ABSTRACTS

(Ordered by "Last Name of First Author on Guide")
(Letters such as A1 indicate lead last name starts with an A)

A1. Importance of one health approach in public health professional preparation: a case study from two universities

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One Health refers to the dynamic interdependence of human, animal, and environmental health provides an ideal foundation to addresses global health challenges that have an ecological connectedness. One Health has technically been practiced by public health, veterinary and medical professions for many years, it is now becoming more recognized and institutionalized. Public health degree programs, at all levels, bachelors, masters, and doctorate are in an ideal position to adapt a One Health approach into their educational programs. Programs have been successful at integrating One Health into public health coursework and educating students to integrate One Health into public health. A public health workforce grounded in One Health will enhance and add much value to the public health core responsibilities (assessment, policy development, and assurance) and essential services. This presentation will focus on how One Health is integrated into the MPH program at Virginia Tech and the Global Health Certificate Program at Old Dominion University in Virginia. The goal of these two programs is to enable more health professionals to learn about the connection between human, animal, and environmental health and to lead to more knowledgeable and competent health professionals in the future. More specifically, the presentation will highlight specific pedagogical concept and product used in these programs to advance One Health and a One Health approach to addressing public health problems.

A2. Indoor Air Quality and Reported Health Symptoms among Hairdressers in Ibadan North Local Government Area, Oyo State, Nigeria

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Introduction: Hairdressers are exposed to potentially hazardous emissions during hair styling that result in adverse health effects, however, there is a dearth of information on the quality of indoor air in salons in developing countries, therefore this study assessed indoor air quality of hair salons in Ibadan North Local Government Area (IBNLGA).

Methods: The study was a comparative cross sectional design in which multi-stage sampling methods were used in selecting the study population in the four study areas of IBNLGA between August and October 2015. The temperature, relative humidity and particulate matter (PM10) concentrations of 65 salons within IBNLGA were monitored for two months using a pDR-1500 particulate monitor. Total Volatile Organic Compounds (TVOC) concentrations were determined using SPF-2000 TVOC meter. Values obtained were compared with ASHRAE and WHO guideline limits. Data obtained were analyzed using descriptive and inferential statistics at $P < 0.05$.

Results: This study shows that hairdressing activities were associated with reported respiratory symptoms, as well as back, leg and shoulder pains. Mean indoor temperature, RH and TVOC concentrations across the sampling locations (28.5 ± 2.2oC, 70.8±6.9%, 20.1±5.9 ppm; 28.2 ± 1.5oC, 71.8±5.7%, 17.3±3.2 ppm; 28.3 ± 2.3oC, 71.5±8.1%, 14.6±5.9 ppm; 28.7±1.2oC, 69.4±3.5%, 15.5±3.4 ppm) were significantly higher than ASHRAE limits of 25.5oC, 65% and 3 ppm respectively.

Conclusion: The higher levels of temperature, RH, and TVOC above permissible limits suggests that the indoor air quality within the salons was compromised. Therefore, ventilation systems in beauty salons should be improved to achieve better air quality in line with acknowledged standards.

B1. Experiences of the Jamaican Public Health Inspectors in Bermuda in Monitoring America's Cup- the Greatest Race on Water

Natalie Blake, MPH-HE/HP, Dip PHI, Patricia Bygrave-Johnson, Damian Harris, Sherika Lewis, Beryl Johnson, *Jamaica Association of Public Health Inspectors*

Introduction: Monitoring at special events is frequently undertaken by Public Health Inspectors (PHIs) in Jamaica. The Pan American Health Organization (PAHO) made request for Jamaican PHIs to provide support at the America's Cup, a major special event, in Bermuda held over six weeks and five Jamaican when on this mission.

Monitoring and Intervention Strategies: The event was held on water and the village mainly consisted of boats, Yachts and large cruise ships on the newly constructed event village which opens up to the ocean. Teams were deployed in key areas including food safety, occupational health and safety, excreta disposal, water quality, solid waste management, vector control and health education and promotion. The PHIs also gained experiences in Bermuda's' environmental health management system and were able to share information about Jamaica's. Exchanges on The culture and heritage of both territories were also included

Key Observations /Conclusion: (1) The experiences were empowering for the Jamaican PHIs; Similarities and differences were observed, but the principles of environmental health were the same. (2) The Jamaican PHIs could not ignore the high levels of cleanliness that appeared to be embedded in the culture; given the absence of pertinent legislations. (3) There was noted major investment in human resource and research for vector control; as such mosquitoes seemed almost "non- existent". (4) The team approach strategy applied in port health proved to be very effective in the face of limited human resource capacities.

Recommendations: (1) The creating of similar exchanges travel opportunities to build experience and capacities while assisting other territories; (2) that PHIs from other territories experience aspects of our programmes here in Jamaica.

B2. Elucidating the environmental drivers of antimicrobial resistance in São Paulo, Brazil

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One of the biggest collective action problems of the 21st century is the prevention and management of antimicrobial resistance (AMR) and key measures are required to reduce the risks posed by resistant genes that occur in the environment (i.e. outside of clinical settings). Significant resources have been devoted to scientific investigation of the ways in which AMR emerges and spreads in these settings by means of natural selection; however, measures accounting for the "human factor" and the identification of critical points of control, particularly in animal husbandry where antimicrobials are routinely used for disease prevention and growth promotion, have largely been ignored.

Understanding the effects of policy, individual and group behaviour and psychology on the genesis and control of AMR in animal husbandry will allow us to identify how responsibility for the issue - as well as strategies that might be employed to mitigate them - is distributed. Bringing together zoology, philosophy and medicine, the present study is designed to address the central research question using a mixed methods approach: What is the role of collective responsibility in the emergence and spread of and appropriate response to the threat of AMR? Considering the excessive use of antibiotics in the agricultural sector and run-off into ground and surface water, the research will be approached from this environmental perspective.

As the world's biggest meat and poultry exporter, and with animal antimicrobial consumption predicted to rise by 99% by 2030, Brazil will form an interesting case study for this research.

B3. Comparative pharmacology and toxicology: an integrating bridge for the one health initiative?

Bryan W. Brooks, PhD, Baylor University Environmental Health Science Program, Waco,
TX, USA

One Health identifies advancing comparative medicine and environmental research as one way to achieve its goals, but identifying and then implementing robust and pragmatic approaches to comparatively examine contaminant impacts on animals requires attention. Compared to industrial chemicals for which very little toxicology information exists, medicines receive extensive study prior to approval. Leveraging this information to define and predict chemical bioactivity across chemical classes and biological species has received recent attention. Comparative pharmacology and toxicology studies have revealed important challenges and opportunities based on metabolism differences among vertebrates. When the structure and function of biological targets are conserved across species, it appears possible to identify susceptible organisms, particularly to molecules designed to elicit specific biological activities. Such information has provided useful exemplars to advance coupling of human and ecological hazard and risk assessment frameworks. For example, high throughput methods adapted from drug discovery promise to yield next generation computational models aimed at reducing uncertainty during regulatory assessments of new and existing products for human and ecological health. However, efforts are needed to understand when in vitro molecular initiation events propagate across scales of biological organization to result in important adverse outcomes. Based on such evolutionary conservation of biological activities, human and veterinary medicines can also be used experimentally as biological scalpels, which afford unique opportunities to explore basic molecular, biochemical and physiological research questions across species. Lessons learned from the rational design of less hazardous pharmaceuticals further promise to prospectively support the sustainable molecular design of less hazardous industrial chemicals.

B4. Technical support provided by Jamaican public health inspectors in response to a ''mystery vomiting sickness'' affecting travellers in another Caribbean island

Karen A.M. Brown, MPH,HE/HP, BHSc., Dip. PHI, Dip MoF, *JAPHI Officer and Regional Health Officer, Northeast Regional Health Authority, Ocho Rios, Jamaica*

Introduction: Gastro intestinal illness(GE) are common illnesses affecting travellers. Norovirus is prevalent and a cardinal sign is public vomiting incidents (PVI) coupled with other GE related signs and symptoms. In May 2012, there were reports of outbreak of GE in the Turks and Cacaos Island (TC). Information surfaced in the island via the media and rumour mill about 'a mystery vomiting sickness' affecting hotels.

Initial Response: The Pan American Health Organization (PAHO requested the support of Jamaican Public Inspection experts. Two Public Health Inspectors (PHIs) responded to provide expertise to the team.

Findings: (A) Over 500 reported GE cases; (B) thirteen(13) hotel establishments affected; (C) one property with over almost 200 rooms has to be closed; (D) laboratory tests confirmed Norovirus; (E) No tourism based GE surveillance programme; (F) Some communities were affected

Response Measures: (A) Meetings with management(s), agreements made and strategies developed; (B) Closure to an additional hotel; (C) Checklist for Prevention of Norovirus implemented in hotels; (D)Environmental investigations, education and interventions beefed up; including cleaning, hand hygiene, disinfection and isolation measures

Result: (A) Sources of exposures were identified; (B) The outbreak declined

Conclusion: (A) The role of the Jamaican PHIs benefited the country and the initially planned time for the PHIs was extended; (B) Adequate environment management systems and disease surveillance programmes will always enhance public health, tourism and economy of a country.
Recommendations: (A) Similar support initiatives in the time of need; (B) a regional response team of experts should be in established; (C) Jamaica's hotel based system to be maintained in order to prevent such situations locally

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B.5. Prospects for full disclosure on closures of premises for public health reasons

Karen A.M. Brown, MPH,HE/HP, BHSc., Dip. PHI, Dip MoF, *JAPHI Officer and Regional Health Officer, Northeast Regional Health Authority, Ocho Rios, Jamaica*

Closure of premises is a frequent public health control measure. The culture of 'official secrets' is sill among us. Presentation will explore the pros and the cons of full disclosure to the public whenever closure of premises for public health reasons.

