary policies toward the control of such diseases and addressing the global health disparity.

Going Forward: Next steps include enhancement of education among future public health professionals about NTDs. In addition, specific NTD education to both undergraduate and graduate students with futures in public health.

Abstract #: *1.018_PLA*

A One Health approach to interdict environmental health threats in Suriname

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Background: A One Health approach was used to analyze environmental and occupational health threats (EOH) in Suriname and those common to the increasingly vulnerable Caribbean region while preserving the unique assets, health and cultural traditions of indigenous- and other health disparate populations.

Methods: EOH assessments targeting goldmining practices included mercury (Hg) analyses in sediment, water, fish, and women/children. Pesticide use in agriculture was examined through pesticide residue analyses of frequently consumed produce. The community-academic partnership facilitated training of mobile-health technology-enabled Community Health Workers (CHWs) to promote safe pesticide use.

Findings: Hg contamination: sediments (0.14-0.35 ug Hg/g); frequently consumed fish (0.17 to 1.64 ug Hg/g), with 75% of fish at levels above WHO's safe consumption level (0.5 ug Hg/g). Depth-wise sediment cores showed decreasing Hg concentrations indicating higher Hg levels were associated with more recent gold-mining-related deposition; mean hair Hg 4.6 ug/g (range 1.1-9.1 ug/g) and 5.3 ug/g (range 1.0-14.1 ug/g) in women and children, respectively. All levels were at or above EPA's reference dose (1.0 ug/g). Produce pesticide residues exceeded Maximum Residual Levels (MRLs). Endosulfan, a banned pesticide, was detected in 1 of 8 samples in Tannia (mean 0.07 ppm, EU MRL 0.05 ppm). Organochlorines and pyrethroids were detected in 35% of samples. Pesticide residues in all contaminated produce exceeded 1 or more MRLs. The 25 CHWs successfully developed and validated safe pesticide use health education messages.

Interpretations: Hg contamination in Suriname's greenstone belt has been confirmed in frequently consumed fish, sediment, and communities near gold-mining areas but there are also indications that climate change may have influenced Hg deposition and bioavailability in non-gold mining areas. Dietary exposure to pesticides represents a priority EOH concern especially in pregnant