C:1. Myiasis caused by the New World Screwworm

Paul Andrew Langton Cadogan, DVM, Veterinary Medical Services, Denbigh Veterinary Clinic, Jamaica

Background: The New World Screwworm, *Cochlyiomyia hominivorax*, has been a scourge for animals and humans in Jamaica since the first case of infestation was described in a human here in the 19th century. An attempt at eradication between 1998 and 2008 failed. The management of cases, particularly in humans has been an issue due to the lack of human-specific larvicides. *Methods*: Review paper.

Results: The screwworm larva causes myiasis in homoiothermic animals and humans of all ages. In Jamaica, dogs are the predominantly affected species. Infested wounds may become severe with major tissue and blood loss resulting in sometimes permanent disability or death. With significant infestation prevalence in the animal population, humans with wounds and other exudative conditions are at risk and do become infested. Effective larvicides include coumaphos, ivermectin, cypermethrin and afoxolaner among others. Wound management involves removal of larvae, second intention healing and prevention of re-infestation. Eradication is carried out using the release of radiation-sterilized flies to break the reproductive cycle of native flies.
Discussion: Veterinarians manage screwworm wounds far more often than physicians do and techniques have been shared. With human-specific larvicides being unavailable, the veterinary larvicides coumaphos and ivermectin have been used successfully and safely in humans. The reasons for the eradication failure have not been officially determined, but may include the large, uncontrolled dog population and insufficient capacity to release effective numbers of sterile flies.

C2. Towards an improved occupational injury surveillance system for Jamaica

Norbert E. Campbell, MPH, BHSc, *Department of Community Health & Psychiatry, Faculty of Medical Sciences, University of the West Indies, Mona, Kingston 7, Jamaica W.I.*

Introduction: Despite international agreements regarding the content, methodology and scope of national occupational injury surveillance systems, only an estimated 13% of such injuries are reported to the international Labour Organisation (ILO) annually. It has been estimated that Jamaica has 181 fatal occupational injuries per year while it reports only 6 to the ILO each year.
Objective: This study sought to demonstrate that more credible occupational injury data can be produced by Jamaica congruent with international recommendations.

Methodology: Revision and piloting of the national insurance employment injury benefit claim form to capture data required by ILO and a determination of the work-relatedness of road traffic accidents and homicides was undertaken. Key informants' interviews and focus group discussion were used to explore perspectives on select aspects of the existing and proposed systems.

Results: Mean annual fatal injuries (62) were 8.8 times greater (range 5-13) than that reported by Jamaica to the ILO. Only 1.5% (5) of the injuries were reported within the required timeframe. Over 96% (179) of violent workplace homicides and 64.4% (58) of non-violent fatal injuries were identified from online news sites with only 3.8% (7) identified from the NIS ($p<0,001$). Taxi/bus drivers and Police officers accounted for 22.1% (61) and 17.0% (47) respectively, of workplace homicides with business persons accounting for 9.1% (25). Males were significantly more likely to be fatally injured than females (OR 3.6, 95% CI: 1.14-11.6).
Conclusion: Important insights are provided into the epidemiology of occupational injuries in Jamaica with significantly increased prospects for an improved occupational injury surveillance system.

C3. Implementation of the global charter for the public's health – health equity: closing the gap in a generation

Stephen Cooper, CEnvH, FCIEH, CIEH Trustee & IFEH Honorary Treasurer; Peter Archer CEnvH FCIEH, IFEH President, *International Federation of Environmental Health, The Old Rectory, Astley, Stouport on Severn, United Kingdon*

Background: In 2008 a WHO Commission, led by Professor Sir Michael Marmot, reported that a girl born in some countries could expect to live more than 80 years but in others just 45 years. However, the difference is not just restricted to being born in different countries; in parts of the UK life expectancy is 82 years but in others it is just 54. The Marmot report concludes that "social injustice is killing on a grand scale" and calls on all governments "to close the gap in a generation." "Achieving health equity within a generation is achievable, it is the right thing to do, and now is the right time to do it." (WHO, 2008). In Rio de Janeiro in October 2011 all member states of the United Nations signed up to this declaration.
Next steps: At the United Nations in Geneva in June 2016 the World Federation of Public Health Associations (WFPHAs) launched the Global Charter for the Public's Health. At the same time the Health Protection Policy Toolkit was published. The toolkit sets out how the implementation of the Charter is to be progressed and recorded. As a practical and visible contribution towards the Charter's implementation, the International Federation of Environmental Health has developed its own project "101 Postcards 'closing the gap in a generation'"

Our presentation in Montego Bay details the aims of the Global Charter and some of the programmes already underway for its implementation. We will detail some of the many IFEH projects included in "101 Postcards 'closing the gap in a generation'" and encourage delegates to the One Health Conference to submit details of their local initiatives using the template available on dedicated pages within the www.ifeh.org website.
We know that in communities across the world there are dynamic projects aimed at improving the health of our citizens and this project is aimed at drawing them together in a simple referenced form to be made available publicly. We hope that these will spark more ideas and projects focused locally addressing local health inequalities.

D1. The Flint, Michigan (U.S.) Water Crisis and the Value of NSF Certified Filtration Systems

Derek DeLand, MPH, REHS/RS, *NSF International, Ann Arbor, Michigan, USA*

NSF International's Drinking Water Treatment Unit (DWTU) Standards program has been around since the 1980s but rarely, if ever, has it been more impactful than during the Flint, MI water crisis. There are

several DWTU standards and hundreds of products certified to them, but this particular discussion will focus on lead reduction in drinking water. The problems in Flint all started with a cost-saving measure. What followed was potentially one of the biggest public health disasters in our nationâ€™s history. As corrosive water poured through the supply lines, lead was leaching into the drinking water and eventually consumed by unsuspecting Flint residents.
This presentation touches on some of the causal events surrounding the Flint water crisis, the subsequent response, and how NSF International, its standards and certified products have played a role in mitigating the drinking water hazards. Environmental health professionals interested in drinking water quality and contamination response efforts will benefit from attending this session. Attendees will gain a better understanding of the safe drinking water requirements for lead, drinking water filtration standard NSF/ANSI 53, lead filter certification and function, and the value certified products can have in environmental health protection.

D2. The Environmental Health Profession: Becoming a leader, catalyst and interdisciplinary connector for One Health

David T. Dyjack[1], DrPH, CIH; Bryan W. Brooks[2], PhD; Angela Dyjack[3], MPH, REHS; Jason W. Marion[4], PhD, *[1]National Environmental Health Association, Denver, Colorado, USA; Baylor University, [2]Department of Environmental Science, Waco, Texas, USA; [3]Colorado Department of Public Health & Environment, Denver, Colorado, USA; [4]Eastern Kentucky University, Department of Environmental Health, Richmond, Kentucky, USA*

Animal and human health are inextricably linked. This relationship gives rise to spillover of diseases from animals to humans, often with devastating public health, social, and economic consequences. The environmental health (EH) workforce is uniquely suited to reduce risks associated with spillover because the workforce is: 1) globally geographically distributed; 2) culturally competent; and 3) has an effective relationship with the regulated community. Furthermore, EH professionals comprise the single largest component of the global public health workforce, making them potential influencers through their access, affect, and axis characteristics. National and international EH professional associations have a special responsibility to leverage these human assets through coordination, collaboration and communication. These efforts should prioritize the braiding of risk management strategies across academia, industry, government, and the health professions. Disciplined leadership by the EH profession represents a potential game changer in One Health management.

D3. KEYNOTE ADDRESS: “100 years of solitude, revisited”

David T. Dyjack, DrPH, CIH, Chief Executive Officer & Executive Director, *National Environmental Health Association, Denver, Colorado, USA*

E1. Safe travels: workplace hazard characterization in rail and other industrial sectors

Esther H. Epps, MPH Candidate, EIT, *Eastern Kentucky University, Master of Public Health Program, Department of Environmental Health Science, Eastern Kentucky University, Richmond, Kentucky, USA*

Funded principally by the International Brotherhood of Teamsters (IBT) and the United States National Institute for Occupational Safety and Health (NIOSH), this project uses a community-based participatory model to study hazards to workers in the trucking and rail sectors. Those sectors include workers who potentially transport hazardous materials on the highways and over the rails.

The International Brotherhood of Teamsters (IBT), one of the United States’ largest labor organizations,

is responsible for developing safety policy and training for all of their members, including in the trucking and rail sectors. This project aimed to characterize the risks that workers in these sectors face in order to inform and improve IBT safety policy and training. Hazard characterization focused on both routine and non-routine tasks. The authors (EE and PS), with staff and union representatives from the IBT, traveled to work sites, union halls, union lodges, and training sessions to identify the major health risks to rank-and-file workers. Using face-to-face interaction with workers and a questionnaire, the major physical, chemical, and ergonomic risks to trucking and rail workers were characterized. This assessment of major risks provided the springboard to implement appropriate controls to protect workers.
Using community-based participation methods was instrumental in ensuring that the workers themselves were able to provide their day-to-day work experience and their perspective in developing a comprehensive inventory and assessment of potential workplace risks and hazards. This can help to maximize the effectiveness of prevention measures and safety policies that are adopted.

G1. Professional Credentials: Why They are Important

TJay Gerber, *National Environmental Health Association, Denver, Colorado, USA*

The presentation informs attendees of the benefits of receiving a credential and how it separates you from your peers. I also discuss how to go about studying for a credential exam in order to achieve a passing score. In my experience from being the credentialing manager for NEHA, many individuals have the book knowledge and experience but many times lack understanding of the credential exam process and what is needed to pass the exam. Lastly, I will speak to attendees about the various types of credentials that NEHA offers, the exam development process, and which credential might be best suited for them. I have found that many individuals do not understand the process behind the creation of a credential. Many people believe that only NEHA staff develop the exam questions. However, the process to create an exam is a lengthy process consisting of 5-7 different 2.5-day meetings with 8-10 Subject Matter Experts. By the end of the presentation, attendees will have a better understanding of the process of creating a credential, which credential to choose for their job or aspirations, and how to go about studying for the credential. The presentation may include other topical areas, but will focus specifically on the REHS/RS, CP-FS, and possibly some our newest credential, the Certified Foodborne Outbreak Investigator credential.

G2. City of São Paulo Strategic Master Plan 2014-2030: Challenges and opportunities for storm water management and potential implications for human and environmental health

Samara E. Gomes, MS, *'One Health and Urban Transformation', Center for Development Research, Graduate School, University of Bonn, Bonn, Germany*

Water is a major component of urban systems, being therefore often affected by urban planning policies. On one hand, urban development depends largely on water resources and wet infrastructure. On the other, the dynamics of cities influence water demands and use, affecting each aspect of the urban water cycle. Fundamental for the integrity of ecosystems and crucial for human food security and wellbeing, water is a central element in the promotion and maintenance of One Health. Following an extensive participatory process, a new Master Plan for São Paulo Metropolitan Area was published in 2014, aiming at orienting the development of the city until 2030. The instrument, which has been praised by urban planning experts locally and internationally, is intended to turn the biggest South-American city into a more sustainable and inclusive place to live. Water has been highlighted as a priority issue of the plan, which includes measures to protect water bodies and increase access to sanitation. Nevertheless, a comprehensive analysis of its potential impacts – direct or indirect – on the city's water systems is yet to be conducted. In order to fulfil this gap, I am currently carrying on a PhD on the assessment of the implications of São Paulo's new master plan on water availability, quality, and distribution, giving particular attention to effects on human and environmental health.

H1. Disaster risk reduction – IFEH partnership with United Nations Office for Disaster Risk Reduction UNISDR

Henning I Hansen, Immediate Past President & Honorary Vice President, *International Federation of Environmental Health, IFEH Council | Danish Association of Nature and Environmental Protection Officers (EnviNa), Maarslet, Denmark*

It has been estimated that disasters in the 10 years period 2005-2015 Globally have caused: 700,000 deaths, 1.4 million injured, 23 million homeless, 1.5 billion affected, € 1.2 trillion economic losses – and the figures seem to be increasing. The UN Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted in March 2015 by the UN GA in order to address this huge challenge. The Sendai Framework is aligned with the UN SDG – Sustainable Development Goals. The Sendai Framework for Disaster Risk Reduction is one of the most important UN initiatives in recent history.

In that light The International Federation of Environmental Health has entered into a partnership with the UNISDR.

Environmental health is a core discipline when it comes to recovery from disasters and EH is also a core discipline when it is about reducing the risk of disaster and preventing and mitigate effects of disasters/hazards, be that natural hazards or man-made hazards. In fact EH is very relevant in all aspects of the Disaster Risk Management cycle: Prevention; Reduction; Preparedness; Response and Recovery.

The IFEH represents a global network of academic health centres and practicing environmental health professionals, and is uniquely able to disseminate relevant training, education, and research findings. Most importantly, our members are committed to identifying best practices, and sharing those through our established network. The International Federation of Environmental Health has offered the UNISDR to use its great network to raise awareness about the implementation of the Sendai Framework and DRR management and build links between the science development and the practitioners.

H2. Does the Environment play a role in the cycle of Multi-drug Resistant Pathogens? Of course!!

Armando, Hoet, DVM, PhD, DACVPM, AVMA One Health Scholar, *Veterinary Public Health Program, College of Veterinary Medicine, Department of Veterinary Preventive Medicine, College of Public Health, Division of Epidemiology, The Ohio State University, Columbus, Ohio, USA*

In this talk the role that the environment plays in the cycle of Multidrug-Resistant Pathogens and their genetic determinants will be described. The presentation will describe how MRSA can move from veterinary settings to human hospitals up to emergency services and public transportation as well as households. MRSA will be used as a model to describe such cycle and to show how the One Health philosophy is put into practice when studying the role of the environment in people and animal health.

K1. Exploring unsuccessful process of newly qualified nurses in difficulties

Chihiro Kawakami, PhD, S. Takuya, S. Yasuyuki, F. Kazuhiko, *Medical Education Development Center, Gifu University, Gifu City, Gifu Prefecture, Japan*

Purpose: Some newly qualified nurses (nurses) cannot adapt well to the workplace, sometimes they change workplaces or retire. It's necessary to establish support system for nurses. We will clarify what kind of nurses are going to change or retire, and what they feel at that time.

Method: We targeted ten nurses who were got change or retire. We interviewed and analyzed the thematic analysis of the interview.

Result: It was divided into three phases, ranging from employment to change or retire. Concepts were summarized. Phase1: Thinking about become a nurse rather than be nurse, it's "choosing" nurse legally purposely because of the entrance examination result, high income, senior's recommendation, etc. Phase2: Struggling after employment: Nurses recognized that the patient was restricted, but was

overwhelmed by the workload. They tried to remember the job randomly; they felt their physical condition collapsed, they immediately forgot even if they remembered. Phase3: Trying to adapt to the workplace: They felt embarrassed to disclose what they could not do for nursing work. They were stumped by what they could not do well with their presenters in busy work. After changing and retiring, some nurses had looked back on their past objectively.
Consideration: It showed the process from employment to change or retirement. And various factors had found. Factors are low self-affirmative, shamefulness, the different environment from expectation, relationship with the preceptor, in the factors. It will be necessary to understand properly from before and after employment, and construct education and spiritual support.

K2. Predictive Analytics: Using Environmental Health Program Data to Work Better, Smarter, Cheaper!

Mel Knight[1], Cal REHS & Terri Williams[2], Cal REHS, *[1]Consultant, Calaveras County, California, USA, [2]Director of Environmental Health, County of Los Angeles Department of Public Health, Los Angeles, California, USA*

Environmental health jurisdictions are universally challenged with too few resources to address the many community needs. While many struggle to do 'more with less', the reality is that the best we can do is to do things differently when faced with deficient and/or decreasing funding or staffing. One strategy to maximize available resources is to utilize program records an data to deploy resources where most needed for critical activities and services.
Los Angeles County California is on the forefront of innovative data utilization and interpretation that guides priorities and assignments to achieve desired environmental health goals and outcomes. Ms. Williams and Mr. Knight will share actual case history and studies that demonstrate the value of data use, disclosure, industry involvement, public participation and more to allow for better management decision making and improved environmental health outcomes.

L1. Building Food Protection Capability and Capacity: A U.S. military approach to health-based partnerships

Matthew A. Levine, DVM, MPH, MS, DACVPM, *United States Army, Fort Sam Houston, Texas, USA*

Preventing foodborne disease poses an immense and daunting challenge, particularly throughout the developing world where the toll on human life and economic development is staggering. Not surprisingly, the United States (US) military places a high priority on safeguarding the food and water supplied to its service members deployed overseas. To achieve that end, the US Army Veterinary Services (VS) has developed a unique approach to Food Protection (FP); delivering cost-effective solutions in low-resource environments. While this VS core competency is typically utilized to protect the health of US forces, food safety experts within the VS recently developed an innovative training product to share its programs with international partners. The standardized training program is designed to build local FP capacity and improve long-term health outcomes by engaging civil and military public health practitioners through a mutually beneficial, bidirectional exchange of ideas and expertise. The goal is to build a sustainable FP competency within the partner nation's military or civilian sector which progresses into indigenous policies, procedures, and organizations ready to meet local needs. From a US military perspective, improved health outcomes set the conditions for regional stability and security. Moreover, FP programs enhance the military readiness of our partner nations to respond in humanitarian assistance, disaster response, and peacekeeping operations. A recent exchange between Chilean and U.S. military veterinary professionals serves as proof-of-concept. The presentation will benefit military and government employees in addition to non-governmental and international organizations interested in building local FP capacity.

M1. Evaluation of Antibiotic Residues in Milk from Kenyan Milk ATMs

Jason W. Marion, Ph.D., Amos Kosgey, MPH Student, *Eastern Kentucky University, Department of Environmental Health Science, Richmond, Kentucky, USA*

The risk of consuming milk containing antimicrobial residues presents a major public health problem by introducing a selective pressure that supports the development of antimicrobial resistant (AMR) bacteria. The use of antibiotics in livestock farming is widely recognized as one major driving force for the rise in AMR bacteria worldwide. Over the years, the frequency of AMR-related illnesses has been rising, especially in developing countries. To investigate one possible route for AMR development using the One Health framework, a total of 80 milk samples from commercial providers (n=25), local/street vendors (n=21) and Milk ATMs (n=34) were collected in Eldoret, Kenya. Samples were tested for the presence of elevated levels of antibiotic residues from four types of antibiotics during a 15-day study between the months of December 2016 and January 2017. IDEXX SNAP tests were used for determining the presence of antibiotics. Results indicated that 2/34(5.9%), 1/34(2.9%), 1/34(2.9%) and 3/34(8.8%) of milk samples were positive for tetracycline, sulfonamide, Beta-lactam and Gentamicin, respectively. Overall, 29% of the samples from the milk ATMs and 24% of samples from the local vendor were positive for at least one of the antibiotics tested. However, none (0%) of the commercial samples exhibited a positive result for any antibiotic. Higher prevalence of antibiotic residues was observed in milk from the Milk ATM and local vendor compared to commercially-packaged milk. Further research and potential regulation is needed to further examine and prevent the inappropriate use of antibiotics within the private dairy industry in Kenya.

M2. Water supply & waste water treatment technology for developing countries, - experiential learning opportunity in China 2017 -Taken up by public health inspectors

Devina McPherson, BSc, Dip PHI, *Jamaica Association of Public Health Inspectors, Jamaica*

Introduction: Selected Public Health Inspectors in Jamaica benefited from a training opportunity on *Water Supply & Waste Water Treatment Technology for Developing Countries* in Suzhou, China, from May 05, 2017 to June 03, 2017. The People's Republic of China and the government of Jamaica conceptualized the programme and further sponsored the participants. Participants were from fifteen (15) other developing countries.

Methods: Participants were exposed to three (3) weeks of lectures complimented by field trips, practical and lab work. The programme was enriched with cultural exchanges and visits to spots the Great Wall of China, Beijing Tiananmen Square and others.

Conclusions: (1) China is much more advanced than Jamaica in the management of water resources and managing waste water, particularly with the application of appropriate technologies. (2) The processes and principles used in water and waste water treatment in China are however very similar to those applied in Jamaica. Many of the principles and technologies used in China can be successfully adopted and in Jamaica. (3) This would assist the advancement of sustainable development of the country.

Recommendations: Much more research is required to improve Jamaica's water situation as done in China. Additionally that the relationship between the Chinese and Jamaican government is maintained in an effort to sustain opportunities such as this. The People's Republic of China has demonstrated its willingness to assist developing countries in this regard.

M3. Detection and Genotyping *Cryptosporidium spp*. Entrapped by Aquatic Biofilms to Source Track Fecal Contamination

Amanda Morris, PhD; *Ryerson University, School of Occupational and Public Health,*

Toronto, Ontario, Canada

The genus Cryptosporidium is a protozoan parasite that causes the gastrointestinal disease cryptosporidiosis in humans and many other vertebrate species. The disease is characterized by severe symptoms of diarrhea, and it is life-threatening to immunocompromised individuals. A primary source of Cryptosporidium oocysts transmission is surface waters contaminated by leachate and runoff from agricultural land. In surface waters, the interaction between Cryptosporidium oocysts and aquatic biofilms influences the lifecycle and transportation of the parasite. Aquatic biofilms recruit oocysts and serve as reservoirs creating a favourable microclimate for their survival, dispersal, and potential extracellular development and multiplication. This study therefore, uses the natural tendency of aquatic biofilms to entrap Cryptosporidium oocysts, as a means to monitor the parasite's distribution in the Black River watershed of Jamaica. In this study, 48 aquatic biofilms were collected using a customized biofilm-sampler from 4 sites in the Black River and tributaries. In addition, 78 cattle manure samples were collected from nearby pastures. Conventional PCR and gene sequencing techniques were used to detect and genotype Cryptosporidium oocysts from the biofilm and cattle manure samples. In addition, fluorescence (UV) microscopy was performed to confirm positive and presumptive detections. Preliminary results reveal positive Cryptosporidium oocysts detection, which were genetically traced to the cattle manure samples.

M4. Healthy Settings Approach to Community Health

Tracy Morse, Tara Beattie, Save Kumwenda, Kingsley Lungu, Kondwani Chidziwisano, *Department of Environmental Health Sciences, Faculty of Public Health, College of Medicine, University of Strathclyde and University of Malawi, Dept of Civil and Environmental Engineering, Glasgow, United Kingdom & Malawi*

The healthy settings approach has been shown to be an effective holistic method to reduce communicable and non-communicable disease rates of infection and incidence, and could be an effective tool to achieve one health. In Malawi, preventable diseases continue to be high, and this is often attributed to poor integration, and cultural, economic, environmental and social barriers. Therefore, we piloted a healthy settings approach in rural communities to determine if it could drive change in key health indicators. This pilot sought to develop model villages using a process of community-led prioritisation and action planning in over 1800 households in 18 villages. The approach was community-led (transect walks (n=18); FGDs (n=108)), to identify key priorities and evaluate governance and social capital amongst community members (leadership, men, women, marginalized and youth). This data was consolidated into village profiles, which were used to develop action plans. Priority setting outcomes showed variation both between villages, and communities, and social capital varied widely between population groups, with youth showing the lowest sense of belonging, and a low level of trust between communities, villages and extension workers overall. Communities developed and implemented action plans over 2 years primarily targeting key areas of food security, water and health access. Significant challenges of governance, leadership and integration of plans had to be addressed through capacity building and mentoring to achieve progress. Initial end point evaluations indicate significant improvements in sanitation coverage (98.6%), client care at health facilities (94.6%) and reduction in diarrhoeal disease and malaria (data being finalized). Further data will be presented at the conference to demonstrate the impact of the healthy settings approach and potential for scale up in Malawi.

M5. The environmental health, one health nexus: environmental health educational needs for the new millennium

Timothy J. Murphy, PhD, *University of Findlay, College of Sciences, Environmental Health Department, Findlay, Ohio, USA*

One Health recognizes the interconnectivity of the health of animals and the environment to the health of the human population. The global health burden of food borne illness, vector borne illness and novel

diseases is staggering. With 1 in 6 people in the US becoming sick each year from food-borne illness (Estimates of Foodborne Illness in the United States, n.d.), over a billion people worldwide being affected by mosquito-borne diseases (WHO, 2014), and 60% of emerging pathogens are transmitted from animals to humans (One Health, n.d.,) the role of the environmental health science and protection scientist-practitioner in One Health is more important now than ever before.
Environmental health is defined as the science and practice of preventing human injury and illness and promoting well-being by identifying and evaluating then limiting exposure to hazardous physical, chemical, and biological agents in air, water, soil, food, and other environmental media or settings that may adversely affect human health (NEHA, n.d.). This definition clearly indicates the important role that the environmental health scientist-practitioner has in One Health. With this important role comes the responsibility that the scientist-practitioner be well educated. This presentation proposes what a post-secondary education curriculum should include to prepare the environmental health science and protection, scientist-practitioner for working within the environmental health, One Health nexus.

M6. The role of environmental health in One Health: A Uganda perspective

David Musoke, PhD; *Makerere University School of Public Health, Department of Disease Control and Environmental Health, Kampala, Uganda*

Background: One Health is the integrative effort of multiple disciplines working locally, nationally and globally to attain optimal health for people and animals. In recent years, One Health initiatives have majorly focused on veterinarians, medical doctors and public health professionals. However, the Environmental Health profession has a major role to play in One Health activities based on Uganda's experiences.
Contribution of environmental health to One Health: In Uganda, Environmental Health Practitioners (EHPs) carry out several duties that contribute towards One Health. These include: inspection of animals before slaughter (antemortem) and meat in abattoirs (post-mortem); inspection of meat in butcheries; destruction of condemned meat; disease surveillance; outbreak investigation and control of zoonoses; control of vectors and vermin such as mosquitoes; health education on pertinent issues such as vaccination of dogs; and food safety including meat and milk. EHPs also play an important role in prevention, detection and abatement of microbial and chemical pollution of land, air and water sources that have created new threats to the health of both animals and humans. EHPs carry out house to house inspections on water, sanitation and hygiene hence involved in abating nuisances that could pose a threat to public health. Such threats could be emerging from the environment including animals. Enforcement of public health legislation is also a key contribution of EHPs to One Health in Uganda.

Conclusion: EHPs play an important role in disease surveillance, prevention and control. Therefore, EHPs should be involved as stakeholders in local, national and global One Health initiatives.

N1. One Health in action: bridging the gap between universities and communities

Rawlance Ndejjo; *Makerere University School of Public Health, Department of Disease Control and Environmental Health, Kampala, Uganda*

Background: The One Health approach is a worldwide strategy to encourage communication and collaboration between healthcare disciplines to attain optimal health for people, animals and the environment. Makerere University through the One Health Central and East Africa Network (OHCEA) has implemented several activities to translate One Health concepts into action benefitting staff, students and the wider communities served. This paper shares approaches through that Makerere University has used to activate the One Health concept.

Activities: Several multidisciplinary programmes have been developed to support the training of future professionals such as the Masters in Veterinary Public Health, and other short courses for example Socio

entrepreneurship course. Efforts have also been taken to integrate One Health into curricula for existing university programmes such as Environmental Health, and Veterinary medicine. In 2013, the University piloted a joint One Health field attachment, which involved students of bachelors of Veterinary Medicine, Nursing and Environmental Health Science who were deployed to work in same locations as multidisciplinary teams. These annual field attachments have continued to involve more professions including nutrition, engineering, and social scientists. The university has also supported students to set up One Health clubs and organize outreach activities. There have also been small grant opportunities to encourage One Health innovations among students most of which have been geared towards solving community problems.
Conclusion: The University has a key role to play in translating One Health into action thus bridging the gap with communities and springing up multiple benefits at different levels.

N2. Environmental health impact of agricultural runoff from the Florida Gulf Coast University Food Forest

Luka K. Ndungu, M.S. Student, Haruka E. Urakawa, Irma L. Sanchez, Ernesto Lasso de la Vega, and Hidetoshi Urakawa, *Florida Gulf Coast University, Department of Marine and Ecological Sciences, Fort Myers, Florida, USA Florida Gulf Coast University, Department of Marine and Ecological Sciences, Fort Myers, Florida, USA*

Runoff from agricultural land can carry potential pollutants that may include sediment, fertilizers, mowed grass debris, bacteria, pesticides, herbicides, heavy metals and petroleum and various oil products into downstream water bodies such as lakes, rivers, estuaries, and groundwater. These pollutants can degrade water quality and harm aquatic life. The FGCU Food Forest is a student-run botanical garden that cultures tropical edible plant species adapted to the climate of South Florida. The goal of this educational garden is to be a contrivance for the university community to learn about food production through hands-on agricultural experience. Because the garden locates nearby a pond called Food Forest Pond, surface runoff from the garden to the pond is inevitable. Apparently, this is a case in which proper watershed management is required; no effort has been made in the past. Therefore, to assess the Environmental health impact of field runoff, we conducted water quality and microbial community monitoring in 2016. We measured physiochemical parameters using an YSI sonde, which records temperature, pH, conductivity, total dissolved solids and dissolved oxygen. Nutrients, fecal coliform and chlorophyll concentration were also measured. Hydrodynamic and watershed influences the functions of microorganisms present. Determining microbial communities is of help for better understanding of the biodegradation potential of pollutants and therefore a useful bioindicator for watershed management. One approach to describing shifts in microbial communities is to develop community level physiological profiles based on the ability of microbes to metabolize certain organic substrates through the use of an EcoPlate. In an effort to identify trends between nutrient and microbial communities, multiple samples were taken from Food Forest Pond and Sugden Welcome Center Lake, which locates next to the Food Forest Pond and served as a non-polluted control lake. Overall no chronic water degradation was observed, and we concluded that the current watershed use by the FGCU Food Forest is appropriate and the hands of passionate students adequately manage the garden.

N3. Community Water Fluoridation: an important public health measure

Alexandra Nicolae, DDS, *Toronto Public Health, Toronto, Ontario, Canada*

Aims: to increase participants' knowledge about what community water fluoridation (CWF) is, how it works and its role in improving oral and general human health; participants will also learn about the types of fluoride compounds added to a water supply, the action mechanism of fluoride, the controversy surrounding this recognized public health measure, and the relevance of this measure in today's world. Methods: literature review. Results: Fluoride is a natural element frequently found in the environment. Fluoride in water is the most efficient way to prevent one of the most common diseases on the planet:

dental disease. Fluoride compounds commonly used for CWF are sodium fluoride, fluorosilicic acid or sodium fluorosilicate. Studies show that fluoride in community water systems still prevents at least 25 percent of tooth decay in children and adults. The Centers for Disease Control and Prevention named CWF one of 10 great public health achievements of the 20th century. Today CWF is endorsed by more than 100 health organizations. CWF was and remained a controversial issue. Over the years, this public health measure has been blamed for a wide array of health conditions. Yet for 70 years, scientific research has proven fluoridation to be safe. In addition to serving as a medium for improving the oral and general health of people, tap water is safer and more environmentally friendly when compared to bottled water. Conclusion: CWF improves the oral and thus the general health of the community; it is accessible and affordable, safe, equitable, and environmentally friendly.

N4. Relationship between lifestyle-related laboratory data and background factors among homeless people, Nagoya City

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It has often been reported that the morbidity and prevalence of tuberculosis are high in Japan's homeless population. However, there are few reports that objectively show actual health conditions among the homeless or diagnoses of lifestyle-related diseases based on blood tests. [Methods] We conducted a complex survey that included diagnoses of lifestyle-related diseases and psychiatric disorders and measurement of intellectual faculties was performed with 114 homeless people living in Nagoya city. Participants were classified into two groups based on the presence of abnormalities in the test values for lifestyle-related disease; then, they were classified into two subgroups based on the presence of mental disorder/intellectual disability. Fisher's exact test was performed to calculate the odds ratio for each of these four groups according to lifestyle-related test values. [Results] Abnormalities among participants in test values for lifestyle-related disease were as follows: hypoalbuminemia in 0.9% participants, abnormalities in liver function in 19.3%, decreased renal function in 1.8%, dyslipidemia in 58.8%, "a person whose impaired glucose tolerance cannot be ruled out" in 17.5%, obesity in 28.9%, thinness in 4.3%, and hypertension in 52.6%. Associations between the presence of abnormalities in liver function, dyslipidemia, impaired glucose tolerance, obesity, hypertension, and mental disorder/intellectual disability were analyzed using Fisher's exact test. As a result, no significant difference was observed in any combination. [Conclusion] It was found that the percentage of homeless people in Nagoya who showed abnormalities in test values for lifestyle-related disease was similar to that of National nutrition survey 2015 in Japan.

O1. A Model to Enhance Diversity in Environmental Health Nationally- the Eastern Kentucky University Experience

Priscilla Oliver[1],PhD, Carolyn Harvey[2], PhD, RS, CIH, Gary Brown[2], DrPH, RS, CIH
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This discussion will present a successful model for diversity recruitment in environmental health academic programs and suggest how it may be relevant towards building a healthy workforce. By utilizing effective diversity recruitment and mentoring models in academic programs and the workplace, we can create a 21st Century Environmental Public Health workforce that is in tune with the public we serve and capable of addressing their health disparities. In 2003 Eastern Kentucky University (EKU) and the Centers for Disease Control and Prevention formed the National Environmental Health Diversity Recruitment Task Force to develop a diversity recruitment "model of excellence" for the profession. The taskforce, composed primarily of environmental health professionals from federal, state, and local

governments, academia, and industry, worked with EKU and CDC through strategic planning to implementation and assessment of the model.
Outcomes included Eastern Kentucky University hiring a minority faculty for the EHS department. Increase in minority enrolment in the EHS program of 12-15% in both the undergraduate and graduate programs. A CD with faculty, practitioners and students participating was created by the University's IT department. The CD was sent to many of the accredited EHS programs around the country. We believe this model of interaction with minority practitioners, faculty, and students to implement and assess a program succeeded and can be a model for other Universities with EHS Programs.
With the success of the initial demonstration in EKU's Department of Environmental Health, the task force recognized the need to become an independent organization to perpetuate diversity recruitment on a national level. The National Council On Diversity in Environmental Health (N-CODE Health) came into being in 2005.

P1. The allergens prevalence in children of preschool and 1st cycle - case study in Carregal Do Sal

Susana Paixao,PhD; I Vasco; A Ferreira; A.L., Baltazar; J.P; Figueiredo. *Instituto Politécnico de Coimbra, ESTeSC | Coimbra Health School, Saúde Ambiental, Portugal; CEGOT, Coimbra, Portugal*

Food allergy is an adverse health reaction, measured by specific lgE (Immunoglobulin E), that occurs when immune system wrongly recognizes a nourishment as an aggressive entity to human body, after its ingestion or contact. The part of the nourishment that is responsible for the allergic reaction is named allergen. Evaluate the prevalence of food allergies, identify the principal allergens in a group of children, on what ages they happen more often, and realize if they happen just after the introduction of nourishment on his day by day routine or if they only appear during the children's growth. This is a cross section observational study in a way we can analyze the allergens' prevalence in a 502 children's universe, with ages between 3 and 10 years old, divided by the pre-school and 1st cycle from Carregal do Sal County. The studied sample has shown a total prevalence in food allergy of 4%, in which pre-school has a prevalence of 2% and 1st cycle of 6%. The most featured allergens are the crustacean, followed by gluten and some fruits that are harder to digest, followed by milk and soy. Food restriction is difficult and even informed people have the risk to accidental adverse reaction by being exposed to hidden allergens, which is the main cause that takes to anaphylaxis. It is imperative to control alimentary industry in the manufacturing process as well as getting an improvement on what concerns labeling the products.

P2. Environmental health in the world - from teaching to profession

Susana Paixao*,PhD, *Coimbra Health School, Saúde Ambiental, Portugal; CEGOT, Coimbra, Portugal*

Urbanization, population and economic growth have led to changes in the environment and in the way it relates to the human being. The origin of Environmental Health arose then due to the need to create a balance in the Human-Environment relationship. Thus, considering the process of Globalization, Environmental Health also evolved from country to country and continent to continent. This study aimed to create a global database on how Environmental Health is practiced and how its professionals are trained. The sample for this study consisted of 43 academic entities spread across 29 countries. Regarding the collection of data from professional bodies, the sample consisted of 11 countries. With this study, it was concluded that Environmental Health varies in different parts of the world having their similarities and differences. Thus, the most common area of study was Environmental Protection and Sustainable Development, and the most used professional title in the countries under study was Environmental Health Technician. Differences were also observed in the entrance requirements as well as the duration of the different courses. The database created during the development of this study will later be placed on the website of the International Federation of Environmental Health (IFEH).

P3. Flood risk reduction- the importance of planning and land use in Coimbra City, Portugal

Susana Paixao, PhD, J. Almeida, *Coimbra Health School, Saúde Ambiental, Portugal; CEGOT, Coimbra, Portugal*

The planning and land use of the territory aims the quality of life of the population, from an economic, social, cultural and environmental view, more favorable through better management of the territory. These factors are important in order to facilitate the balance between the impacts of progress and the sustainability of quality of life in all parameters of social life. Planning and land use have a significant influence on the reduction of floods and its consequences. Note that, in Europe, more than 10 million people live in flood risk areas. Due this fact (and in view of the increase in the number of floods) people affected and estimated losses, as well as the risks to the public health, environment, infrastructures and socio-economic used on floodable areas, becomes to intervene in a timely manner. The present study aimed to describe the main effects of the Mondego River floods in the city of Coimbra, as well as to analyze the causes and presenting measures to mitigate these effects. It has been concluded that some work has been done over the past 30 years in terms of flood and flood risk management and that this management follows five intervention vectors such as: prevention, protection, preparedness, response and recovery.

P4. Medical waste management in fire brigades

Susana Paixao, PhD, S. Gonçalves, J.P. Figueiredo, A. Ferreira, *Coimbra Health School, Saúde Ambiental, Portugal; CEGOT, Coimbra, Portugal*

According to the Portuguese-Law, medical waste are the waste resulting from activities of providing health care to humans or animals in the areas of prevention, diagnosis, treatment, rehabilitation or research and education, as well as other activities involving invasive procedures such as acupuncture, piercings and tattoos. The management of medical waste is a key issue in public health protection. Fire brigades, for the provision of the first health care, are places where there is a significant production of these waste. Over time, the amount of this type of waste has undergone an increasing, which directly implies that there is a proper separation of the same, as medical waste management is an important problem for public health and the environment. This study analyzes the personal knowledge of firefighters in relation to medical waste, specifically about their separation by the four existing groups and the perception of risk associated with these. For its realization resorted to the use of questionnaires in five fire brigades belonging to the district of Guarda, for further processing of data using the computer program Statistical Package for Social Sciences (SPSS). It is concluded that there are malpractices in all questioned fire corporations; multiple failures are sensing-with regard to knowledge of health professionals from corporations in the field of medical waste.

P5. SwimSafe - Toronto Public Health's Disclosure System: the posting of inspection findings for swimming pools and spas

Mahesh Patel, MSc., CPHI(C), *Toronto Public Health, Healthy Environments, Toronto, Ontario, Canada*

Public swimming pools and spas are inspected under Toronto Public Health's (TPH) comprehensive recreational water program. These inspections ensure that recreational water facilities within the City of Toronto meet the minimum health and safety requirements of regulations made under Ontario's Health Protection and Promotion Act. Owner/operators are given notice of non-compliance and instructions for corrective actions as required. Furthermore, an order to close the premises can be issued if an immediate health hazard is identified.

Another part of the program, governed by a Toronto by-law requires the owners of all public swimming pools and spas to post inspection notices issued by the Medical Officer of Health indicating the findings of the inspection. TPH has developed and implemented SwimSafe, its public disclosure system for public pools and spas.
SwimSafe enables the public to learn about the most recent inspection outcomes of their favourite public pool and/or spa within the City of Toronto. This enables patrons to make informed decisions about using the facility based on the health and safety record of the facility. It is anticipated that such disclosure of information will result in improved public health. Furthermore, by providing access to timely and accurate information to the public, SwimSafe aligns with the City of Toronto's strategic theme of good governance and with the TPH's foundational principle of accountability and transparency.
This presentation will address key aspects of the development and implementation of SwimSafe system. It will outline the rationale for its development and discuss some of the successes and challenges encountered.

P6. One Health, One Caribbean, One Love- promoting One Health across the Caribbean region

Dahlia R. Plunkett[1], MPH, B.TECH, PHI, Alexandra A.M. Vokaty[2], Cedric Lazarus, Adana Mahase-Gibson, Christopher A L Oura *One Health One Caribbean One Love Project/One Health Jamaica, Southern Regional Health Authority, Manchester Jamaica; [2]PAHO/WHO Representation in Trinidad and Tobago, Port of Spain, Trinidad and Tobago*

Inter-sectoral collaboration is extremely limited, both at policy and technical levels, across the Caribbean region. However, many of the priority health problems currently facing the region, like climate change, food security, ocean health, and emerging diseases arise from the interactions between people, animals and our shared environment. If these health issues are to be addressed effectively and efficiently, an inter-sectoral or One Health approach is clearly required. The European Union funded project “One Health, One Caribbean, One Love” set out to promote and entrench a “One Health” approach to priority health issues affecting humans, animals and the environment within the Caribbean region. The project, which spanned from March 2014 and ended in June 2017, successfully built the capacity of the national veterinary, public health and environmental health services, through the development of a cadre of One Health Leaders, the creation of Caribbean regional and national One Health Networks, and the development of a One Health strategic framework. The One Health Leadership Series developed a core group of One Health Leaders from 12 Caribbean countries. The leaders attended a series of 5 themed One Health Leadership workshops, and each country team developed and conducted a One Health project addressing a national priority health issue at the interface between human, animal and environmental health – a learning by doing approach. The One Health leadership series has enabled the leaders to more effectively design and manage One Health policies, programs and projects in order to develop more holistic scientific solutions to emerging health problems.

R1. Food Innovation Labs - A New Approach

Raymond Ramdayal, MASc, COHS, CPHI(C), Postgrad Cert Eng., *Canadian Institute of Public Health Inspectors, Ontario Branch, Ontario, Canada*

Food system reform is a strategic priority for Toronto Public Health. In 2014, our Division undertook a strategic analysis of our current food-related programs and deliveries. The purpose was to share information among our directorates in order to collaborate and streamline our efforts. One key recommendation which arose from this process was to establish a Food Innovation Lab which would act as a safe place to "incubate, test and launch collaborative food programs. Healthy Environments is the directorate which includes all Public Health Inspectors for the City of Toronto. The food innovation labs have been attended by our PHIs where they offer key guidance, feedback, and ideas for a public health

inspection lens. It is unique due to the fact that PHIs balance education with enforcement to ensure the public's health is protected. The presentation will provide a summary of the food portfolio consultation which occurred in 2014 and 2015. It will also give examples of some ideas which have been brought forward to the Food Innovation Labs. Moreover, it will highlight the common thread that links so many health professionals at Toronto Public Health and the key role they play in food reform, food sustainability and brainstorming emerging ideas on that foster systems thinking.

R2. A lead exposure assessment of known contaminated Jamaican communities.

Trevor A. Ramikie, Ph.D. Candidate, *Department of Chemistry/Occupational and Environmental Safety and Health Program, Faculty of Science and Technology, University of the West Indies at Mona, Jamaica*

Although the processes of backyard smelting operations and mining of lead have ceased, its presence in environmental media continues to impact health in communities. Follow- Studies of three known contaminated communities in Jamaica (Fraser's Content, Mona Commons and Kintyre) were conducted to assess the potential for childhood (age< 7 years) lead exposure. The environmental assessments were conducted using systematically administered questionnaires, data collected from environmental samples (n=350), blood samples (n=100), laboratory studies and analysed using Excel and SPSS 19.0 statistical packages. Correlations between blood lead levels in soil (LS) and dust (LD) were r =0.9 and r =0.3 ($p<0.05$) respectively at Frasers's Content. Hazard mapping indicated the existence hotspots (soil lead>400mg/Kg) in communities, which are above the US-EPA recommended maximum value of 400mg/kg for residential areas. Mean surface lead concentrations were 231.8 mg/Kg for Fraser's Content, Mona Commons 880.6 mg/Kg and Kintyre 95.2 mg/Kg. The geometric mean blood Lead Level (BLL) of 40.7% (n=81) of the children attending Frasers Content Basic Schools was 5.4µg/dL which exceeds the recommended reference level of 5.0µg/dL set by the Centre for Disease Control (CDC U.S). It was concluded that a strong correlation existed between blood lead levels and environmental soil lead. The mean lead surface concentrations exceeded the island's background level (44.5mg/Kg) particularly at hotspots. Children blood lead levels were being impacted by soil and dust and potential sources of childhood lead exposure still exist despite previous mitigation measures.

R3. The impact of bioavailability of lead in soils on lead poisoning of Jamaican child

Trevor A. Ramikie, PhD Candidate, *Department of Chemistry/Occupational and Environmental Safety and Health Program, Faculty of Science and Technology, University of the West Indies at Mona, Jamaica*

The impact of bioavailability of lead in soils on lead poisoning is well documented in developed countries. In developing countries such as Jamaica studies are few which highlights its importance. Exposure studies have indicated that the main pathway to human (children) uptake is soil ingestion and hence a determination of its value can significantly improve community health risk assessments. This study seeks to determine the bioavailability of lead in contaminated Jamaican soils from known sites; Mona Commons and Kintyre both in the Parish of St Andrew and Fraser's Content in St Catherine. Investigations were conducted using the Solubility Bioavailability Consortium Research methodology (SBRC) assay, which is an in-vitro technique. This technique has been assessed and approved by the US EPA for specific site assessments and correlated with in- vivo techniques. Three runs were conducted using representative samples of particle size <250 µm from each site (high, low and control). To date, the results indicate relative bioavailability (RBA) of Fraser's Content and Mona Commons are in the range of 58-61% and Kintyre -44%. These results are within the range experienced in other countries (USA, Australia) and were attributed to the different sources of contamination (lead battery smelting and mine tailings). The information gained will be used to develop a Bio-kinetic Model to assess the present Environmental Health and Safety status of these communities.

T1. Identifying critical points for behaviour change in an integrated WASH and hygiene of complementary foods intervention

Steven Taulo*, Tracy Morse, Save Kumwenda, Kondwani Chidziwisano, Chisomo Msefula, Bagrey Ngwira, Janelisa Mwalija, Elizabeth Tilley, *Department of Environmental Health Sciences, Faculty of Public Health, College of Medicine, University of Strathclyde and University of Malawi, Dept of Civil and Environmental Engineering, Glasgow, United Kingdom & Malawi*

Diarrhoea continues to be the second leading cause of death in children under five; worldwide the lives of approximately 760,000 are lost each year (WHO, 2013). Food safety and hygiene play an important role in reducing and controlling diarrhoeal disease, particularly in children under the age of two, and poor hygiene could be responsible for more diarrhoeal disease transmission than exposure to contaminated water (Lanata, 2003). This is compounded when children are introduced to solid food early, (before 6 months), where the effect of poor food hygiene and contaminated water can be severe and is exacerbated by their poorly developed immune systems. This formative research aims to identify potential sources and causes of diarrhoeal disease in a sample population of children under five in rural Malawi (n=1000), through observation (n=100), microbiological sampling (n=600) and household questionnaires (n=1000). We are isolating and quantifying disease-causing organisms from stools (n=600), complementary foods (n=600), hands (n=1200), household surfaces (n=1200) and animals (n=600). Observations are based on Hazard Analysis Critical Control Points (HACCP) principles to identify critical points of control. This will be supported by the RANAS model (Mosler 2012) to determine target behaviours for change. This information will be triangulated with microbiological and household data to form the basis of a subsequent integrated intervention programme. Data collection will be completed in May 2017 and initial findings will be presented here.

T2. An investigation into the use of supplements consumed by Jamaican student athletes: A multi- faceted approach

Sophie C. Turfus, PhD, R. Delgoda, J. McKenzie, C. Lindsay, R. Nelson, S. Ricketts, S. Malcolm, C. Pavy, A. Mansingh, S. Roopchand-Martin, *University of West Indies at Mona, Department of Basic Medical Sciences, Faculty of Medical Sciences, Kingston 7, Jamaica*

Introduction: Intake of nutritional supplements causes concerns over safety and failed doping tests in athletes due the presence of unknown ingredients and deliberate or inadvertent mislabelling. Methods: Supplement usage was investigated employing a multifaceted approach incorporating: 1) questionnaires investigating supplement-taking habits administered to high school athletes; 2) screening of supplements for the presence of banned substances or undeclared substances, by liquid chromatography-tandem mass spectrometry and; 3) screening of supplements for interaction with metabolising Cytochrome P450 enzymes and their substrates to determine safety.

Results: The questionnaire indicated 31 % athletes take supplements regularly (â‰¥ once/week). Supplements included whey protein, creatine, Multimen, all plant protein powder, Forlan, Pharmaton and Nutrilite Rhodalia 110. Substances detected included caffeine, hydroxycortisone-21-butyrate, efavirenz, letrozole, hydrochlorothiazide, isoprenaline and letrozole. Supplements screened so far in in vitro assays have shown no significant impact on the activity of CYP450 enzymes.

Discussion: Many supplements contained substances not listed on the packaging. Greatest concern surrounds the presence of banned substances including anti-estrogenic letrozole, diuretic hydrochlorothiazide and Î² adrenoceptor agonist isoprenaline, results which require confirmation alongside certified analytical standards. Drug-supplement interactions do not appear to be a concern at present, although complete analysis is needed before such assertions can be confirmed.

U1. Rabies surveillance data analysis in Addis Ababa, Ethiopia, 2012/13

Fantu L. Untiso, MD, *Saint Pauls' Hospital Millennium Medical College, Department of Public Health, Addis Ababa, Ethiopia*

Background: Rabies is a highly fatal viral disease of all warm blooded animals including human globally. However, effective rabies control program still remains to be a reality and needs to be strengthened.
Objective: Reviewing of recorded data and analyzing it to generate information on the status of rabies in Addis Ababa in the year 2012/13.
Methods: A retrospective data were used from the Ethiopian Public Health Institute rabies case record book registered in the year 2012/13.
Results: Among 1357 suspected rabid animals clinically examined; only 8.84%were positive for rabies. Out of 216 animal brains investigated in the laboratory with FAT, 55.5% were confirmed rabies positive. The quarantine and clinical examination of different animals showed high percentage in animals that came from sub cities of Kolfe (15.48%) but lower numbers from Akaki-Kality (3.24%). Out of 1149 humans who came to the institute seeking anti-rabies post exposure prophylaxis, 85.65% and 7.87% of them were exposed to suspected dogs and cats respectively. 3 human deaths due to rabies were reported in the year.
Conclusion: Underestimate of rabies diagnosis and post exposure prophylaxis and fatal human cases, which could be attributed due to the absence of national rabies surveillance system. Mapping the national picture of rabies within a given time interval to launch a national rabies control strategies important. Mass immunization and control of stray dog populations is also recommended.

V1. How Food Employees Learn: The importance of employee education in protecting the public health.

Melissa Vaccaro, BSEd, MS, CP-FS, PCQI; Tara Paster, CP-FS, *PTI Consulting Group Inc., A Division of Paster Training, Inc, Gilbertsville, Pennsylvania, USA*

Does training really impact how well a foodservice facility functions? Do facilities do better on their inspections if they have a certified food manager or trained food handlers? Can you reduce the potential for a foodborne illness in your facility if you have properly trained food employees? The answer is simple: YES!

Having a Person-In-Charge (PIC) who is knowledgeable about food safety during all hours of operation guarantees there is always someone in the facility who is responsible for monitoring and managing all operations and, most importantly, is permitted to make decisions and take immediate measures should a corrective action be needed. The food industry is changing rapidly and it's important that the PIC be knowledgeable and up-to-date on code changes. But we cannot forget about our food employees. They need to be trained as well. Although a certified food manager may be knowledgeable about food safety, they may not be effective at conveying that information to employees. So, if that's the case, managers must find effective solutions to meet employee food safety training needs. We all have different learning styles. You must use various training styles to effect change in a food service worker.

With one in six Americans getting sick and 3,000 dying from foodborne illness annually, we must continue to support and encourage effective training opportunities for foodservice workers. Properly trained staff will improve food safety and reduce risks and behaviors that are associated with foodborne illness.

V2. Understanding How Controlling the 5 CDC Risk Factors will Significantly reduce incidence of Foodborne Illness

Melissa Vaccaro, BSEd, MS, CP-FS, PCQI; Tara Paster, CP-FS, *PTI Consulting Group Inc., A Division of Paster Training, Inc, Gilbertsville, Pennsylvania, USA*

"While the food supply in the United States is one of the safest in the world, the Centers for Disease Control and Prevention (CDC) estimates that each year roughly 1 in 6 Americans (or 48 million people) gets sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases." www.cdc.gov
The top five risk factors that most often are responsible for foodborne illness outbreaks are: (1) Improper hot/cold holding temperatures of potentially hazardous food; (2) Improper cooking temperatures of food; (3) Dirty and/or contaminated utensils and equipment;(4) Poor employee health and hygiene, and (5) Food from unsafe sources.
When food is being prepared by either the public in their home, or by a food facility operator, the presence of one or more of these risk factors dramatically increases the risk of a foodborne illness outbreak. If one of these risk factors is observed in a retail food facility, it constitutes a major violation and must be immediately corrected. Often the correction involves the destruction of food products to minimize the risk of foodborne illness to the public. According to the US Food and Drug Administration, controlling these Risk Factors and implementing interventions strategies will reduce the chances of a foodborne illness outbreak.

V3. An assessment of the global distribution of lead-contaminated sites in low- and middle-income countries

Mitko Voutchkov,PhD, DSc; Sandra Gualtero; Russell Dowling; Emma Krasovich. Pure Earth, New York, NY, USA

Aims: Pure Earth's (PE) Toxic Site Identification Program (TSIP) identifies and assesses polluted sites that pose a risk to global public health. Though not comprehensive, TSIP functions as a tool to improve environmental health in low- and middle-income countries (LMICs). One of many key pollutants that the TSIP database documents is lead as lead exposure can be deleterious to human health. This study aims to review the global distribution of lead documented by TSIP to depict at-risk populations.
Methods: In March 2017, data for 1,084 TSIP identified lead contaminated sites were extracted from the TSIP database and imported into STATA to review descriptive statistics.
Results: Analysis reveals the global distribution of TSIP identified lead contaminated sites as follows: 521 (48.1%) in Asia, 225 (20.8%) in Africa, 265 (24.5%) in Latin America and the Caribbean, and 73 (6.7%) in Eastern Europe and Central Asia. From available TSIP data, the top three industries contributing to global lead emissions include lead battery recycling (21.9%), lead smelting (10.6%) and mining and ore processing (7.7%). The average at-risk population per site is 13,000, with 351 (32.4%) sites having documented health effects from lead exposure. There are 21.4% sites containing two-five additional contaminants of concern.
Conclusions: These results give insight into global distribution of lead as well as populations that are at risk of detrimental health effects from exposure. The results are used by PE to prioritize limited funding to conduct additional assessment and to support site cleanup for those that have the highest risk.

V4. Assessment of heavy metal pollution and health impacts in Jamaica using portable x-ray fluorescence technology

Mitko Voutchkov,PhD, DSc; P. Ann Ricketts; Trevor Ramikie; Andre Gordon; Sanchez Palmer, *University of West Indies at Mona, Department of Physics, Kingston, Jamaica*

The health hazards associated with elevated levels of As, Hg, Cd, Cr, Pb and other toxic metals are well documented. An important source of exposure to heavy metals is diet, as crops grown in heavy metal contaminated soils may serve as an entryway for metals into the food chain. To protect human and animal health it is critical to be able to measure concentrations of heavy metals in soils using accurate, cheap and field portable instruments. Field portable X-ray fluorescence (XRF) spectrometry is an advanced technology for in-situ measurement of elemental concentrations of heavy metals and allows measurement in soils, plans and animals. This technology allows for in-situ measurements of both essential macro and micronutrients, as well as the toxic and hazardous elements in the soil-food chain. A Thermo Scientific

Niton XL3t GOLDD+ XRF analyser was used to map the concentrations of lead in Jamaican soils. Lead contamination is prevalent in Jamaica due to used lead-acid battery smelting activities. XRF was also applied for screening of nutrient levels and toxic metals of over 15 elements in the most common Jamaican foods, including ackee, banana and avocado, as well as in local chicken and fish. The portable XRF unit was also applied to human health studies of lead poisoning, such as measurements of lead, calcium and strontium concentrations in the long bones of lead poisoned children, and measurement of toxic metals in human placenta. The placenta is considered as a "dual biomarker" for maternal and fetal exposure to toxic and essential trace elements.

V5. Panel: Role of predictive toxicology, green chemistry and alternative assessments in protection of human and environmental health

Adelina Voutchkova[1]; Bryan Brooks[2]; Jakub Kostal[1;] Lauren Heine[3,4]; Joel Tickner[4]; Saskia van Bergen[4] || *[1]George Washington University, Columbian College of Arts & Sciences, Dept of Chemistry, Washington, District of Columbia., USA; [2]Baylor University, Environmental Health Science Graduate Program, Waco, TX, USA; [3]Lauren Heine Group, LLC, Spokane, WA, USA; 4 Northwest Green Chemistry, Spokane, WA, USA.*

Concern over the safety of commercial chemicals and the potential for unintended health and environmental consequences is steadily growing. While governments struggle to reform the regulation of new chemicals in order to better protect human and ecological health, communities and businesses are faced with making decisions about which materials to source, which industries to allow in their communities and which products to purchase in order to protect the health of the population. The aim of this panel is to showcase how predictive toxicology, green chemistry and alternative assessments cannot only be applied to protect health and the environment at the national level but also at the community level.

The panelists include experts in toxicology (Brooks), green chemistry (Voutchkova), predictive toxicology (Kostal), alternative assessments (Heine), business engagement in green chemistry (Tickner) and community applications of green chemistry to environmental health (van Bergen). The panelists will address both opportunities and remaining challenges that the respective fields present to protecting human health.

Toxicologists and eco-toxicologists have elucidated the range of concerns and have extended the understanding to the molecular level. While chemists are able to design chemicals with specific industrial or pharmaceutical functions, relatively little consideration is given to minimizing undesired toxicity during the design stage. Thus, the role of green chemists is to develop methodology that can be applied to designing safe commercial chemicals in a manner analogous to the design of active pharmaceuticals with precise therapeutic action. Meanwhile, the development of accurate in silico predictive tools for toxicological endpoints rests on the application of computational methods for simulating biological reactions and the molecular-level understanding of chemical fate in the body. Experts in predictive toxicology shall discuss the latest advances in predictive methods and how they can be applied by community health professionals to make informed decisions when evaluating commercial chemicals. Such decisions require not only use of predictive methods, but a systematic evaluation of a number of toxicological endpoints in the form of an "alternatives assessment" (AA). Experts in AAs shall discuss how such a systematic process can be approached by government and community organizations in order to avoid chemical substitution that results in trading off one toxicological hazard for another. Finally, the experts in working with community applications of the above disciplines and in engaging businesses to adapt a protective approach to human health shall discuss case studies and best practices based on extensive experience in these fields.

Expected outcomes include a) an appreciation of a proactive strategy in addressing concerns about chemicals in the environmental; b) comparing comprehensive chemical toxicological hazard and c) translating the practices of green chemistry and predictive toxicology to the community level. It is only through this multifaceted approach that we can make any progress towards minimizing the toxic commercial chemicals that communities and ecosystems are exposed to.

W1. Capacity building in food safety – an opportunity for Jamaican public health inspector in Changzhou, China

Wayne Watkis, BSc, ASc., Dip. MoF, Patrick Dehaney, Rupert Stephens, *Veterinary Public Health Inspectors, Ministry of Health, Northeast Regional Health Authority, St. Ann Health Department, Jamaica*

Introduction: (1) Providing technical training support for developing countries is actively pursued by Chinese Government. (2) One of humanity's most fundamental relationships is with what we eat; as such food safety is always one of the common global priorities of China. (3) Public Health Inspectors from Jamaica participated on a food safety training programme in Changzhou, China from April 10 to April 30, 2017.

Goals: The goals were to: (1) Strengthen global and local systems to mitigate risks associated with the food and trade; (2) Foster a traditional friendship, cooperation as well as economy and trade between countries; (3) Provide better understanding about China, its people and its culture; (4) Accelerate human development, economic and social progress in the countries through the training and developmental activities.

Content and Methodologies: Participants were exposed to a wide range of technical areas on issues concerning the trade of foods and food safety. Methodologies included lectures, discussions, field trips and other approaches. Some of the contents explored were: (1) Introduction to China and Chinese culture; (2) Food safety controls and systems in China; (3) Food inspection and quarantine measures, and (4) Local and international; trade agreements, standards, protocols and regulations.

Exchange Opportunities: Participants interacted with local officials and entrepreneurs to share with information about the food trade and safety in Jamaican, the economic situation, trade policies and future needs for bilateral economic cooperation.

Conclusion: (1) It was a very successful, worthwhile and beneficial training opportunity; (2) China is way ahead of Jamaica and several counties with regard to food Safety management systems.

Recommendations: (1) Future training and developmental opportunities to be explored; (2) Some of the programmes and technologies be adopted in Jamaica;

(3) That the relationship between the Chinese government and Jamaican government be maintained in an effort to sustain opportunities such as this. The People's Republic of China has demonstrated its willingness to assist developing countries in this regard.

W2. Performance management - how the use of soft skills leads to hard results

Debra E Williams CGAP, CFE, *City of Toronto Public Health, Performance and Standards, Toronto, Ontario, Canada*

Performance Management includes methods and tools to enable best practices for organizations to achieve measurable outcomes. But before indicators and logic models can be developed, the culture of an organization needs to be assessed. Often, the real work to promote and improve efficiency and employee effectiveness starts with an environmental scan, including active listening and discovery sessions to understand existing routines and attitudes. This may be essential in order to influence behaviour. Our conversation will discuss the first steps of what will be eventually be a continuous process, for management and employees to work together to plan, implement and monitor objectives, goals and shared outcomes for their organization.

W3. Innovative on site wastewater management

James M. Wood, M Env St; Grad Dip (Tech Man); Dip App Sc (EH); PhD enrolled; *University of Tasmania, Hobart, Tasmania, Australia*

Innovative and sustainable on site wastewater management is often constrained by lack of evidence of the effectiveness of such systems. Examples include raised beds, reed beds, sand filters or vermi-culture in composting systems that need evidence to demonstrate their viability or otherwise. The challenges facing regulators and alternative system approval processes are the very limited published 'in-use' performance data. Additional challenges include Australian Standard wastewater flow design requirements compared to very 'eco' and water conscious house occupants. This paper aims to demonstrate such evidence by analysis of various in-situ systems that are operating in Tasmania. The paper will describe each system including their design and installation and provide data to demonstrate their performance. The social acceptance and myths surrounding such innovative systems is also discussed.

Z1. The HARVEST Initiative, determining food safety from farm to table in Northeast Georgia, USA

Anne Marie Zimeri, PhD; *University of Georgia, College of Public Health, Department of Environmental Health Sciences, Global Health Institute, Athens, Georgia, USA*

The HARVEST Initiative (Healthy, Affordable, Renewable Variety: Enabling Sustainable Trade) is a program in Northeast Georgia with social and physical science components as well as outreach and education. Four organic farms that supply a local farmers' market were examined for irrigation water, compost, and soil contaminants. These components were tested for seventeen chlorinated pesticides and forty heavy metals. Many of these components were found on farms, some of which have been certified organic for more than a decade. In addition produce from the farmers' market was examined and compared to organic and conventional produce from three national chain grocery stores for the same contaminants. An undergraduate education program was developed so that undergraduate researchers could perform the research for these determinants. Outreach was developed in collaboration with Live Forward, a local organization that supports those affected by HIV, to encourage more vegetable consumption and to teach them culturally sensitive dishes that could be prepared from farmers' market foods. This One Health approach will also include the microbial ecology of animal waste fertilizers verses veganic farming in the future to determine health risks associated with pathogenic and antibiotic resistant bacteria on produce in the future. As more consumers turn to farmers' market food in the future, the safety of those foods must be determined to protect public health.

Z2. **IFEH Roy Emerson Student Presentation Award** Is knowledge of international travel health a legal obligation or a social and personal responsibility?

Zarja Zrinski, Roy Emerson Student Award Winner, *University of Ljubljana, Ljubljana, Slovenia*

The prestigious Roy Emerson Award is intended for undergraduate students in the field of environmental health. The award is based on an essay competition where the topic is defined by the IFEH. The award is presented at IFEH World Academic Conferences. Roy Emerson was the Inaugural President of IFEH, 1986 - 1988. The naming of this prestigious award has been given in honour of Roy Emerson who passed on 27 December 2010. The IFEH Roy Emerson Award for 2017 is kindly sponsored by **Highfield ABC** and **RIAMS**. The Federation thanks and recognizes Highfield ABC and RIAMS for their generous support that enabled student travel to Montego Bay. The theme of the 2000-3000 word essay competition for this year was "international travel and health". A panel of judges chaired by the IFEH President Peter Archer reviewed the Essays and Presentations and selected the Award Winner for the Roy Emerson Award 2017

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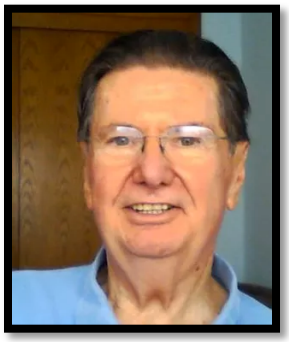

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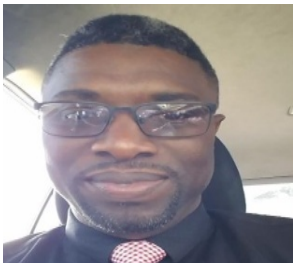

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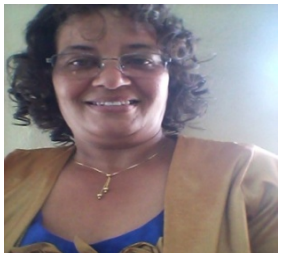

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